7.8 Results of Public Consultation -2 (Discussion on the Results of SEA)

In the process of evaluating the development options, two stakeholder meetings were held in order to inform the results and discuss further studies and considerations.

Since the project site is in the process of being selected, it didn't seem appropriate to invite local inhabitants from each candidate site. Instead of inviting local inhabitants, local governments and fishermen's cooperatives around the selected project sites (Cilamaya and Kalibaru) were consulted respectively after the meetings.

7.8.1 Consultation for Preliminary Results

The second stakeholder meeting was held on January 13th, 2011. The objectives of the meeting were to inform the preliminary results of SEA to related organizations. Participants are listed in Table 7.8-1.

In the meeting, JICA Study Team presented the preliminary evaluation results of the three development options and reported that option-2 is to be selected. Although it was confirmed that further assessment and consideration would be required for rice field protection, coral reef conservation and fishery, no opposition was raised for the development of Cilamaya. The participants shared information on the development plan through the question and answer session.

Table 7.8-1 Participants of the Stakeholder Meeting for Preliminary Results (Jan.2011)

Category (Number of Participants)	Organization
Central Government (3)	− DGST, Ministry of Transportation − Ministry of Environment
Local Governments (13)	− Bappeda (Regional Development Planning Board), DKI Jakarta − Bappeda (Regional Development Planning Board), Kab. Bekasi − Bappeda (Regional Development Planning Board), Kab. Karawang − Bappeda (Regional Development Planning Board), Kab. Tangerang − BPLHD (Environmental Management Agency), DKI Jakarta − BPLHD (Environmental Management Agency), West Java Province − BKSP Jabodetabekjur (Development Cooperation Agency of Jakarta, Bogor, Depok, Tangerang, Bekasi and Cianjur) − Bappeko (Regional Development Planning Board), North Jakarta City
Port authorities/ developer/ operator (9)	− PT.(Persero) Pelabuhan Indonesia II − Port Authority of Tanjung Priok − Port Authority of Marunda − Syahbandar Tanjung Priok

Source: JICA Study Team

7.8.2 Consultation for Final Results

The third stakeholder meeting was held on the 19th in May 2011 in order to confirm the final results of SEA and discuss further studies and considerations needed in the next study phase. It was confirmed that the option-2 was selected as the results of SEA. For the alternatives of North Kalibaru Phase I project, it was presented that alternative-2 was to be selected by DGST to minimize environmental and social impacts.

Participants of the meeting are listed in Table 7.8-1. Apart from the stakeholder meeting, JICA Study Team visited the local governments and fishermen's cooperatives around the selected sites (Table 7.8-3) to consult with them about the development plan, since they will be affected directly by the development.

Through the meeting and the individual consultations, the port development plan was disseminated among the stakeholders. Toward the next study phase, requests and suggestions were made as shown in Table 7.8-4 in terms of the environmental and social considerations.

Table 7.8-2 Participants of the Stakeholder Meeting for Final Results (May 2011)

Category (Number of Participants)	Organization
Central Government (5)	− DGST, Ministry of Transportation − Planning Bureau, Ministry of Transportation − Ministry of Environment
Local Governments (25)	− Bappeda (Regional Development Planning Board), DKI Jakarta − Bappeda (Regional Development Planning Board), Banten Province − Bappeda (Regional Development Planning Board), Kab. Bekasi − Bappeda (Regional Development Planning Board), Kab. Karawang − Bappeda (Regional Development Planning Board), Kab. Tangerang − Bappeko (Regional Development Planning Board), North Jakarta City − BPLHD (Environmental Management Agency), DKI Jakarta − BKSP Jabodetabekjur (Development Cooperation Agency of Jakarta, Bogor, Depok, Tangerang, Bekasi and Cianjur) − Dinas (Official Agency) of Fishery and Marine, DKI Jakarta − Suku Dinas (Official Agency) of Fishery and Marine, North Jakarta City − Suku Dinas (Official Agency) of Fishery and Marine, Kab. Karawang − Dinas (Official Agency) of Transportation, DKI Jakarta − Dinas (Official Agency) of Transportation, West Java Province − Suku Dinas (Official Agency) of Transportation, North Jakarta City − Kecamatan (Sub-district) Tempuran, Kab. Karawang − BKPP (Development Coordination Agency) of Area II Purwakarta, West Java Province
Associations (7)	− HNSI (Indonesian Fishery Community) − APBMI (Indonesian Cargo Handling Companies Association) − GPEI (Association of Indonesian Exporter) − GAFEKSI (Association of Indonesian Forwarder)
Port authorities/ operators (7)	− Port Authority of Tanjung Priok − Operational Unit of Marunda − Administrator of Tanjung Priok − Administrator of Sunda Kelapa
NGO (1)	− WALHI (Wahana Lingkungan Hidup)
Academician (2)	− University of Indonesia − Oceanographic Research Center, LIPI

Source: JICA Study Team

Table 7.8-3 Consulted Local Governments and Fishermen's Cooperatives (May 2011)

Relevant Project Site	Organization
Kalibaru	Suku Dinas (Official Agency) of Fishery and Marine, North Jakarta City Suku Dinas (Official Agency) of Transportation, North Jakarta City Kecamatan (Sub-district) Cilincing Kelurahan (Village) Kalibaru Fishermen's cooperatives of Kalibaru, Cilincing and Marunda
Cilamaya	Suku Dinas (Official Agency) of Fishery and Marine, Kab. Karawang Kecamatan (Sub-district) Tempuran Kelurahan (Village) Tanjungjaya Fishermen's cooperatives of Ciparage

Source: JICA Study Team

Table 7.8-4 Requests and Suggestions from the Stakeholders

Project	Requests and Recommendations from the Stakeholders	Draft Policies dealing with the Stakeholders' Requests and Recommendations
Phase I at North Kalibaru	− Dumping area of the dredged material should be decided and controlled appropriately considering impacts on fishing ground. (Fishermen's cooperatives and North Jakarta City)	Although the current dumping area has been moved to the offshore with less impact on fishing ground, suitable management shall be ensured in the implementation stage.
	− Impacts on the existing road traffic by the new access road need to be assessed. (North Jakarta City)	(Impacts were assessed as shown in Table 7.9-2.)
	− Comprehensive assessment and management of the coastal area is required. (WALHI and DKI Jakarta)	Local government shall consider the request in their Spatial Planning.
	− It is expected that the project will contribute to improving sanitation and water supply condition of this area as well as decreasing unemployment. (Cilincing Sub-district)	-
Phase II and III at Cilamaya	(Rice field conservancy) − Flyover needs to be considered as one of the options for the access road structure. (Kabupaten Karawang and Sub-district Tempuran)	The possibility of flyover shall be considered in the Feasibility Study phase.
	(Coral reef conservation) − Detailed survey of the coral reef is indispensable for assessing the impact. (LIPI, Kabupaten Karawang and others) − Water pollution from vessels needs to be considered (LIPI and University of Indonesia)	Detailed survey shall be conducted in EIA study. Water pollution shall be assessed carefully in EIA study.

	(Impact on Fishery) − The access bridge connecting with the terminal needs to be designed for fishing boats to be able to pass through. (Fishermen's cooperatives and Sub-district Tempuran)	The request shall be considered in designing stage.
	− Restricted area for fishery needs to be minimized. (Fishermen's cooperatives)	Restricted area will be limited to the navigation channel.
	− Impacts on fishpond need to be considered. Especially, coordination is required with ADB project that has been conducted around the project area for supporting fishpond production. (Kabupaten Karawang, Sub-district Tempuran and Village Tanjungjaya)	Impacts on fishpond shall be assessed carefully in EIA study.
	− Corporative Social Responsibility (CSR) program needs to be considered for local society prosperity, such as providing education opportunities and funding for large size fishing boats. (Fishermen's cooperatives, HNSI and Kabupaten Karawang)	Possibility of CSR program shall be discussed in the Feasibility Study phase.
	− Detailed impact assessment on fishery is required. (LIPI and others)	Impact on fishery shall be assessed in EIA study.
	(Others) − Elevated access road (e.g. flyover) is required since some areas are suffering from flood. (Kabupaten Karawang)	The possibility of flyover shall be considered in the Feasibility Study phase.
	− Sea level rising due to global warming needs to be considered for designing. (University of Indonesia)	Height of the port structure shall be designed considering sea level rising.
	− Coordination with oil drilling activities and relevant facilities such as pipelines needs to be assured for the detailed design. (Kabupaten Karawang)	Coordination with the relevant organizations shall be ensured for the detailed design.

Source: JICA Study Team

7.9 Impact Matrix and Mitigation Measures for Selected Plans

Towards implementation of the selected plans, Impact Matrix was developed in IEE (Initial Environmental Examination) level to extract necessary mitigation and further environmental studies for each of the Phase I project at North Kalibaru and Phase II & III at Cilamaya.

7.9.1 Phase I at North Kalibaru

(1) Impact Matrix

Impact matrix for Phase I at North Kalibaru is shown in Table 7.9-1. Although alternative-1 was recommended in March 2011 by the Study Team, it has been judged that there are no decisive differences affecting the selection between Alternative-1 and Alternative-2 in scores as shown in Chapter 4. DGST preferred Alternative-2, and intended to present that alternative

at the stakeholder meeting held in may 2011. Thus, upon the request of DGST, the impact has been assessed for alternative-2. The result is shown in this section below.

Table 7.9-1 Impact Matrix for Phase I at North Kalibaru

No	Likely Impacts	Overall Rating	Planning Phase	Construction Phase						Operation Phase			
			Land acquisition	Dredging of channel and basin	Demolition and construction of breakwater	Reclamation	Construction of terminal buildings	Construction of access bridge and road	Operation of construction equipment and vehicles	Arrival & departure of ship	Operation of port facilities	Increase of road traffic volume	Appearance/ occupancy of building structure
Social Environment													
1	Involuntary Resettlement												
2	Local economy such as employment and livelihood, etc.	**C**		C	C	C		C		C			
3	Land use and utilization of local resources												
4	Social institutions such as social infrastructure and local decision-making institutions												
5	Existing social infrastructures and services												
6	The poor, indigenous and ethnic people												
7	Misdistribution of benefit and damage												
8	Cultural heritage												
9	Local conflict of interests												
10	Water Usage or Water Rights and Rights of Common												
11	Sanitation	**B**		B	B	B	B	B	B		B		
12	Hazards (Risk), Infectious diseases such as HIV/AIDS	**B**		B	B	B	B	B	B				
Natural Environment													
13	Topography and Geographical features	**C**				C							
14	Soil Erosion												
15	Groundwater												
16	Hydrological Situation												
17	Coastal Zone (mangroves, coral reefs, tidal flats, etc.)												
18	Flora, Fauna and Biodiversity	**C**		C	C	C		C					
19	Meteorology												
20	Landscape												
21	Global Warming												
Pollution													
22	Air Pollution	**B**							B	B		B	
23	Water Pollution	**B**		B	B	B		B		B			
24	Soil Contamination												
25	Waste	**B**		B									
26	Noise and Vibration	**B**							B	B		B	
27	Ground Subsidence												
28	Offensive Odor												
29	Bottom sediment												

30	Accidents	**B**		B	B	B	B	B	B	B	B	B	

Rating:
A: Significant impact is expected.
B: Some impact is expected.
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses)
No mark: No Impact is expected.
Source: JICA Study Team

1) Social Environment

Involuntary resettlement (No.1): -

The selected layout plan, alternative-2, does not require involuntary resettlement.

Local economy such as employment and livelihood, etc. (No.2): C

The water area adjacent to the project area is used for fishery as described in Figure 7.7-9. However, the selected plan, alternative-2, will neither obstruct the navigation of the fishing boats nor eliminate the fishing ground.

Although there are no fishing activities within the project area, there is a possibility that the fish resources may be affected by likely environmental change such as water quality change.

Land use and utilization of local resources (No.3): -

Land use alteration will not be required since the project area is located in the existing port area.

Social institutions such as social infrastructure and local decision-making institutions (No.4): -

No impact is expected.

Existing social infrastructures and services (No.5):-

The new access road will connect to the existing road, Jl. Cilincing Raya. In order to assess the impacts on the existing road traffic caused by the new access road, traffic volume was projected and compared with the capacity of Jl. Cilincing Raya. As shown in Table 7.9-2, traffic volume in 2014 including additional traffic from the new terminal will be smaller than the capacity of Jl. Cilincing; the result means that the impact on the existing road traffic will be small enough.

Table 7.9-2 Traffic volume of Ground Level Road of Jl. Cilincing Raya at 2010 and 2014

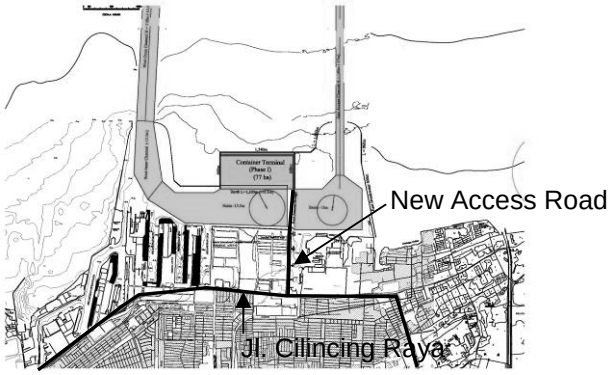
	Existing Road Capacity (Jl.Cilincing Raya)	Traffic volume (PCU/day)		
		Total	Others	Kalibaru Phase I
2010	120,000	70,600	70,600	-
2014	80,000*	42,100	21,500	20,600

(Assumed Conditions for the Verification)

Road capacity of Jl.Cilincing Raya	120,000 PCU/day (6 lanes) (Ground level road) in 2010 80,000 PCU/day (4 lanes*) (Ground level road) in 2014
Current Traffic volume of Jl.Cilincing Raya	70,600 pcu/day from traffic survey on Jun 2010

Traffic growth rate	5% per year
Opening year of new Terminal at Kalibaru	2014
Opening year of TgPA (Toll Road)*	2014
Percentage of Shift to TgPA from the existing ground level road	75% of traffic volume (Based on the Traffic Survey in 2010)

* After TgPA (Toll Road, flyover) is opened in 2014, number of lanes of the existing Jl. Cilincing Raya at ground level will be decreased to 4 lanes.



The poor, indigenous and ethnic people (No.6): -

The east of the project area, Kelurahan Kalibaru, Kecamatan Cilincing is known as the poorest Kelurahan in Jakarta Province with 85 percent of the households living below the poverty line (Pos Kota, 25/10/2010). However, the selected plan, alternative-2, will minimize the impacts on those people, since the location of the terminal and the access road is outside of the congested residential area of Kalibaru.

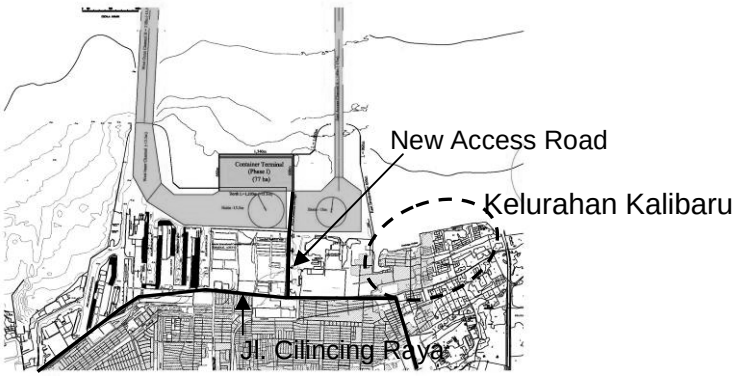


Figure 7.9-1 Location of Kelurahan Kalibaru

Misdistribution of benefit and damage (No.7): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Cultural heritage (No.8): -

No cultural heritage exists in the project area.

Local conflict of interests (No.9): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Water usage or water rights and rights of common (No.10): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Sanitation (No.11): B

Since there will be a large influx construction workers, increase of waste and wastewater will deteriorate the sanitary condition in the area. Therefore, proper measures to treat the waste and wastewater are required.

Hazard (Risk) and infectious diseases such as HIV/AIDS (No.12): B

Because of the inflow of construction labor, risk of infectious diseases will increase.

2) Natural Environment

Topography and geographical features (No.13): C

For the reclamation, large amount of sand with the volume of more than three million cubic meters needs to be procured from the mountain area; it may change the topography of the mountain. However, the sand is planned to be collected from an existing quarry; therefore, impact on the natural environment will be minimized although confirmation is required when the details of the sand procurement plan are developed.

Soil erosion (No.14): -

No impact is expected.

Groundwater (No.15): -

No impact is expected.

Hydrological situation (No.16): -

The water exchange between inside and outside of the port basin will be secured after the reclamation because two openings of the breakwater will be secured and the location of the terminal is outside of the breakwater.

Coastal zone (mangroves, coral reefs, tidal flats, etc.) (No.17): -

There are no mangroves, coral reefs and tidal flats in and adjacent to the project site.

Flora, fauna and biodiversity (No.18): C

Although no rare species have been reported around the project area, fish and benthic species living in/around the project area will be affected by elimination of their habitat and the change of habitat condition caused by the reclamation. Therefore, inventory of the species in/around the project area needs to be developed to assess the impact.

Meteorology (No.19): -

No impact is expected.

Landscape (No.20): -

There are no special landscapes to be considered around the project area.

Global warming (No.21): -

Increase of port cargo may lead to increased discharges of Greenhouse Gas (GHG) from vessels. However, the amount of cargo will increase in accordance with the economic growth of Indonesia regardless of the development of the new terminal.

3) Pollution

Air pollution (No.22): B

Volume of air pollutant will increase due to the construction works and the traffic increase. The extent of the impact needs to be assessed in the EIA study.

Water pollution (No.23): B

In the construction phase, turbid water will be generated by construction works at sea such as dredging and reclamation. Since the project area is adjacent to the fishing ground, construction method needs to be selected considering minimization of the turbidity generation.

In the operation phase, waste water from vessels may cause water pollution. Indonesia has not ratified MARPOL 73/78 IV; however, proper management of discharge needs to be considered. Likewise, it is desirable to consider that ballast water could introduce alien species and damage the eco-system although Indonesia has not ratified Ballast Water Convention. .

Soil contamination (No.24): -

No impact is expected.

Waste (No.25): B

Over 20 million cubic meters of seabed materials will be dredged to construct a navigation channel and basins. The dredged material is basically planned to be disposed offshore adjacent to Jakarta Bay; however, relatively high levels of mercury and lead concentration were reported in the seabed materials by the previous survey in 2002. Although Indonesia does not have certain guideline and criteria for ocean dumping, proper measures need to be considered based on the detailed survey in EIA study in light of marine environmental conservation around the dumping site.

In addition, it is reported that the dredged materials generated from maintenance dredging are sometimes dumped outside of the appointed dumping area. As the coastal area of Jakarta Bay is used for fishery, proper management is required for dumping as well as selecting proper dumping site so as not to disturb fishing activities.

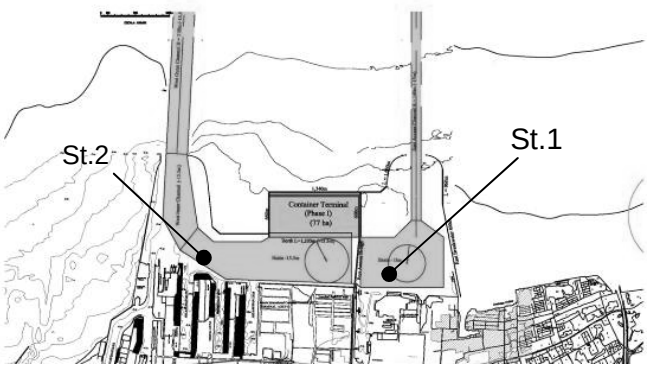
Table 7.9-3 Content of Heavy Metals in Seabed Materials

(Unit: mg/kg)

	Survey Results in 2002[1)]		(Reference) Guideline for Ocean Dumping in Australia[2)]	
	St.1	St.2	Screening Level	Maximum Level
Mercury	0.73	0.68	0.15	1
Arsenic	<0.5	<0.5	20##	70
Lead	47	69	50	220
Chromium	13	13	80	370
Cadmium	<0.5	<0.5	1.5	10

Source: 1) The Study for Development of Greater Jakarta Metropolitan Ports, JICA Study, 2003
2) National Ocean Disposal Guidelines for Dredged Material, Commonwealth of Australia, Canberra, 2002

(Site Location)



Noise and vibration (No.26): B

Noise will increase due to the construction works and the traffic increase. The extent of the impact needs to be assessed in EIA study.

Ground subsidence (No.27): -

No impact is expected.

Offensive odor (No.28): -

No impact is expected.

Bottom sediment (No.29): -

No impact is expected.

Accidents (No.30): -

Risk of accident is considerable for construction works, navigation of vessels and road traffic. Proper management is required to reduce the risk.

(2) Suggested Mitigation Measures for Key Impacts

Based on the possible impacts, suggested mitigation measures and further studies in the next stage are summarized in Table 7.9-4.

Table 7.9-4 Suggested Mitigation Measures and Recommended Further Studies (North Kalibaru Phase I)

No.	Items	Rating	Likely Impacts	Suggested Mitigation Measures	Recommended Further Studies (e.g. in EIA)
Social Environment					
2	Local economy such as employment and livelihood, etc.	C	Fish resources may be affected by likely environmental change such as water quality change.	Construction and Operation phase: To prevent negative environmental change such as turbidity generation and waste water discharge from vessels.	To assess the impact on fish resources.
11	Sanitation	B	Waste and waste water will increase due to inflowing workers.	Construction and Operation phase: To prepare sufficient capacity of treatment facilities and develop proper management plan.	To collect base line data about the social condition around the project area.
12	Hazards (Risk),	B	Inflow of construction labor	Construction phase: To educate workers to prevent	

	Infectious diseases such as HIV/AIDS		will increase risk of infectious diseases.	the spread of infectious diseases.	
Natural Environment					
13	Topography and Geographical features	C	Procurement of mountain sand for reclamation may impact the environment of the mountain area.	Construction phase: To procure the sand from an existing quarry. Tentatively, existing quarries in South Sumatra, which have enough sand volume, are planned as the source of the sand.	To confirm that the procurement of mountain sand does not affect the environment around the quarry.
18	Flora, Fauna and Biodiversity	C	Marine species in/around the project site will be affected by the project.	Planning phase: To consider relocation of important species if they are found.	To develop inventory of the species living in/around the project area.
Pollution					
22	Air Pollution	B	Volume of air pollutant will increase due to the construction works and the traffic increase.	Construction and Operation phase: To control operation of heavy equipments and vehicles to reduce the emission.	To measure the current air pollutant level to assess the impact and develop management plan.
23	Water Pollution	B	Turbid water will be generated by construction works at sea. Waste water from vessels may cause water pollution.	Construction phase: To select construction method with little turbidity generation; for example, using suction dredger rather than grab dredger or spreading silt screen and fence. To monitor the turbidity to control the generation. Operation phase: To control the waste water discharge from vessels.	To measure the current turbidity to assess the impact and develop management plan.
25	Waste	B	Dredged materials will be generated. The dredged materials may content heavy metals with high concentration.	Construction phase: To utilize the polluted materials for the reclamation instead of disposing offshore if high concentration of heavy metals is detected through the survey for EIA. In the case of utilization for the reclamation, measures to prevent leaking of the materials needs be considered. To appoint proper dumping site not to disturb fishing activities as well as to control the dumping activities.	To examine current concentration and horizontal distribution of heavy metals in the planned dredging area in order to determine the necessity of the mitigation measures and the area that needs the measures.
26	Noise and Vibration	B	Noise will increase due to the construction works and the traffic increase.	Construction and Operation phase: To control operation of heavy equipments and vehicles to reduce the noise and vibration; for example, to restrict construction works at night time.	To measure the current noise level to assess the impact and develop management plan.
30	Accident	B	Risk of accident is considerable for construction works, navigation of vessels and road traffic.	Construction phase: To develop a safety control plan for the construction works. Operation phase: To secure the safety control in/around the port area.	To list the possible accidents and assess the risks.

Rating:

A: Significant impact is expected
B: Some impact is expected
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses
Source: JICA Study Team

7.9.2 Phase II & III at Chilamaya

(1) Impact Matrix

Impact matrix for Phase II & III at Cilamaya is shown inTable 7.9-5.

Table 7.9-5 Impact Matrix for Phase II & III at Cilamaya

No	Likely Impacts	Overall Rating	Planning Phase		Construction Phase						Operation Phase			
			Land acquisition	Arrangement of water area use	Dredging of channel and basin	Construction of breakwater	Reclamation	Construction of terminal buildings	Construction of access bridge and road	Operation of construction equipment and vehicles	Arrival & departure of ship	Operation of port facilities	Increase of road traffic volume	Appearance/ occupancy of building structure
Social Environment														
1	Involuntary Resettlement	**A**	A											
2	Local economy such as employment and livelihood, etc. (Fishery)	**B**		B										
3	Land use and utilization of local resources	**B**	B											B
4	Social institutions such as social infrastructure and local decision-making institutions													
5	Existing social infrastructures and services	**B**	B											
6	The poor, indigenous and ethnic people													
7	Misdistribution of benefit and damage													
8	Cultural heritage													
9	Local conflict of interests													
10	Water Usage or Water Rights and Rights of Common													
11	Sanitation	**B**			B	B	B	B	B	B		B		
12	Hazards (Risk), Infectious diseases such as HIV/AIDS	**B**			B	B	B	B	B	B				
Natural Environment														
13	Topography and Geographical features	**C**					C							
14	Soil Erosion													
15	Groundwater													

16	Hydrological Situation	**C**				C	C							
17	Coastal Zone (mangroves, coral reefs, tidal flats, etc.)	**C**			C	C	C		C		C			
18	Flora, Fauna and Biodiversity	**C**			C	C	C		C		C			
19	Meteorology													
20	Landscape													
21	Global Warming													
Pollution														
22	Air Pollution	**B**								B	B		B	
23	Water Pollution	**B**			B	B	B		B		B			
24	Soil Contamination													
25	Waste	**B**			B									
26	Noise and Vibration	**B**								B	B		B	
27	Ground Subsidence													
28	Offensive Odor													
29	Bottom sediment													
30	Accidents	**B**			B	B	B	B	B	B	B	B	B	

Rating:
A: Significant impact is expected.
B: Some impact is expected.
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses)
No mark: No Impact is expected.
Source: JICA Study Team

1) Social Environment

Involuntary resettlement (No.1): A

An access road of about 30 km in length will be newly constructed to connect the terminal with the existing toll road (Cikampek Toll Road). Along the route alignments, residential houses and the other buildings need to be relocated to vacate the land for the road. Although the exact routes have not been decided, the number of buildings to be resettled is roughly estimated as about 170.

Local economy such as employment and livelihood, etc. (No.2): B

Around the planned new terminal, water area has been used for fishery by local fishermen as shown in Figure 7.7-10. The fishing activities will be affected by appearance of the new terminal because the terminal will eliminate part of the fishing grounds and become an obstacle to fishing boats.

For minimizing the impact, it is necessary to design the access bridge so that it does not hinder the navigation of fishing boats, since the boats based in Ciparage need to pass through the terminal area to reach the fishing ground to the west.

Land use and utilization of local resources (No.3): B

Land use alteration for the access road and the railway is required. In particular, a large portion of the area along the alignments has been used as rice field with irrigation. The estimated area of the rice field to be altered to the access road and the railway is about 70 ha and 40 ha, respectively. Furthermore, it is feared that the area along the access road might be developed in a disorderly fashion if the road is opened to the public. According to the Law No.41/2009 on sustainable food protection of agricultural land, if agricultural land designated in the spatial plan needs to be converted to the other land use for public interest, at least three times of the original area is required to be prepared with irrigation in addition to compensation for farmers.

Coastal area around the planned terminal has been used as fishpond. Although the terminal itself will be constructed offshore and does not eliminate the fishpond directly, the existing fishpond might be converted to the other land use related to the terminal activities.

Social institutions such as social infrastructure and local decision-making institutions (No.4): -

No impact is expected.

Existing social infrastructures and services (No.5): B

As described in the section 7.7 (7), the new access road will interrupt the existing road traffic and split communities. It is necessary to design the detailed route alignment to minimize the impact as much as possible.

The poor, indigenous and ethnic people (No.6): -

As far as the site observation during this study, no communities that seem to be poor were found.

Misdistribution of benefit and damage (No.7): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Cultural heritage (No.8): -

No cultural heritage exists in the project area.

Local conflict of interests (No.9): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Water usage or water rights and rights of common (No.10): -

No factors which may cause impacts have been found through consultations with relevant organizations and local governments.

Sanitation (No.11): B

Since there will be an influx of construction workers, increase of waste and wastewater will deteriorate the sanitary condition in the area. Therefore, proper measures to treat the waste and wastewater are required.

Hazard (Risk) and infectious diseases such as HIV/AIDS (No.12): B

Because of the inflow of construction labor, risk of infectious diseases will increase.

2) Natural Environment

Topography and geographical features (No.13): C

For the reclamation, about 30 million cubic meters of sand needs to be procured from the mountain area; it may change the topography of the mountain. As of this moment, the sand is planned to be collected from an existing quarry; therefore, impact to the natural environment is not predicted although confirmation is required when the detail of the sand procurement plan is developed.

Soil erosion (No.14): -

No impact is expected.

Groundwater (No.15): -

No impact is expected.

Hydrological situation (No.16): C

Surface water current around the project site caused by wind and tide will be changed by appearance of the terminal. However, the degree of the change will be small because the surface

current in the Java Sea is originally very weak, 0.4-0.6 m/sec in average and 1 m/sec at the maximum as described in Chapter 3.

Longshore current caused by wave in the shallower area is also weak, since wave condition in the Java Sea is in calm condition; 68.5% of the deepwater wave is hindcasted as calm (see Chapter 3). However, the longshore current is contributing to shoreline morphology in general by bringing sediment and causing erosion. Although the terminal is planned to be apart from the existing shoreline with the distance of 800 m to reduce the impact caused by hindering the longshore current, it may still affect the current and cause shoreline change. Since dominant wave direction is west according to the hindcasting (Chapter 3), sedimentation could occur at the shoreline at the western side of the terminal while erosion is possible on the other side; however, the extent of the change is unknown.

Coastal zone (mangroves, coral reefs, tidal flats, etc.) (No.17): C

There are coral reefs 2-14 km east of the project site. Although the project does not affect the reefs directly, consideration is still required based on the detailed survey in EIA Study. According to the coral expert in the Indonesian Institute of Sciences Research Center for Oceanography (LIPI), following potential impacts need to be considered.

- Turbidity during construction works,
- Waste water from vessels, and
- Sedimentation caused by the current change due to appearance of the terminal.
- Alien species brought by the ballast water.

Department of Fishery and Marine of Kabupaten Karawan have been working for conservation of the coral reef in collaboration with the local community associated with local fishermen. This type of cooperation is good for effectively managing the coral reef.

In addition, the coastal area is a gently shelving shallow beach, of which upper area corresponds to a tidal flat. As described above, sediment accumulation or erosion may be caused by the current change; therefore, the condition of the tidal flat could be affected.

Flora, fauna and biodiversity (No.18): C

Although the existing information on flora and fauna is limited, no rear species has been reported around the project area. However, fish and benthic species living in/around the project area will be affected by elimination of their habitat and the change of habitat condition; hence, inventory of the species in/around the project area needs to be developed to assess the impact.

Meteorology (No.19): -

No impact is expected.

Landscape (No.20): -

There are no special landscapes to be considered around the project area.

Global warming (No.21): -

Increase of port cargo may lead to increased discharges of Greenhouse Gas (GHG) from vessels. However, the amount of cargo will increase in accordance with economic growth of Indonesia regardless of the development of the new terminal.

3) Pollution

Air pollution (No.22): B

Volume of air pollutant will increase due to the construction works and the traffic increase. The extent of the impact needs to be assessed in EIA study.

Water pollution (No.23): B

In the construction phase, turbid water will be generated by construction works at sea such as dredging and reclamation. Since the project area is adjacent to the coral reefs and the fishing ground, construction method needs to be selected considering minimization of the turbidity generation.

During the operation phase, waste water from vessels may cause water pollution. Although Indonesia has not ratified MARPOL 73/78 IV, proper management of discharge needs to be considered.

Soil contamination (No.24): -

No impact is expected.

Waste (No.25): B

Large volume of seabed materials will be dredged to construct a navigation channel and basins. The dredged material is planned to be disposed offshore of the project site.

Noise and vibration (No.26): B

Noise and vibration will increase due to the construction works and the traffic increase. The extent of the impact needs to be assessed in EIA study.

Ground subsidence (No.27): -

No impact is expected.

Offensive odor (No.28): -

No impact is expected.

Bottom sediment (No.29): -

No impact is expected.

Accidents (No.30): -

Risk of accident is considerable for construction works, navigation of vessels and road traffic. Proper management is required to reduce the risk.

(2) Suggested Mitigation Measures for Key Impacts

Based on the possible impacts, suggested mitigation measures and further studies in the next stage are summarized in Table 7.9-6.

Table 7.9-6 Suggested Mitigation Measures and Recommended Further Studies (Cilamaya)

No.	Items	Rating	Likely Impacts	Suggested Mitigation Measures	Recommended Further Studies (e.g. in EIA)
Social Environment					
1	Involuntary resettlement	A	About 170 buildings need to be relocated for the access road.	Planning phase: To design the detailed route alignment of the road to reduce the number of buildings to be relocated. To obtain agreements of the communities and develop resettlement plan that includes proper compensation.	Census survey of the people and the buildings to be resettled. To reassess the number of buildings to be relocated and affected people based on the detailed route alignment.
2	Local economy such as	B	Fishing activities will be affected by appearance of the	Planning phase: To design the access bridge connecting with the terminal so as not to	To conduct detail survey of the fishing activities to assess the

	employment and livelihood, etc.		new terminal.	hinder the navigation of fishing boats. To coordinate with the fishing activities and consider proper compensation.	impact.
3	Land use and utilization of local resources	B	About 72 ha of rice field will be converted to the access road. Fishpond at the coastal area may be converted to the land use related to the terminal activities.	Planning phase: To design the detailed route alignment of the road to reduce the area of rice field to be converted. To acquire the rice field properly in accordance with the relevant law and regulations (e.g. Law No.41/2009). To plan the access road as an exclusive road for the port traffic to prevent disorderly development in the rice field along the road. To consult with the land owners and communities and obtain agreement.	To reassess the area to be converted based on the detailed route alignment.
5	Existing social infrastructures and services	B	The new access road will interrupt the existing road traffic and split the communities.	Planning phase: To design the detailed route alignment of the road to avoid communities as much as possible. To plan flyovers and tunnels not to interrupt the existing traffic and activities of the communities.	To reassess the interruption of existing road traffic and splitting communities based on the detailed route alignment.
11	Sanitation	B	Waste and waste water will increase due to inflowing workers.	Construction and Operation phase: To prepare sufficient capacity of treatment facilities and develop proper management plan.	To collect base line data about the social condition around the project area.
12	Hazards (Risk), Infectious diseases such as HIV/AIDS	B	Inflow of construction labor will increase the risk of infectious diseases.	Construction phase: To educate the labors to prevent the spread of infectious diseases.	
Natural Environment					
13	Topography and Geographical features	C	Procurement of mountain sand for reclamation may cause impact to the environment of the mountain area.	Construction phase: To procure the sand from an existing quarry. Tentatively, existing quarries in South Sumatra, which have enough sand volume, are planned as the source of the sand.	To confirm that the procurement of mountain sand does not affect the environment around the quarry.
16	Hydrological Situation	C	Surface water current will be changed by appearance of the terminal. Longshore current may be hindered by the terminal and cause shoreline change.	Operation phase: To maintain the proper shoreline by sand bypassing.	To quantify the current change and shoreline change by numerical simulation.
17	Coastal zone	C	Turbidity generated	(See the column of water	To survey the coral

	(mangroves, coral reefs, tidal flats, etc.)		by construction works, waste water from vessels and sedimentation caused by the current change may affect coral reefs. Condition of the tidal flat backside of the terminal may be changed by shoreline change.	pollution (no.23) and hydrological situation (no.16)) To collaborate with the existing efforts to conserve the coral reef by local community.	reef condition and species composition as well as the tidal flat to assess the impacts. To assess the impact of the selected construction method.
18	Flora, Fauna and Biodiversity	C	Marine species in/around the project site will be affected by the project.	Planning phase: To consider relocation of important species if they are found.	To develop inventory of the species living in/around the project area.
Pollution					
22	Air Pollution	B	Volume of air pollutant will increase due to the construction works and the traffic increase.	Construction and Operation phase: To control operation of heavy equipment and vehicles to reduce the emission.	To measure the current air pollutant level to assess the impact and develop management plan.
23	Water Pollution	B	Turbid water will be generated by construction works at sea. Waste water from vessels may cause water pollution.	Construction phase: To select construction method with little turbidity generation; for example, using suction dredger rather than grab dredger or spreading silt screen and fence. To monitor the turbidity to control the generation. Operation phase To control the waste water discharge from vessels.	To measure the current water quality to assess the impact and develop management plan.
25	Waste	B	Dredged materials will be generated.	Construction phase: To dispose offshore properly after checking the content of harmful substance in the material. In the case of utilization of the materials for the reclamation, measures to prevent leaking of the materials needs be considered. To appoint proper dumping site not to disturb fishing activities as well as to control the dumping activities.	To examine content of harmful substances such as heavy metals in the dredged materials.
26	Noise and Vibration	B	Noise and vibration will increase due to the construction works and the traffic increase.	Construction and Operation phase: To control operation of heavy equipment and vehicles to reduce the noise and vibration; for example, to restrict works at night time.	To measure the current noise level to assess the impact and develop management plan.
30	Accident	B	Risk of accident is considerable for construction works,	Construction phase: To develop a safety control plan for the construction works.	To list the possible accidents and assess the risks.

			navigation of vessels and road traffic.	Operation phase: To secure the safety control in/around the port area.	

Rating:
A: Significant impact is expected
B: Some impact is expected
C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses
Source: JICA Study Team

7.10 Recommendation

In this SEA study, the nine existing potential sites for the port development were evaluated from the environmental viewpoints and the three best options were selected. Next, the three options were evaluated again to compare the possibility and the magnitude of the social and environmental consequences in accordance with the scoping results. The results of the two evaluations were considered in the Master Plan study and contributed to making a decision on selecting the plan of the new terminal in terms of environmental consideration.

However, the SEA study has been basically focused on the site selection from a broad perspective; therefore, the details of the impacts and the mitigation measures need to be discussed in the next study phase. Based on the information obtained through the SEA study, following recommendations are made for the next study phase.

(1) It is necessary to implement EIA study properly to assess the impacts and develop necessary measures for mitigation and management. Specific recommendation for the EIA study fo phase I at North Kalibaru and the phase II & III at Cilamaya was summarized in Table 7.10-1 and Table 7.10-2, respectively.
(2) Especially for the phase II & III at Cilamaya, necessary information for assessing impacts on the coral reef and fishery is limited at this moment. It is necessary to conduct studies to comprehend the detailed current condition and assess the impact carefully under the collaboration with the local government, communities, researchers and NGO.
(3) In the stage of discussing the detailed route alignment of the access road for phase II & III at Cilamaya, the impacts on rice fields and communities (e.g. relocation of houses) need to be minimized.
(4) Dialogue and coordination with local communities are indispensable to minimize the negative impacts and enhance the positive aspects of the project.

Table 7.10-1 Recommended Studies in EIA (Phase I at North Kalibaru)

Items	Impact to be assessed	Data collection /Field survey	Evaluation Concept
Sanitation and infectious diseases	Construction and Operation phase Sanitary condition and risk of infectious diseases will be increased by inflowing labour and workers.	Collecting baseline data on social condition such as demography, livelihood, health and sanitation.	Construction and Operation phase Assessing impacts based on the current social condition and projected number of people who will flow to the area.
Fishery	Construction and Operation phase Fish resources may be affected by likely environmental change.	Collecting information on fish resources.	Construction and Operation phase Assessing impacts on fish resources based on the collected fish information considering the results of projection of the environmental change (e.g. water quality).
Air quality	Construction phase Emission of construction vehicles and equipments. Operation phase Emission of increased traffic.	Measuring ambient air quality (PM10, TSP, NO2, SO2 and CO).	Construction phase Predicting the air quality during the construction phase based on the number of the construction vehicles and equipment; then comparing with the current condition and the standards. Operation phase Predicting the air quality during the operation phase based on the number of the vehicles to be increased; then comparing with the current condition and the standards.
Noise	Construction phase Construction noise. Operation phase Traffic noise around the access road.	Measuring the ambient noise.	Construction phase Predicting the construction noise based on the number of the construction vehicles and equipment; then comparing with the current condition and the standards. Operation phase Predicting the traffic noise during the operation phase based on the number of the vehicles which will use the access road; then comparing with the current condition and the standards.
Water quality	Construction phase Turbidity caused by the construction works.	Measuring ambient water quality around the project area (Turbidity, TSS, DO, Salinity, COD and BOD))	Construction phase Assessing impacts based on the ambient turbidity and the potential turbidity generated by the construction works. Operation phase Assessing impacts based on the ambient water quality and the potential discharge from vessels.
Waste: dredged material (Sediment quality)	Construction phase Sea bottom sediment to be dredged may contain harmful substance such as heavy metals.	Measuring the contents of heavy metals in the sediment to be dredged.	Construction phase Comparing with the world standards for ocean dumping. In case high concentration of heavy metals are detected, utilization of the dredged materials for the reclamation instead of dumping offshore.
Aquatic fauna	Construction phase Impact on aquatic fauna and their habitat.	Inventorying the species (benthic fauna and fish) in/around the project area.	Construction phase Confirming that there is no vulnerable species to be protected in/around the project area.
Procurement of reclamation materials	Construction phase Impact on the mountain area to collect sand materials.	Confirmation of the quarry to collect the sand.	Construction phase Confirming that the quarry has enough sand volume and the collecting activities does not affect the environment around the quarry.
Accident	Construction and Operation phase Risk of accidents.	Collecting information on likely accidents.	Construction and Operation phase Assessing the risk based on the current management framework.

PM10: Particulate Matter (size between 2.5 and 10 micro meter), TSP: Total Suspended Solod, NOx: Nitrogen Oxides SO2: Sulfur Dioxide, CO: Carbon Monoxide, TSS: Total Suspended Solid, DO: Dissolved Oxygen, COD: Chemical Oxygen Demand, BOD: Biological Oxygen Demand

Table 7.10-2 Recommended Studies in EIA (Phase II and III at Cilamaya)

Items	Impact to be assessed	Data collection /Field survey /Analysis	Evaluation Concept
Land acquisition and resettlement	Planning phase Land acquisition and resettlement for the access road and the terminal activities.	Census survey of the affected people and the land to be acquired.	Planning phase Assessing impacts based on the number of affected people and their livelihood as well as the results of consultation with them.
Existing infrastructure	Planning phase Interruption of existing road traffic and splitting communities by the access road.	Confirmation of the existing road and communities along the detailed route alignment.	Planning phase Assessing impacts based on the detailed route alignment and the surrounding conditions.
Sanitation and infectious diseases	Construction and Operation phase Sanitary condition and risk of infectious diseases will be increased by inflowing labour and workers.	Collecting baseline data on social condition such as demography, livelihood, health and sanitation.	Construction and Operation phase Assessing impacts based on the current social condition and projected number of people who will flow to the area.
Fishery	Planning phase Fishing activities at sea and the fishponds have to be restricted for the new terminal.	Comprehending details of the current fishing activities, such as fish catch, fishing ground, fishing method and fishermen's income, by interviewing and collecting secondary data.	Planning phase Estimating the impact on fishery based on the current conditions and the project plan; the results will be used as a base for the compensation.
Air quality	Construction phase Emission of construction vehicles and equipments. Operation phase Emission of increased traffic.	Measuring ambient air quality (PM10, TSP, NO2, SO2 and CO).	Construction phase Predicting the air quality during the construction phase based on the number of the construction vehicles and equipments; then comparing with the current condition and the standards. Operation phase Predicting the air quality during the operation phase based on the number of the vehicles to be increased; then comparing with the current condition and the standards.
Noise	Construction phase Construction noise. Operation phase Traffic noise around the access road.	Measuring the ambient noise.	Construction phase Predicting the construction noise based on the number of the construction vehicles and equipment; then comparing with the current condition and the standards. Operation phase Predicting the traffic noise during the operation phase based on the number of the vehicles which will use the access road; then comparing with the current condition and the standards.
Water current	Construction phase Surface water current and longshore current will be changed by appearance of the terminal.	Analysing current surface water current and longshore current using numerical simulation.	Construction phase Predicting the current changes quantitatively using numerical simulations. The results will be used for assessing impacts on coral reefs and the other ecosystems.
Coastal line	Construction phase Change of longshore current may cause shoreline change.	Analysing shoreline change using numerical simulation.	Construction phase Predicting the shoreline change quantitatively using numerical simulations. The results will be used for assessing impacts on tidal flats and the other ecosystems.
Water quality	Construction phase Turbidity caused by the construction works. Operation phase Waste water from vessels may cause water pollution.	Measuring ambient water quality around the project area (Turbidity, TSS, DO, Salinity, COD and BOD)	Construction phase Assessing impacts based on the ambient turbidity and the potential turbidity generated by the construction works. Operation phase Assessing impacts based on the ambient water quality and the potential discharge from vessels.
Waste: dredged material	Construction phase Sea bottom sediment to be dredged may content	Measuring the contents of heavy metals in the	Construction phase Comparing with the world standards for ocean dumping. In case high concentration of

(Sediment quality)	harmful substance such as heavy metals.	sediment to be dredged.	heavy metals are detected, utilization of the dredged materials for the reclamation instead of dumping offshore.
Coral reef	Construction and Operation phase Coral reef may be affected by turbidity, waste water and sedimentation caused by water current change.	Comprehending the detailed distribution of the coral reef, species composition and their conditions as the baseline data.	Construction and Operation phase Assessing impacts based on the current condition of the coral reef and the possible physiochemical environmental change caused by the project.
Aquatic fauna	Construction phase Impact on aquatic fauna and their habitat.	Inventorying the species (benthic fauna and fish) in/around the project area.	Construction phase Assessing impacts based on the current species composition and the possible physiochemical environmental change caused by the project.
Procurement of reclamation materials	Construction phase Impact on the mountain area to collect sand materials.	Confirmation of the quarry to collect the sand.	Construction phase Confirming that the quarry has enough sand volume and the collecting activities do not affect the environment around the quarry.
Accident	Construction and Operation phase Risk of accidents.	Collecting information on likely accidents.	Construction and Operation phase Assessing the risk based on the current management framework.

PM10: Particulate Matter (size between 2.5 and 10 micro meter), TSP: Total Suspended Solod, NOx: Nitrogen Oxides SO2: Sulfur Dioxide, CO: Carbon Monoxide, TSS: Total Suspended Solid, DO: Dissolved Oxygen, COD: Chemical Oxygen Demand, BOD: Biological Oxygen Demand

CHAPTER 8 FORMULATION OF IMPROVEMENT PLAN FOR RAIL ACCESS TRANSPORT CONNECTING TG. PRIOK PORT WITH ITS HINTERLAND

8.1 Preliminary Railway Access Plans Corresponding the Respective Port Plans

8.1.1 Preliminary Rail Access Plans

In accordance with the port development projects proposed by authorities and private entities in Indonesia, the Team studied preliminary plans for railway access to the following locations.

Table 8.1-1 Destinations of Preliminary Rail Access Plans

Province	Port Development Projects
DKI Jakarta	Off Kalibaru at Tanjung Priok Terminal
West Java Province	Cilamaya Coast in Regent Karawan (Kabupaten Karawan)
Banten Province	Tangeran Coast in Regent Tangeran (Kabupaten Tangeran)

8.1.2 Operational Route Plans

(1) Route Summary

Brief profiles of each operational route are summarized below:

Table 8.1-2 Proposed Operational Routes

Route	Total Route Length (km)	Existing (km)	New (km)
Existing Freight Corridor			
- Tpk-Cikampek-Bandung-Gedebage Dryport	187.5	187.0	0.5
Proposed Freight Corridors			
Direct Access to Tanjung Priok Terminal			
- Tpk-Cikampek-Bandung-Gedebage Dryport	187.5	187.0	0.5
Alt-1: Cilamaya New Terminal			
- Cilamaya-Cikampek-Bandung-Gedebage	132.1	95.5	36.6
- Cilamaya-Karawang-Cikarang Dryport	63.2	26.6	36.6
Alt-2: Tangerang New Terminal			
- Tangerang-Jatinegara-Cikampek-Bandung-Gedebage	208.4	183.7	24.7
- Tangerang-Jatinegara-Bekasi-Cikarang Dryport	86.3	61.7	24.7

Source: Study Team

(2) Alternative-1: Access to Cilamaya New Terminal

36.6-kilometer of new access to Cilamaya Terminal with single track at grade level is proposed. The access will be connected with existing rail network nearby Klari Station. The route can be selected either straight over agricultural fields or along roads and rivers depending on the scale of land acquisition.

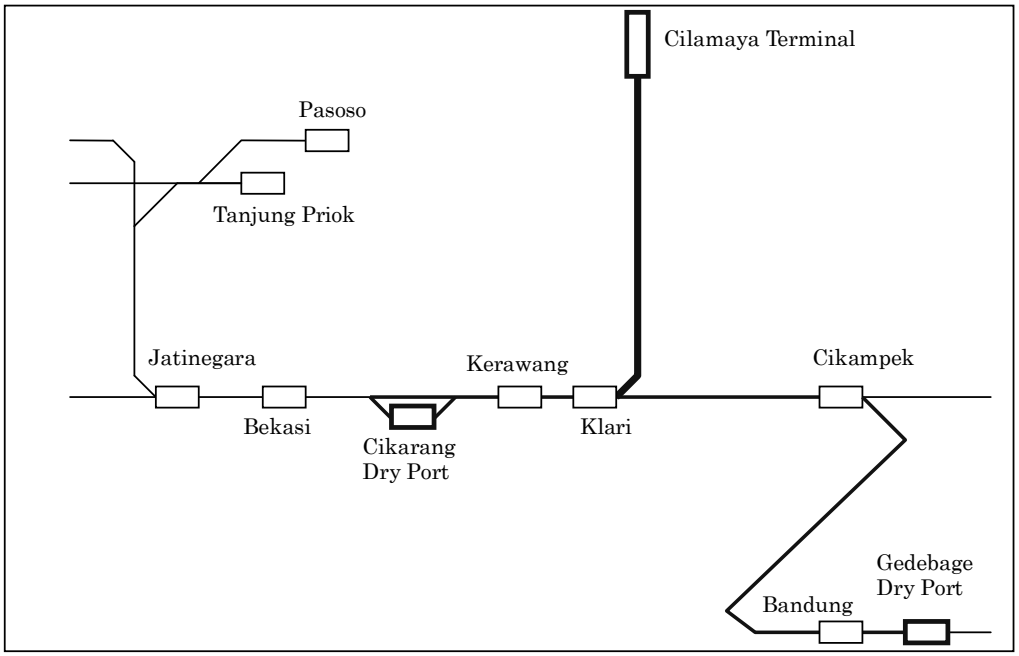


Figure 8.1-1 Route of Container Train (Alternative-1: Access to Cilamaya New Terminal)

(3) Alternative-2: Access to Tangerang New Terminal

24.7-kilometer long new access route to Tangerang Terminal with single track at grade level is proposed. The access will be connected with the existing rail network nearby Batuceper Station. The route immediately north of existing Tangerang Line is broad enough to accommodate single railway track on surface level.

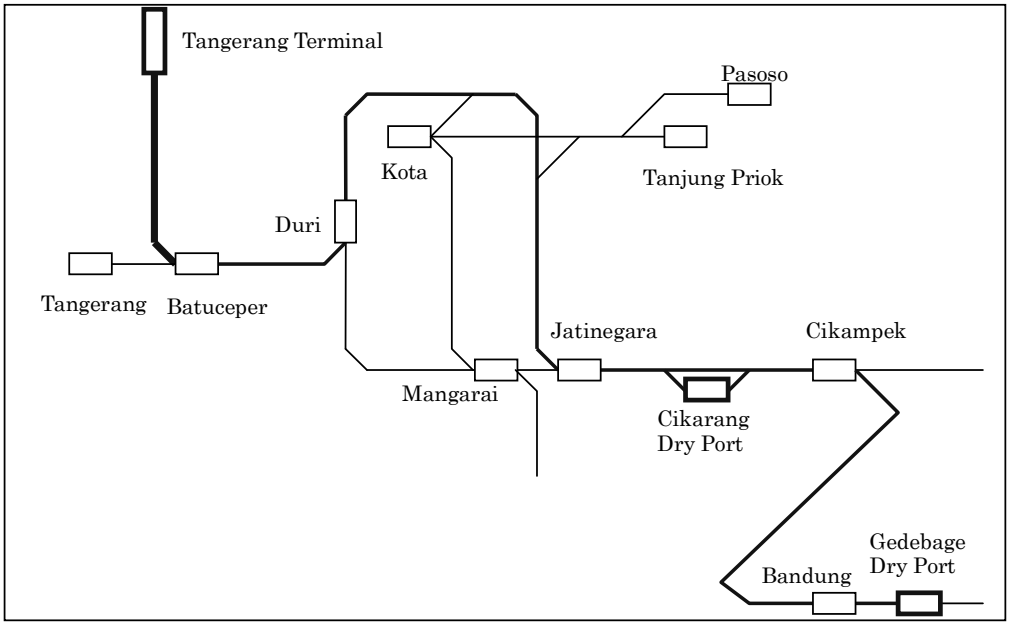


Figure 8.1-2 Route of Container Train (Alternative-2: Access to Tangerang New Terminal)

8.1.3 Freight Terminal Facility Plan

(1) Location

At this preliminary stage, all the freight terminal facilities are proposed on the premises of the new terminal area in order to minimize the time for container loading and unloading. Detailed structure analysis will be made once the new terminal locations are determined.

(2) Track Layout

Typical track layout of new terminal is shown in the following figure.

The layout consists of:

- Loading and unloading side tracks 2 x 438 m
- Passing loop for loading track 1
- Stabling tracks (for departure and arrival) 4 x 438 m
- Passing loop for loading track 1
- Loco inspection track 1 x 30m
- Loco stabling tracks 2 x 60m

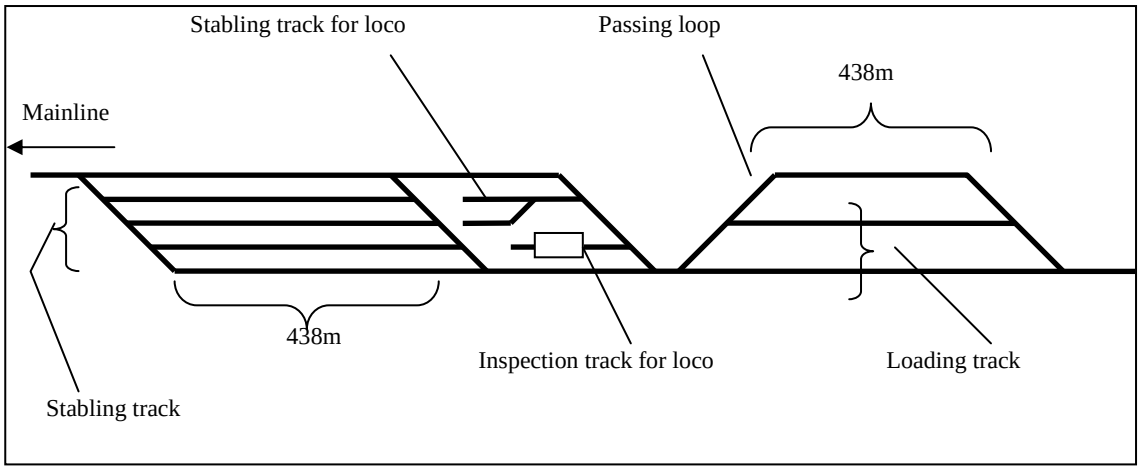


Figure 8.1-3 Typical Track Layout in Freight Terminal Facility

8.1.4 Dry Port Facility Plan

(1) Location

Through the consultation with government authorities, dry port locations in future are identified in existing Gedebage and Cikarang, where intensive investment has been observed these days.

(2) Track Layout

The Team assumed that track layout of Cikarang Dryport is basically identical to that of the new terminal, while track layout of Gedebage Dryport remains the same as existing one due to the constraint in land space.

(3) Freight Handling Facilities

The Team assumed that freight handling facilities of Cikarang Dryport are basically identical to those of the new terminal, while those of Gedebage Dryport remain the same as existing one. This is because the transport capacity of New Terminal– Gedebage Corridor has an unavoidable constraint regardless of the freight handling facilities in Gedebage Dryport.

8.1.5 Railway Access to Cilamaya

(1) Facility Plan

1) Description of the Route

A 36.6 km section of this spur line branches from existing Java North Main Line and goes northward to connect with the new terminal of Cilamaya.

2) Route Alignment

Proposed route alignment, composed of 36.6 km of at-grade section, is drawn in the following figure. The proposed alignment is laid along the existing road or at river banks.

3) Track Layout

Following figure shows the planned track layout. Taking the distance and frequency of the operation into account, single track with one intermediate taking-over tracks is proposed.

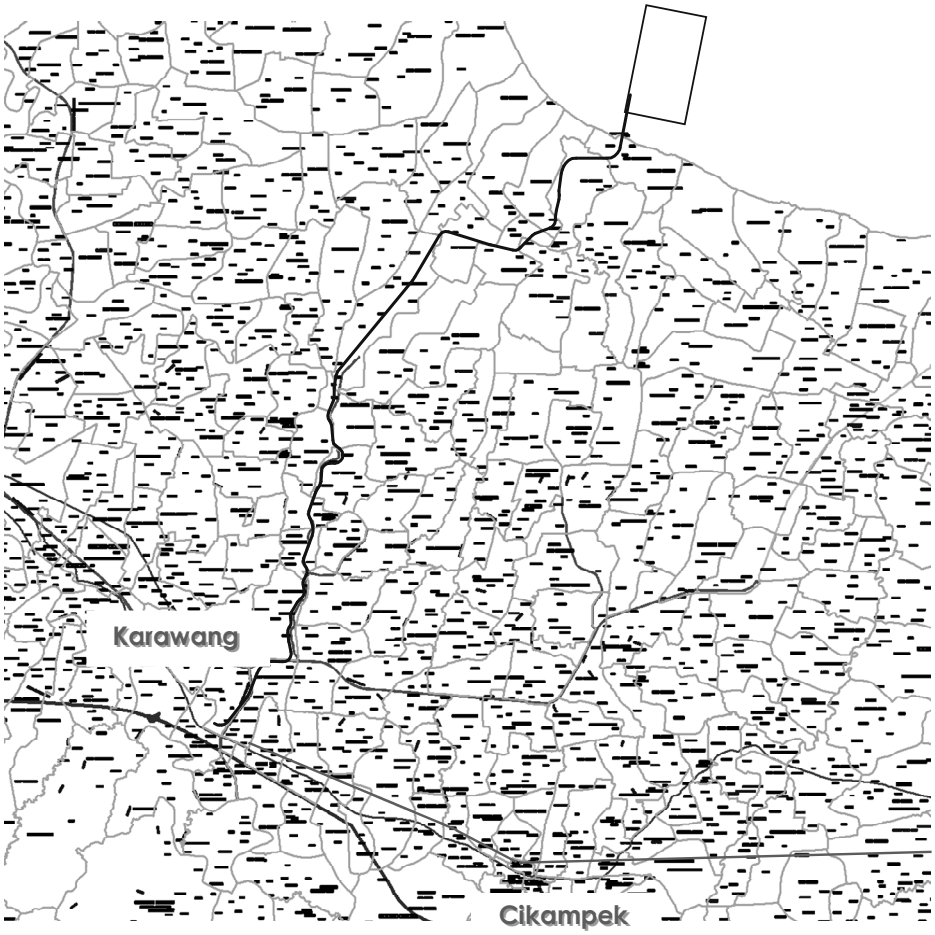


Figure 8.1-4 Route Alignment (Railway Access to Cilamaya New Terminal)

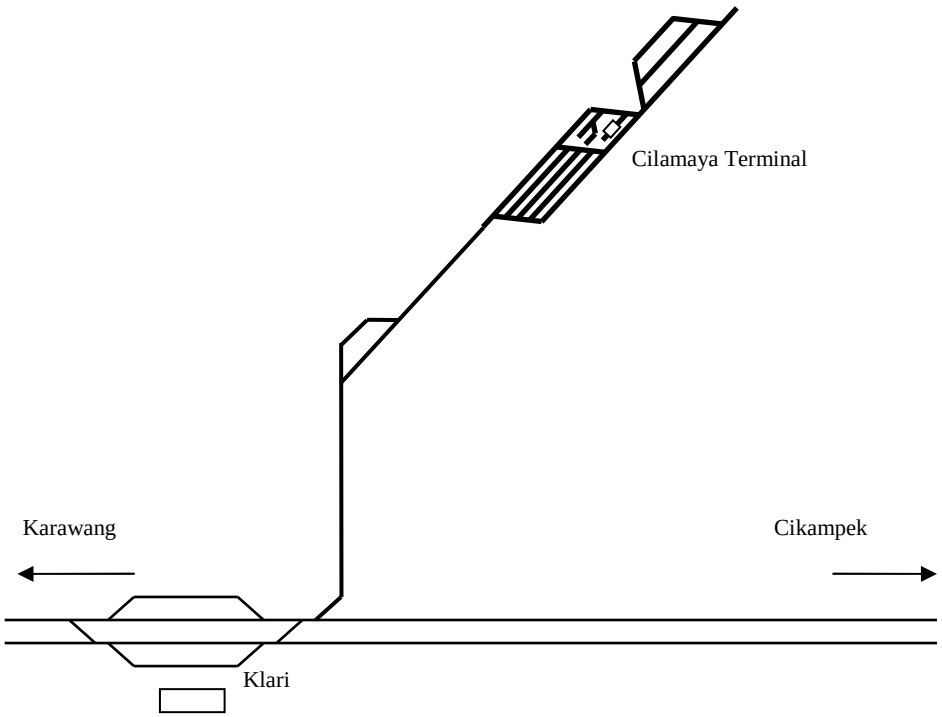


Figure 8.1-5 Track Layout (Railway Access to Cilamaya)

4) Civil Works

At grade structure is proposed to accommodate single track and auxiliary wayside facilities. Embankment works and sub-base construction for new track will be carried out to construct substructure for the railroad by filling up selected materials for embankment.

5) Signal and Telecommunication Systems

Proposed signalling and telecommunication system layouts are depicted in the following figures.

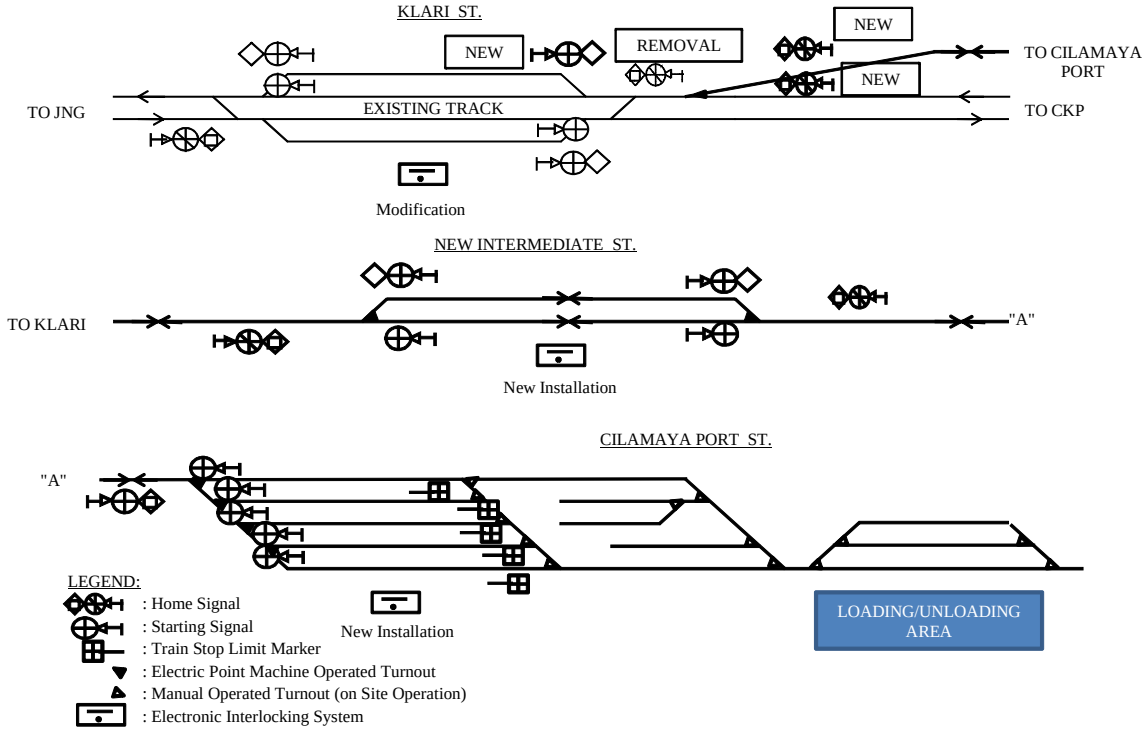


Figure 8.1-6 Signalling System Layout (Railway Access to Cilamaya New Terminal)

(2) Train Operation and Rolling Stock Plan

1) Transport Capacity

Freight train operations are planned as follows:

- If all containers are loaded, an average of 24 trains per day will be required to move the projected traffic in 2030.
- Adding a factor for moving empty containers; some containers can be reloaded for return loads, however, others will return empty. Assuming that 20% or more containers will be transported for empties, there will be a total of 28 trains per day.
- These will be adjusted in accordance with the estimate of modal share between road and railway traffic in this freight corridor.

Table 8.1-3 Train Operation Plan (Railway Access to Cilamaya New Terminal)

Section	No. of TEU by railway per day		Operation Plan In 2030	
	Inbound	Outbound	No. of Trains/day	Adjusted
Cilamaya Terminal – Gedebage	130	130	5	5
Cilamaya Terminal – Cikarang	1210	1210	19	23

2) Train Consist

Train consist of each section are as follows.

- Cilamaya Terminal – Gedebage Dry Port: CC201 + 16 container wagons.
- Cilamaya Terminal – Cikarang Dry Port: CC201 + 32 container wagons.

3) Train Schedule

Based on the result of driving simulation and current train schedule, preliminary traveling time of the train is set as follows:

Table 8.1-4 Traveling Time (Cilamaya New Terminal and Dryports)

Section	Traveling time	Average Speed
Cilamaya – Gedebage Dry Port	4 h 11 m	31.6 km/h
Cilamaya – Cikarang Dry Port	1 h 37 m	39.3 km/h

4) Procurement of Rolling Stock

Number of locomotives required for the above operation will be computed after modal share of the freight traffic in this freight corridor is estimated.

5) Maintenance Facility

Existing Bandung workshop is proposed for maintenance of locomotive in this route alternative

8.1.6 Railway Access to Tangerang

(1) Facility Plan

1) Description of the Route

A 24.7 km section of this spur line branches from existing North Line and commences descent toward the terminal of Tangerang.

2) Route Alignment

Proposed route alignment, composed of 24.7 km of at-grade section, is drawn in the following figure.

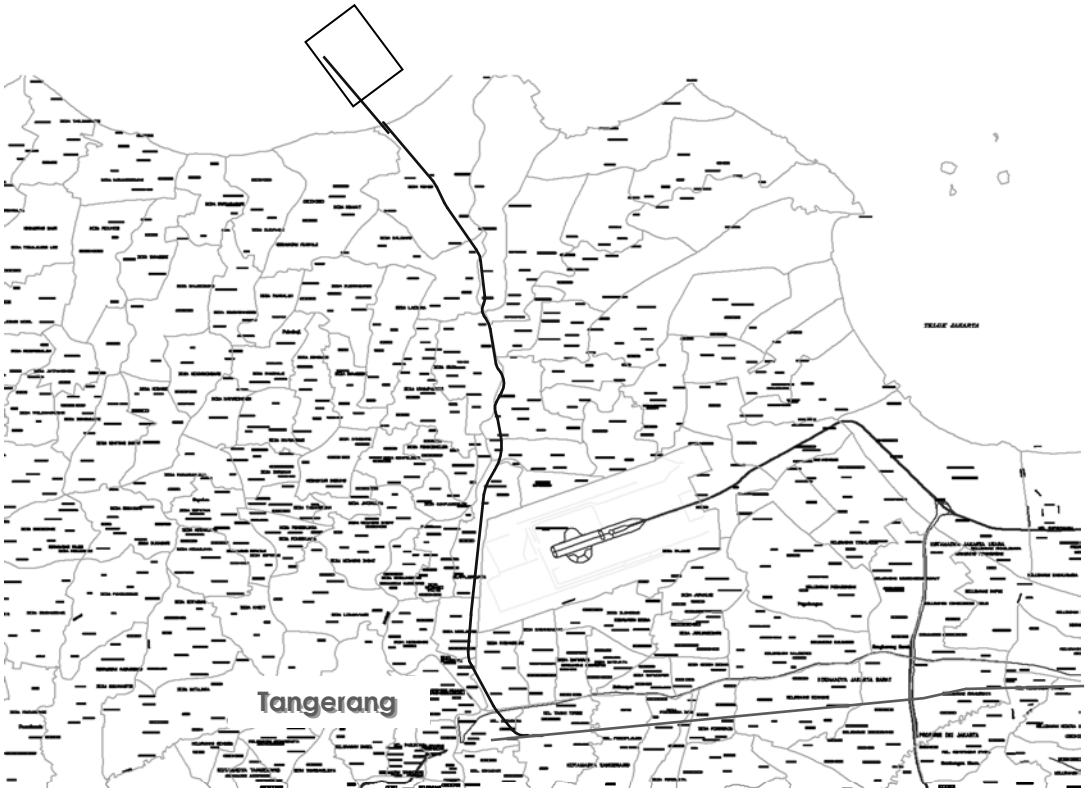


Figure 8.1-7 Route Alignment (Railway Access to Tangerang New Terminal)

3) Track Layout

Following figure shows the planned track layout. Taking the distance and frequency of the operation into account, single track with no intermediate taking-over tracks is proposed.

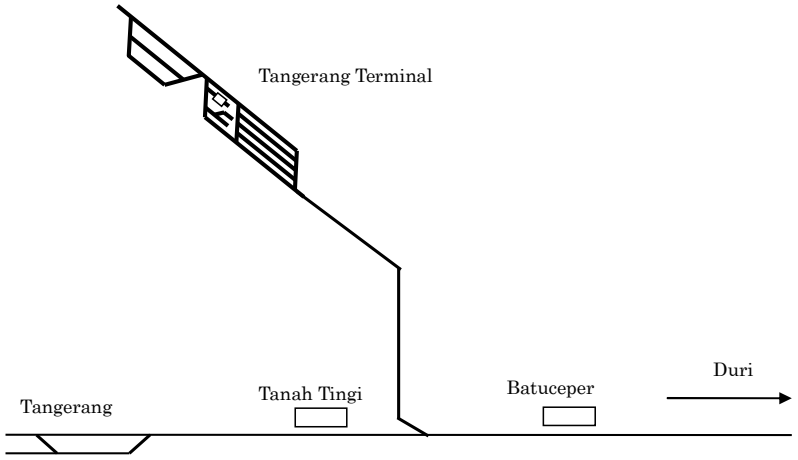


Figure 8.1-8 Track Layout (Railway Access to Tangerang New Terminal)

4) Civil Works

At grade structure is proposed to accommodate single track and auxiliary wayside facilities. Embankment works and sub-base construction for new track will be carried out to construct substructure for the railroad by filling up selected materials for embankment.

5) Signal and Telecommunication Systems

Proposed signalling and telecommunication system layouts are depicted in the following figures.

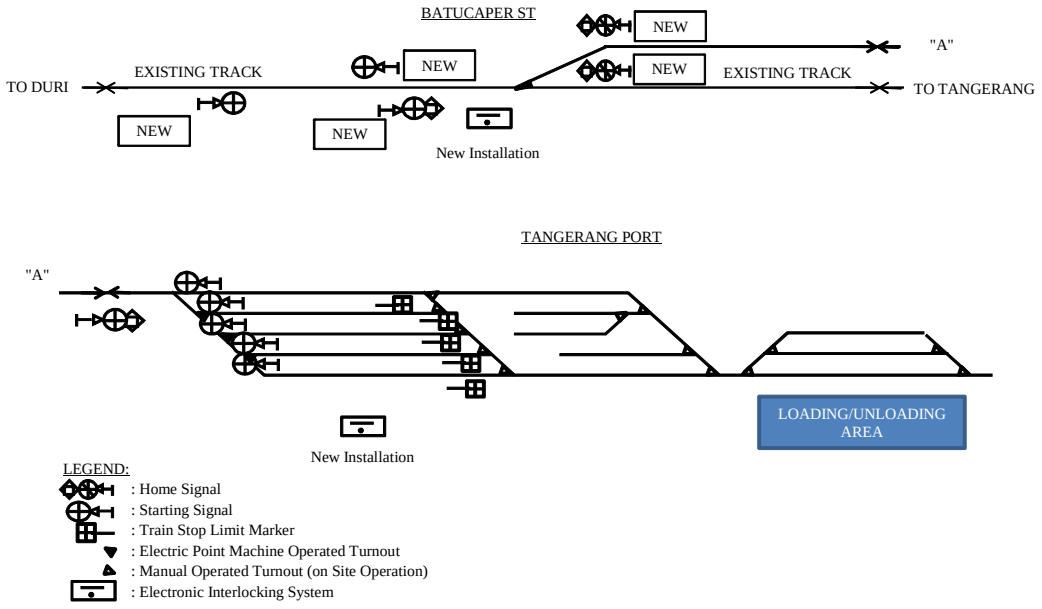


Figure 8.1-9 Signalling System Layout (Railway Access to Tangerang New Terminal)

(2) Train Operation and Rolling Stock Plan

1) Transport Capacity

Freight train operations are planned as follows:

- If all containers are loaded, an average of 24 trains per day will be required to move the projected traffic in 2030.
- Adding a factor for moving empty containers, some containers can be reloaded for return loads, however, others will return empty. Assuming that 20% or more containers will be transported for empties, there will be a total of 28 trains per day.
- These figures will be adjusted in accordance with the estimate of modal share between road and railway traffic in this freight corridor.

Table 8.1-5 Train Operation Plan (Railway Access to Tangerang New Terminal)

Section	No. of TEU by railway per day		Operation Plan In 2030	
	Inbound	Outbound	No. of Trains/day	Adjusted
Tangerang Terminal - Gedebage	130	130	5	5
Tangerang Terminal - Cikarang	1210	1210	19	23

2) Train Consist

Train consist of each section are as follows.

Tangerang Terminal – Gedebage Dry Port: CC201 + 16 container wagons.
Tangerang Terminal – Cikarang Dry Port: CC201 + 32 container wagons.

3) Train Schedule

Based on the result of driving simulation and current train schedule, preliminary traveling time of the train is set as follows:

Table 8.1-6 Traveling Time (Railway Access to Tangerang New Terminal)

Section	Traveling time	Average Speed
Tangerang – Gedebage Dry Port	6 h 6 m	34.2 km/h
Tangerang – Cikarang Dry Port	2 h 26 m	35.5 km/h

4) Procurement of Rolling Stock

Number of locomotives required for the above operation will be computed after modal share of the freight traffic in this freight corridor is estimated.

5) Maintenance Facility

Existing Bandung workshop is proposed for maintenance of locomotive in this route alternative.

8.2 FREIGHT TRANSPORTATION DEVELOPMENT SCENARIO

8.2.1 Existing Railway Freight Capacity for Port Cargo

Existing rail services for container traffic, between Tanjung Priok Terminal, Pasoso (POO) and Gedebage (GDB), comprise 4 trains, 2 trains each way over a 24 hour period. This accounts for an annual transport capacity of 11,680 TEU, but actual volume of the container traffic is 4,891 TEU with an estimated loading rate of 41.8 %.

Table 8.2-1 Existing Railway Freight Capacity for Port Cargo

	Distance (km)	Ave. Trip Time (min)	Trips per day	Wagons per train	Annual Capacity (TEU)	Actual Volume (TEU)	Estimated Loading Rate (%)
Pasoso - Gedebage	187	278 (one way)	4 trains (2 r-trips)	16	11,680	4,891 (*1)	41.8

(*1) Assumed that 1 TEU = 25 ton

Source: Based on PT.KA Annual Report

Following figure indicates the route of existing container transportation.

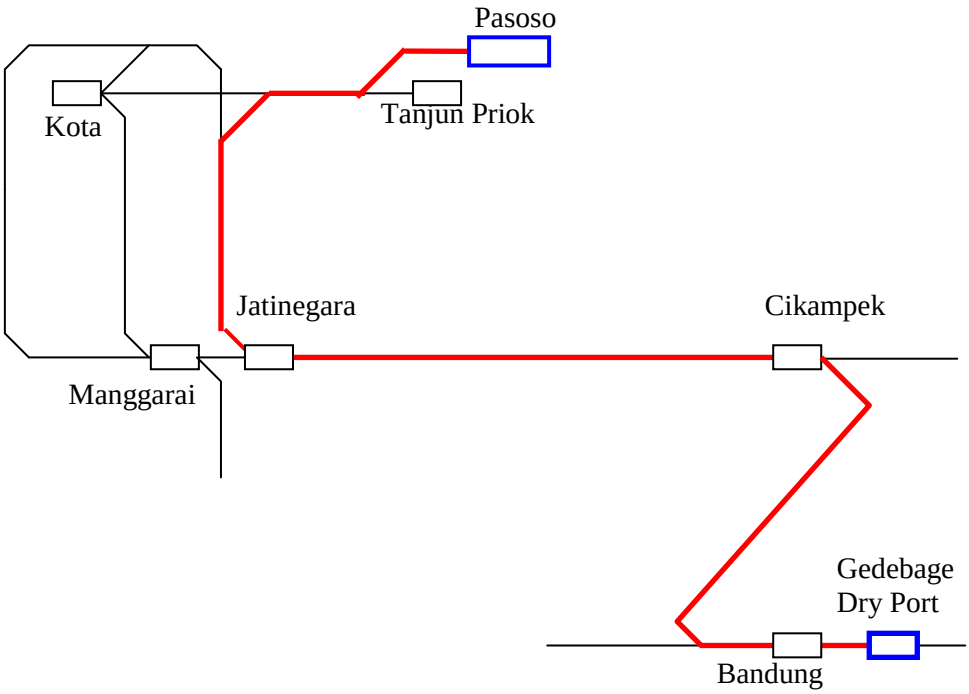


Figure 8.2-1 Existing railway transportation of port container

8.2.2 Current and Future Operational Bottlenecks

(1) Travel Time

Train running times between Tanjung Priok Terminal, POO and GDB, at present, are generally within the range of 5 hours to 5 hours 30 minutes. The travel time from TPK Terminal and POO takes 30 minutes to 1 hour depending on the road traffic congestion. The approach road between JICT and POO experiences considerable queuing of vehicles at peak times. Direct access to JICT should allow the average running time to be reduced to the lower end in order to secure competitiveness over the road transport.

(2) Freight Tariff

It is perceived that current railway freight tariff has little or no advantages largely due to the cost of feeder trucking charge from/to GDB. As the railway freight tariff is often influenced by the volume of traffic on a given route, PT. KA is expected to enhance market-based approach and offer discounts to significant clients to compete with trucks.

(3) Line Capacity

With the increase of passenger trains as programmed in several masterplan studies and on-going projects, line capacity of the Jabodetabek Railway will have little room to be spared for additional freight operations. Either increase of the line capacity or rerouting will be a fundamental solution.

Following figure indicates line capacity of railway route and number of trains in current diagram.

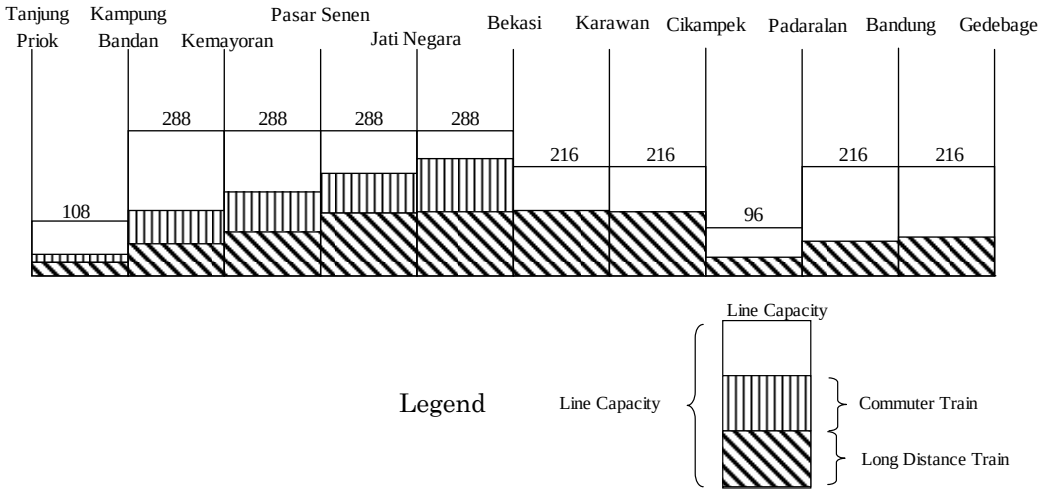


Figure 8.2-2 Line Capacity of Railway Route

8.2.3 Container Transportation Demand Forecast

(1) Future Port Cargo Volume

As presented in Chapter 5, Throughput at Tanjung Priok Terminal will grow from the current 2.7 million TEU in 2009 to 4.0 million TEU in 2020 and onwards, whilst the same at the New Terminal will account for 9.4 million TEU in 2030.

(2) Future Rail Freight Traffic

Given the intensive expansion of the port cargo handling capacity as programmed in Tanjung Priok as well as in New Terminal, the container transportation demand is anticipated to be by far beyond the carriable freight volume by railway as demonstrated in 8.1.5.

Therefore, this chapter aims to propose a rail infrastructure improvement plan which materializes the highest transportation capacity to maximize its modal share.

(3) Objectives for the Project Formation

Taking account of the major capital investments for passenger rail projects that are already programmed with assistance from international funding agencies such as JICA and KfW, it is advisable that freight transportation should get quick revenue with minimal investment at least in the short-term.

Therefore, this study aims to achieve maximum capacity with minimal capital investment in the initial stage, followed by additional investment for further promotion of the freight transport. Based on this principal, the Team developed a scenario with two stages of implementation, as described in 8.1.5.

8.2.4 Current Construction and Planning Efforts

(1) Direct Access to JICT Terminal (in Progress)

DGR have been promoting land acquisition, and have secured yard space at JICT. However, land acquisition for the approaching track branches off from existing Pasoso track is now pending. Although this exercise will be resumed next year, completion date for this Project is still uncertain.

(2) Cikarang as New Destination for Railway Freight

In addition to the reinforcement of existing freight corridor, future railway freight for port cargo could serve Cikarang where integrated logistics facilities and services are provided to cater for the biggest industrial population in West Java. In fact, several dry port and rail access projects, such as Javabeka, are in progress with private financing.

(3) Location of the New Terminal

Among candidate sites for the New Terminal the Team selected the Cilamaya Terminal as the most suitable site for promoting freight railway transportation. Justifications for the selection include the following:

- The strategic location has advantages in access to Cikarang Dryport where the largest transport volume is forecasted.
- Other sites will find it difficult to provide a sufficient number of freight trains as they have to run on the same trucks as Jabodetabek Railway where passenger trains will be operated with the headway of 4-5 minutes in future time.
- Burden of the land acquisition to construct the rail access would be not so large as farmland is widely observed across the project site.

8.2.5 Future Railway Freight Capacity for Port Cargo

(1) Origin and Destination

Taking the above conditions into account, the Team formulated the improvement plan which focuses on the four (4) transportation patterns.

Case I : Direct access to JICT terminal and Cikarang Dryport will be achieved as follows.

i) Tanjung Priok – Gedebage (existing)
ii) Tanjung Priok – Cikarang (new)

Case II : When new terminal is constructed in Cilamaya following two patterns are planned.

iii) Cilamaya – Gedebage (new)
iv) Cilayama – Cikarang (new)

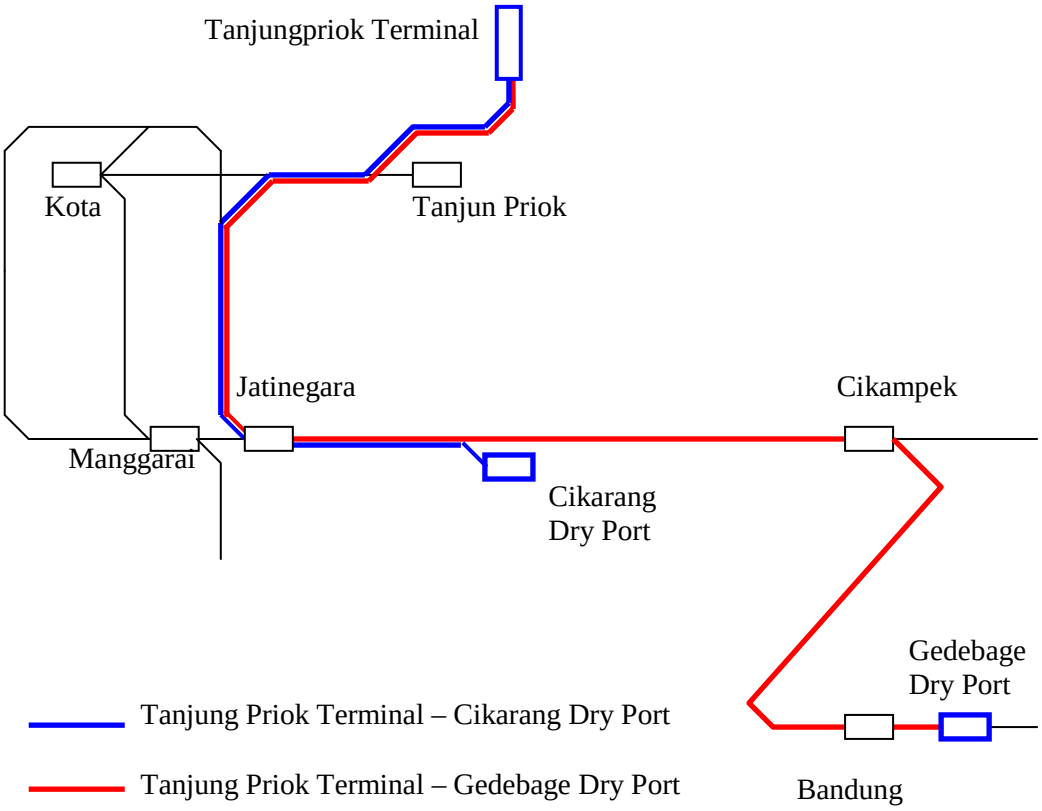


Figure 8.2-3 Origin and Destination of Case II

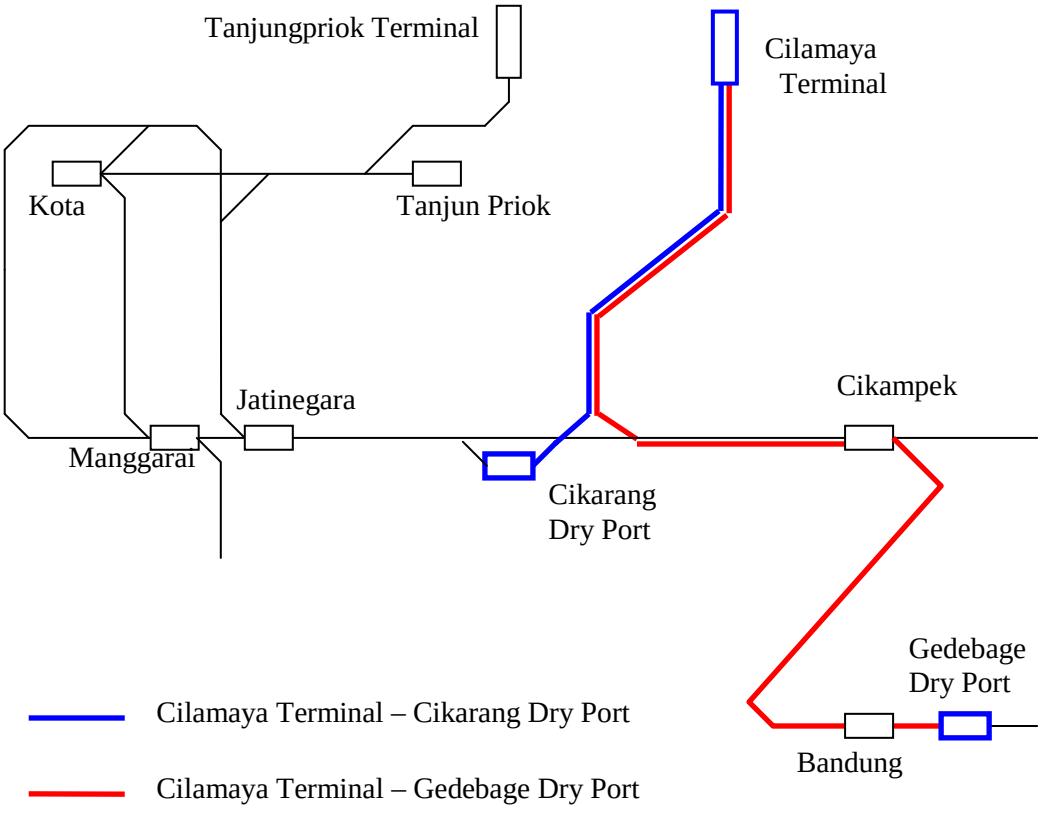


Figure 8.2-4 Origin and Destination of Case II

(2) Future Railway Freight Capacity for Port Cargo

The Study Team has made a conservative assumption that the proportion of Tanjung Priok Terminal and New Terminal throughput requiring ICD facilities will increase to 4.24% in Case1 and 11.42 % in Case 2 in 2020 and diminish to a level of around 3% in Case1 and 8% in Case 2 in 2030. In this plan, ICD throughput is around 1 million TEUs by 2020 and onwards by full utilization of the line capacity of the above 4 travel patterns.

Table 8.2-2 Capture Rates of Port Total Throughput and Future Dryport Development

International Containers	Terminal Throughput (million TEU)			Railway Transportation			
				Case I		Case II (total)	
	Tg. Priok	New Port	Total	Throughput (million TEU)	Capture Rate (%)	Throughput (million TEU)	Capture Rate (%)
2010	4.850	-	4.850	0.012	0.24%	0.012	0.24%
2015	4.850	-	4.850	0.257	5.30%	0.257	5.30%
2020	4.000	5.100	9.100	0.385	4.24%	1.040	11.42%
2025	4.000	8.100	12.100	0.385	3.19%	1.040	8.59%
2030	4.000	9.400	13.400	0.385	2.88%	1.040	7.76%

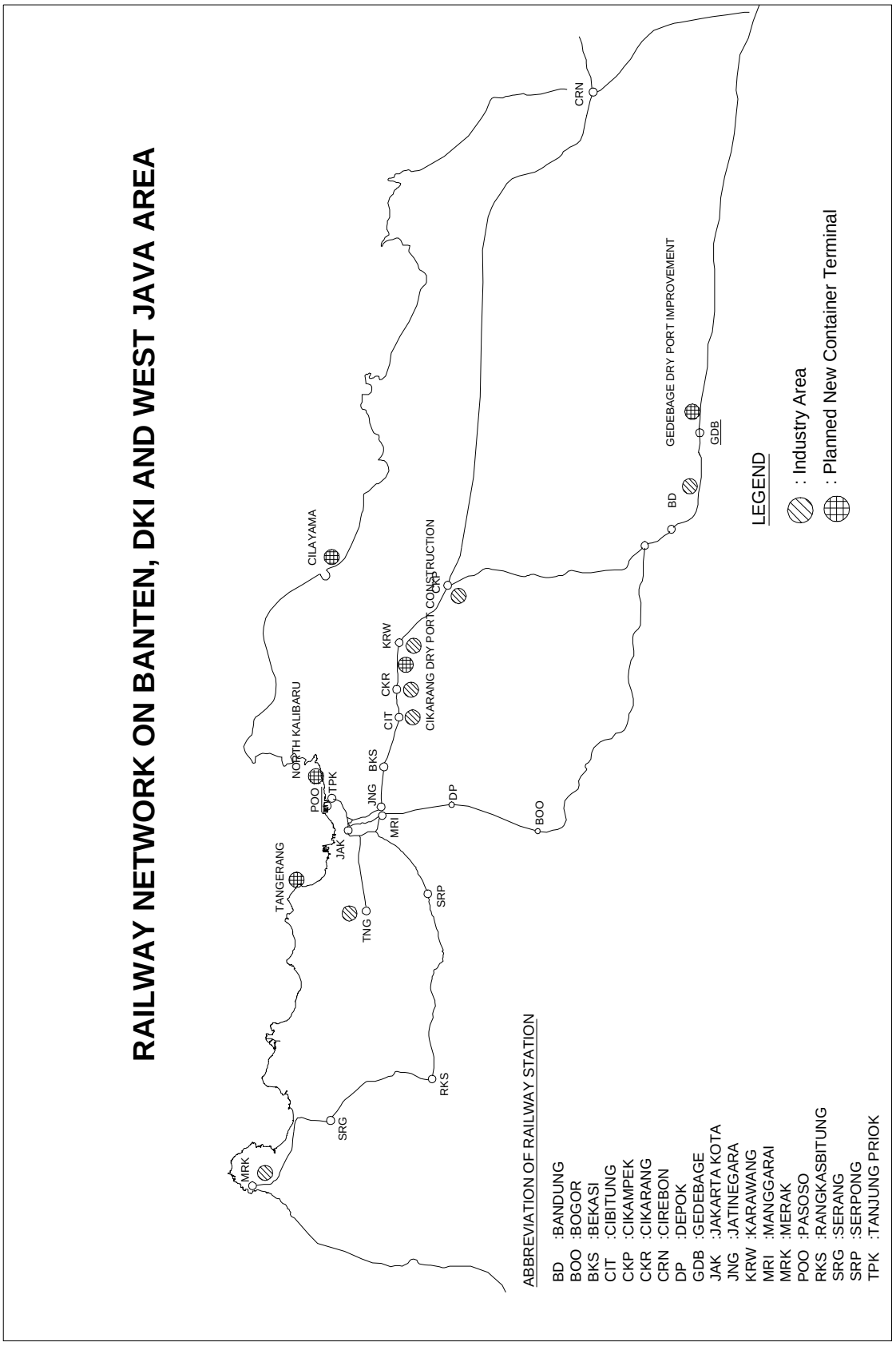
Source: Study Team Estimate

8.2.6 Future Potential of Railway Freight

With intensive capital investments, freight transportation capacity is able to further increase through the combination of following projects.

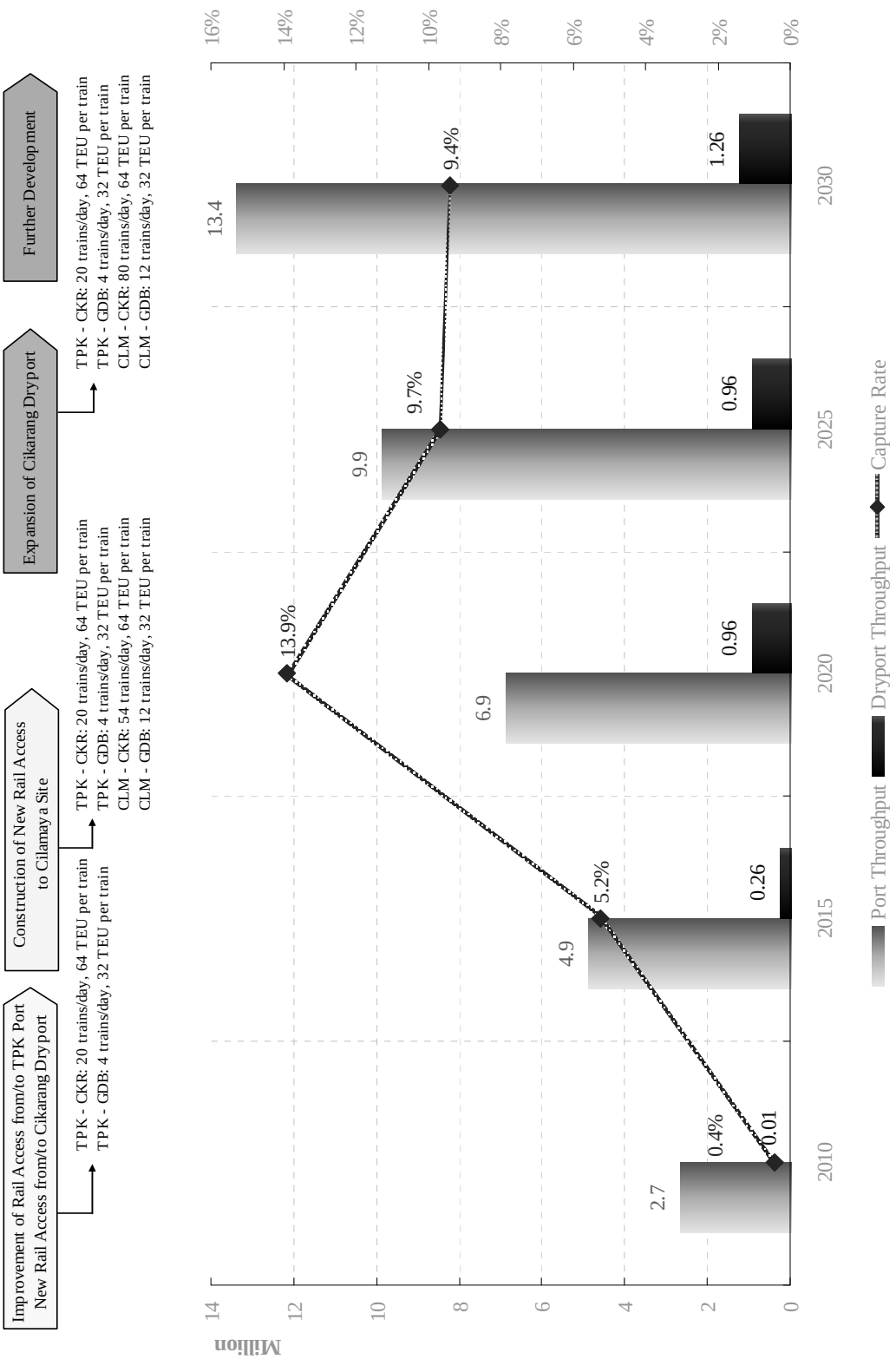
- **Track Elevation of Eastern Line (Jakartakota - Jatinegara Section)** – Although this project concept originally aims to cater for commuter traffic, exclusive use of existing at grade track for freight trains can diminish current line capacity constraints. However, it will involve huge capital investments, say within the range of 1 to 2 billion USD.

- **Bekasi New Line (Tanjung Priok – Cikarang Section)** – Several past studies proposed construction of new freight line between Tanjung Priok and Cikarang. The alignment goes eastwards from Tanjung Priok and later down to south direction. The route requires elevated tracks to avoid large-scale land acquisition at Bekasi area, hence the project is capital intensive



Source: JICA Study Team

Figure 8.2-5 Selected Project Locations



Source: JICA Study Team

Figure 8.2-6 Roadmap for Promotion of Railway Freight Transportation for Port Cargo

8.3 Railway Freight Facilities Improvement Plan

8.3.1 General

(1) Railway Infrastructure Design Criteria

Table 8.3-1 presents a summary of basic geometric design criteria and recommended values for railway facilities. The design criteria apply to all sections of the project.

Table 8.3-1 Design Criteria

Item		Criteria
1.	Maximum Design Speed	120 km/h
2.	Maximum Operational Speed	100 km/h
3.	Axel Load	18 ton
4.	Rail Type	R 54
5.	Sleeper Type	Concrete Sleeper
6.	Ballast Thickness	300 mm
7.	Maximum Gradient (Station)	0.15 %
8.	Maximum Gradient (Main Line)	2.0 %
9.	Minimum Distance between Tracks (Station)	4.2 m
10.	Minimum Distance between Tracks (Main Line)	4.0 m
11.	Turnout	8#, 10 #, 12 #
12.	Minimum Curve Radius	300 m (absolute min: 150 m)

Source: JICA Study Team

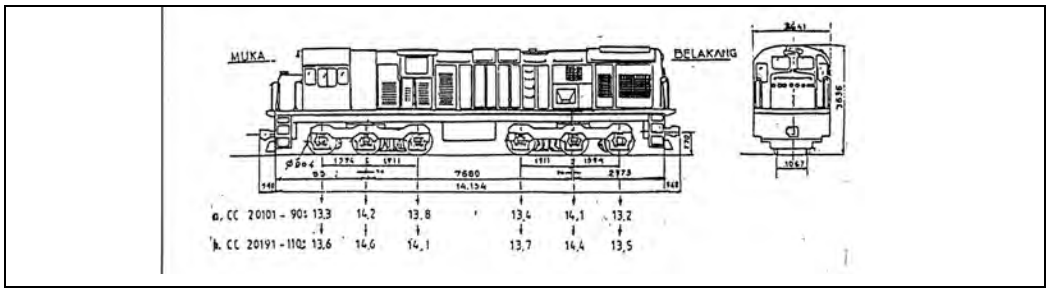
(2) Rolling Stock

A primary requirement of rolling stock is that it should permit rail conveyance of shipping containers of all types and sizes either currently used or likely to be used in international trade.

It is advisable that the diesel locomotive should be similar to those recently procured by PT. KA considering maintenance requirements and labor skills. Weight of the locomotives shall be superior to 32-TEU loading at 16% gradient. Diesel Electric Locomotives (DEL) are in use for heavy hauling service. Following table shows profiles of CC201 currently in operation for freight service.

Table 8.3-2 Profile of Locomotive

Item		Profile
1.	Overall length	15,214 mm
2.	Overall height	3,635 mm
3.	Body width	2,642 mm
4.	Wheelbase	3,304 mm
5.	Tare weight	78 t
6.	Weight in working order	84 t
7.	Engine power	1950 HP
8.	Power for traction	1825 HP
9.	Number of traction motor	6
10.	Maximum speed	120 km/h
11.	Maximum tractive effort	17,640 kgf
12.	Capacity of fuel tank	3,028 lt



Source: PT .KA

In this study train schedule is assumed based on current CC201 type DEL, however, it is recommended to install high performance locomotive so that freight train will not affect passenger train or commuter train.

Flat wagon is used for transportation of container available for two 20ft containers in one car. Main profile of container wagon is as follows.

Table 8.3-3 Profile of Container Wagon

Item	Profile
1. Overall length	13,460 mm
2. Length of body	12,400 mm
3. Body width	2,440 mm
4. Tare weight	12 t
5. Loading capacity	30 t

Source PT.KA

(3) Train Consist

Maximum gradient between Tanjung Priok to Cikampek is 6‰ and between Cikampek to Bandung it is 16‰. Considering that trains can start at the gradient, number of wagons that run to Gedebage is restricted to 16 and number of wagons going to Cikarang will be 32. Total length include locomotive is 230m for a 16-wagon train and 450m for a 32-wagon train.

8.3.2 Formulation of Improvement Plan of Railway Freight from/to Tanjung Priok Terminal (Case I)

(1) Initial Stage after access railway to Tanjung Priok is connected

1) Access Railway Plan and Facilities Required

As the Stage1 of Case I development, following works are required to achieve the target throughput.

- Direct rail access to Tanjung Priok Terminal
- Improvement of Gedebage Dryport
- Construction of Cikarang Dryport and the access from main line
- Procurement of rolling stock

As described below, project designs and implementation plans of 1. and 2. were already outlined by local entities. Also, several dry ports of the private sector include construction of direct rail access by their own funding. These plans are basically consistent with the scenario prepared by the Team. Therefore, these should be treated as “programmed” developments.

2) Operation Plan for Railway Freight from/to Tanjung Priok

As the East line and Bekasi line of Jabodetabek section share the track with commuter train and long distance passenger train, it is only possible to increase the number of trains to 10 for one direction. Rail services for container traffic between Tanjung Priok and Cikarang as well as Tanjung Priok and Gedebage is proposed to comprise 20 and 4 trains, 10 and 2 trains each way respectively over a 24 hour period. Train operation diagram of the same is given in Figure 8.3-11.

Table 8.3-4 Operation Plan for Railway Freight from/to Tanjung Priok

	Distance (km)	Trip Time (min)	Trips Per day	Wagons per train	Throughput (TEU)
Tg. Priok - Gedebage	191.5	278	2	16	23,360
Tg. Priok – Cikarang	52.0	61	10	32	233,600

Source: Study Team Estimate

3) Travel Time Comparison with Road Modal Cargo from/to Tanjung Priok

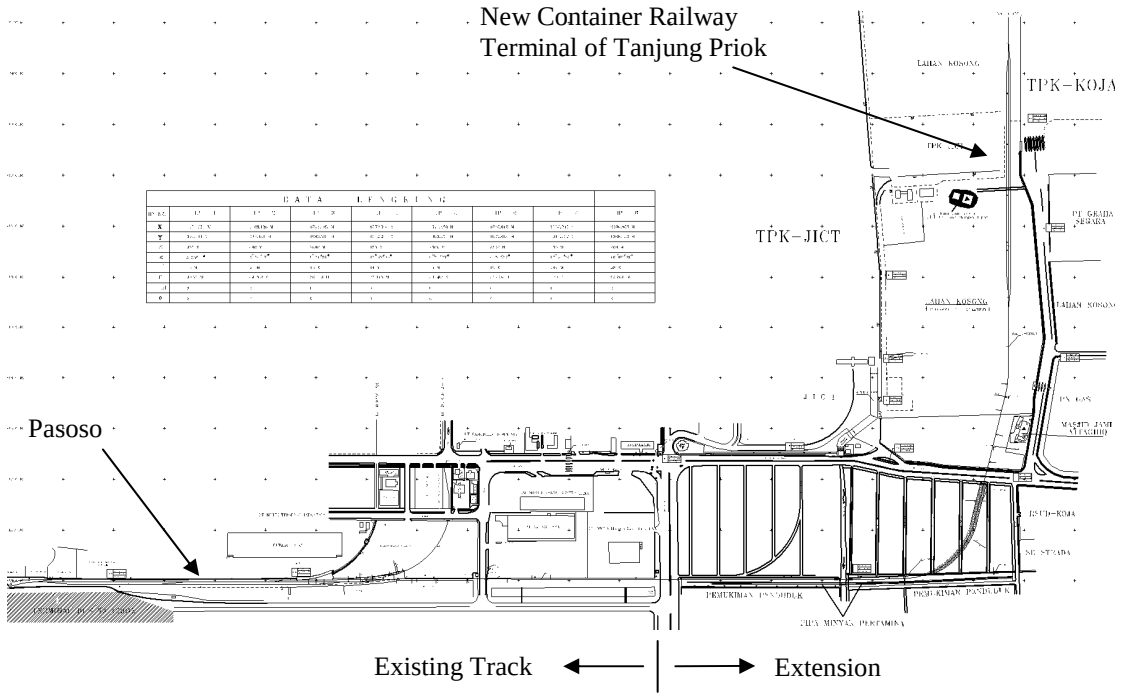
Travel time savings from direct access to Tanjung Priok Terminal are expected to be within the range of 30 minutes to 1 hour. Therefore, trucking has precedence over freight train even after project completion in the case of Tanjung Priok – Gedebage corridor. Rail has to attract customers by stressing their advantages of capacity, reliability, punctuality and customer service over trucking.

Meanwhile, it is anticipated that rail should retain competitiveness in travel time over trucking for Tanjung Priok – Cikarang corridor (61 minutes for rail and 100 minutes for trucking).

4) Preliminary Design of Required Facilities

Direct Rail Access to Tanjung Priok Terminal

- Rail Access - DGR have been promoting land acquisition, and have secured yard space at JICT. However, land acquisition for the approaching track branches off from existing Pasoso track is now pending. Although this exercise will be resumed next year, completion date of the Project is not yet certain.
- Track Layout at Tanjung Priok Terminal - The railhead infrastructure and facilities were designed by local entities (local consultant hired by DGLC). The Railhead at Tanjung Priok Container Railway Teriminal consists of 3 rail tracks, with a single-track neck. The two outer tracks are used for container handling and the 1 inner track for access to the outer tracks. The length is sufficient to serve 1 bay each for 32 freight wagons. Following figure shows the current extension plan.



Source DGR

Figure 8.3-1 Tanjung Priok Extension Plan

Container Handling Equipment

There is no procurement plan for container handling equipment at this moment. Recommended arrangement is as follows.

- Reach stacker: 2
- Head Truck/Chassis 6

Based on the diagram stabling track is required near the terminal. After extension to Tanjung Priok Terminal, Pasoso will still be used for domestic container loading and unloading. This location is suitable for stabling track and it is proposed to construct additional track for stabling beside loading track of Pasoso.

Following figure indicates loading/unloading track at Tanjung Priok Terminal and stabling track at Pasoso.

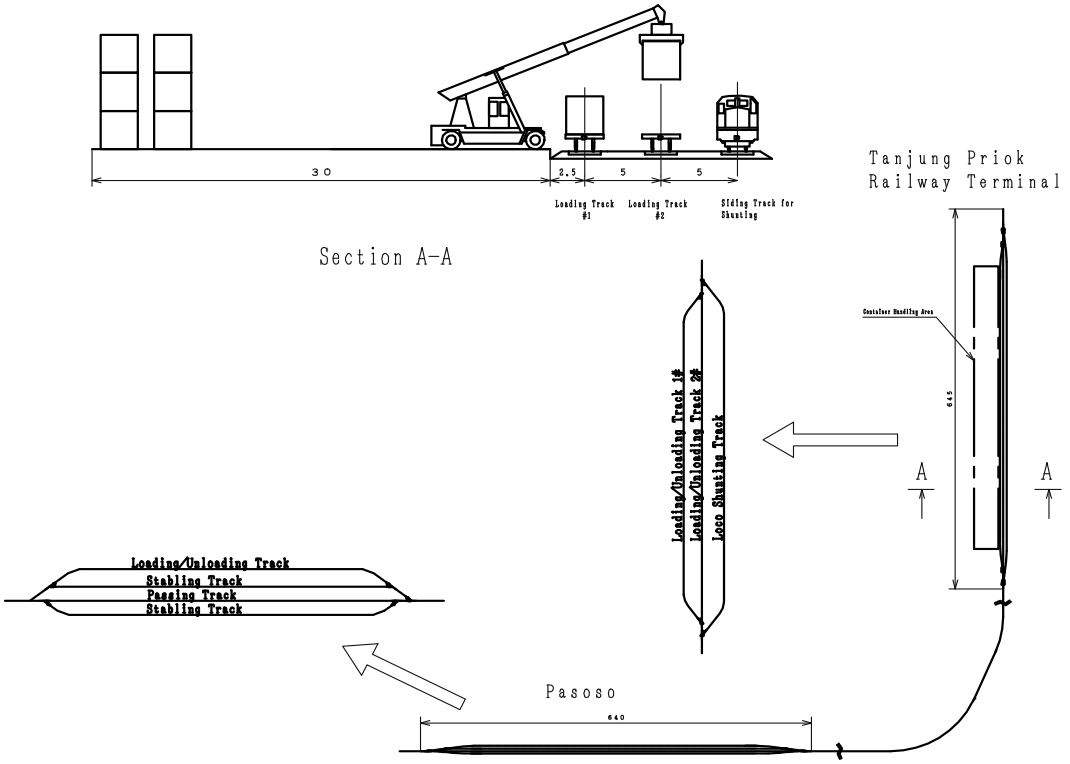


Figure 8.3-2 Proposed Loading Track of Tanjung Priok and Stabling Track of Pasoso

- Signalling Facility - The railhead proposed for Tanjung Priok Terminal is broadly similar to existing Pasoso. Mobile equipment should be used for container handling and that signalling is unnecessary at the railhead itself. Access tracks would though be signalled, together with the main line connections.
- Telecom Facility - There is a need for internal PABX facilities to serve internal telephone communications at Container Railway Teriminal at Tanjung Priok especially in the future as traffic grows.

Improvement of Gedebage Dryport

- Track Layout at Gedebage Dryport - The railhead infrastructure and facilities were designed by local entities (local consultant hired by PT. KA). Currently there are one loading and unloading track and one stabling track. Loading track is enough for future demand however to fix the departure time one more stabling track is required.
- Container Handling Equipment - Currently the time required to load + unload a full train using the existing facility of portal crane is around 2 hours. Therefore, future dry port operation should give preference to the use of 2 reach stackers to increase the capacity.
- Signalling and Telecom Facility – Basically, no improvement will be required from the existing facilities. However, it would be desirable if shunting operation to/from main line is undertaken in a more flexible manner. Providing entrance/exit at both sides and supporting communication equipment is advisable.

Construction of Cikarang Dryport

- Track Layout at Cikarang Dryport - To cater for the target throughput, the railhead at

Cikarang Dryport should consist of 4 tracks for loading and unloading, 2 siding tacks of loco shunting, with 2 single-track necks.

- Signalling and Telecom Facility - Signalling facilities shall be required as station yard with main and shunting signals with point machines and train detection equipment. Following figure indicates the proposed track layout of Cikarang Dryport

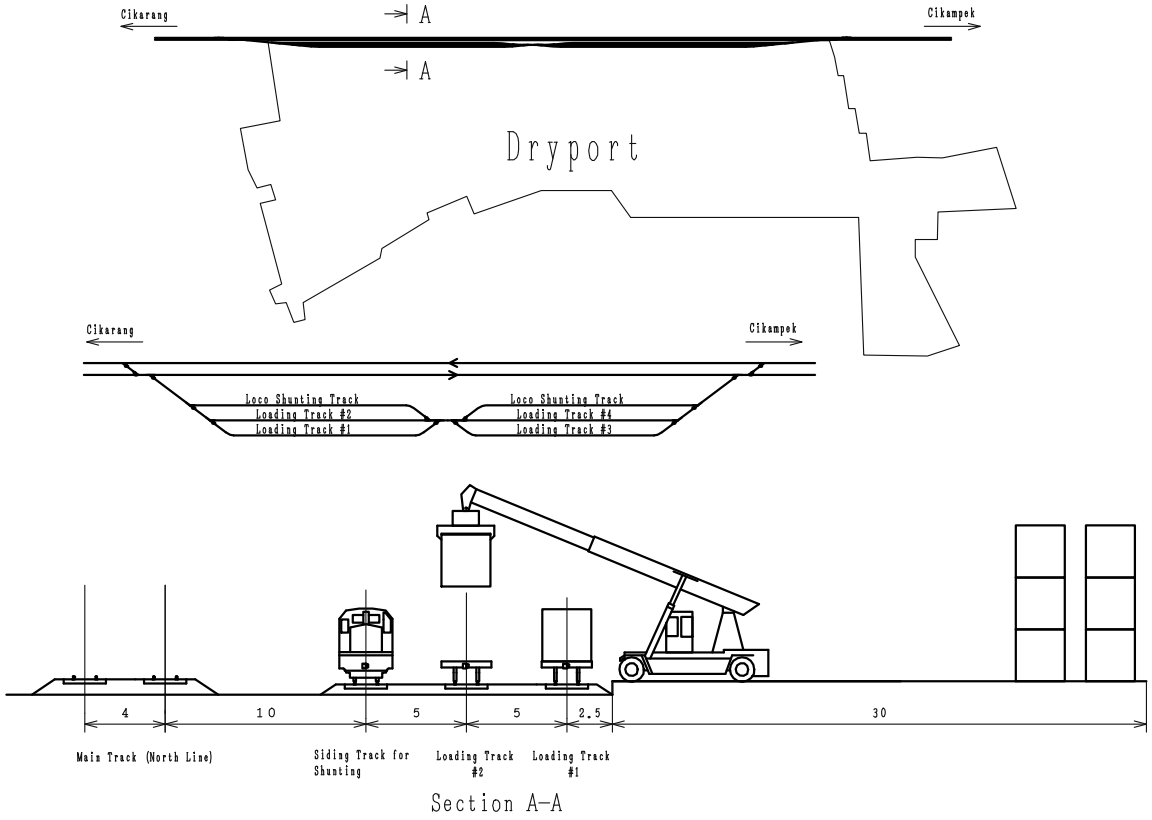


Figure 8.3-3 Proposed Track Layout of Cikarang Dryport

Procurement of Rolling Stock

In view of the locomotive traction power and effective length at intermediate crossover tracks, train consist of each section are set as follows.

- Tanjung Priok Yard – Gedebage Dry Port: CC201 + 16 container wagons.
- Tanjung Priok Yard – Cikarang Dry Port: CC201 + 32 container wagons.

Required number of rolling stock, estimated from the train operation diagram, is given below.

Table 8.3-5 Rolling Stock Procurement Plan

	In operation	Reserved	Total number
Number of Locomotives	10	2	12
Number of Wagons	288	14	302

Source: Study Team Estimate

5) Construction Schedule

These works are likely be carried out by 2015.

(2) Second stage when Jabodetabek Network is improved

1) Access Railway Plan and Facilities Required

Jabodetabek network will be improved to transport 3 million passengers per day from the current 0.7 million. To synchronize with this improvement the number of trains dedicated to container transportation is planned to increase by 50%. Following works are required to achieve the target throughput.

- Construction of stabling yard at Tanjung Priok
- Procurement of rolling stock

2) Operation Plan for Railway Freight from/to Tanjung Priok

To improve the Jabodetabek network, signalling system will be changed to allow 3 minutes headway. However to maximize the passenger transportation it is prohibited to operate freight train in peak hours. Train schedule is planned for container trains not to pass in peak hours (from 6 a.m. to 9 a.m. and 5 p.m. to 9 p.m). Rail services for container traffic, between Tanjung Priok and Cikarang as well as Tanjung Priok and Gedebage, is proposed to comprise 30 and 6 trains, 15 and 3 trains each way respectively over a 24 hour period. Train operation diagram of the same is given in Figure 8.3-12.

Table 8.3-6 Operation Plan for Railway Freight from/to Tanjung Priok

	Distance (km)	Trip Time (min)	Trips Per day	Wagons per train	Throughput (TEU)
Tg. Priok - Gedebage	191.5	278	3	16	35,040
Tg. Priok – Cikarang	52.0	61	15	32	350,400

Source: Study Team Estimate

3) Travel Time Comparison with Road Modal Cargo from/to Tanjung Priok

Travel time is the same as previous stage. However it is anticipated that travel time of trucking will become longer due to the congestion that economic growth could spur. Tanjung Priok – Cikarang will be much competitive and even Tanjung Priok – Gedebage route could become competitive in travel time.

4) Preliminary Design of Required Facilities

Providing Tanjung Priok Yard for Freight Trains

Track Layout at Tanjung Priok Yard – To operate 36 trains per day stabling track at pasoso is not enough. To the the west of the Tanjung Priok passenger terminal up to Ancol there is space of about 30m between tracks that is currently not used. This area is proposed as the stabling yard for freight trains. 6 stabling tracks are available in this area. However 7 stabling tracks are required by train schedule so stabling track at Pasoso is utilised as well. Following figure indicates the track layout of Tanjung Priok stabling yard.

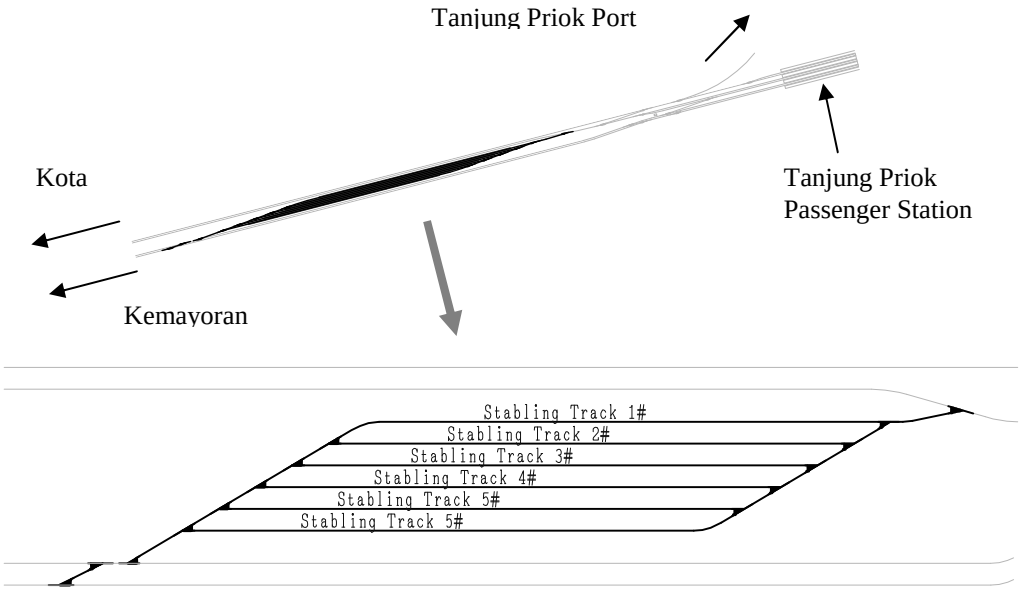


Figure 8.3-4 Proposed Track Layout of Tanjung Priok Yard

Signalling Facility - the adjacent facility, being connected to the main line in the same way as at any other station, will require full signalling to be able to handle the traffic in a timely manner and to provide the necessary safety. Control of this yard with full circuiting of the line is assumed in this study.

Procurement of Rolling Stock

In view of the locomotive traction power and effective length at intermediate crossover tracks, train consist of each section are set as follows.

- Tanjung Priok Terminal – Gedebage Dry Port: CC201 + 16 container wagons.
- Tanjung Priok Terminal – Cikarang Dry Port: CC201 + 32 container wagons.

Required number of rolling stock, estimated from the train operation diagram, is given below.

Table 8.3-7 Rolling Stock Procurement Plan

	In operation	Additional	Total number
Number of Locomotives	2	1	3
Number of Wagons	48	2	50

Source: Study Team Estimate

5) Construction Schedule

These works are likely to be carried out by 2020.

8.3.3 Formation of Access Railway Plan to Cilamaya Site (Case II)

(1) Access Railway Plan and Facilities Required

Following works are proposed to achieve railway transportation of Cilamaya site.

- Construction of single track between Cilamaya Terminal and Cikarant Dryport
- Construction of stabling yard at Cikarang
- Construction of container termianl at Cilamaya New Terminal
- Procurement of rolling stock

Location of access railway is indicated below.

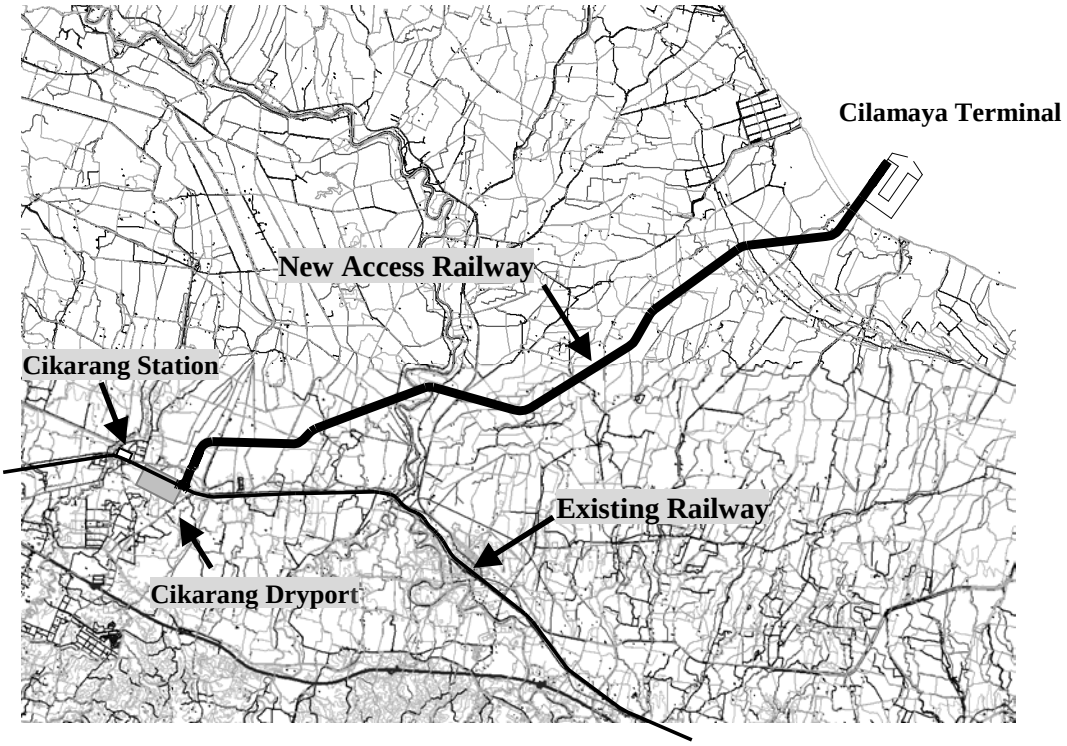


Figure 8.3-5 Location of Cilamaya Access Railway

(2) Operation Plan for Railway Cargo from/to Cilamaya Site

Rail services for container traffic, between Cilamaya and Cikarang and Cilamaya and Gedebage, has been assumed to comprise 12 and 50 trains, 6 and 25 trains each way respectively over a 24 hour period.

Train operation diagram of this case together with Tanjung Priok Terminal access is given in Figure 8.3-13.

Table 8.3-8 Operation Plan for Railway Freight from/to Cilamaya New Terminal

	Distance (km)	Trip Time (min)	Trips per day	Wagons per train	Throughput (TEU)
Cilamaya - Gedebage	178.5	307	6	32	70,080
Cilamaya – Cikarang	41.5	78	25	64	584,000

Source: Study Team Estimate

(3) Travel Time Comparison with Road Modal Cargo from/to Cilamaya

Again, travel time of rail is less advantageous compared to road for both Cikarang and Gedebage destinations unless road traffic congestion becomes critically worse. However, time difference is not big in Cikarang destination (78 minutes for rail and 70 minutes for trucking) and travel can be shorter when introducing high performance locomotive.

(4) Preliminary Design of Required Facilities

1) Construction of single track between Cilamaya Terminal and Cikarang Dryport

- Route Alignment - 41.7-kilometer long new access route to Cilamaya Terminal with single track at grade level is proposed. The access will be connected with existing rail network east of Cikaran Drayport.
- Civil Works - The construction of Cilamaya – Cikarang new railroad requires the design and construction of 41.7 km new embankment. Characteristics of typical embankment cross section is as follows:
  - . Embankment height: 3.0 m
  - . Ballast thickness: 0.30 m
  - . Embankment top width: Varies from 6.0 m to 10.0 m
  - . Side slope (V:H): 1 : 1.5

  The drainage ditch shall be located at the outer limits of the railroad right-of-way with a flat bottom drainage ditch for future maintenance. The railway fence shall be provided at the boundary of right-of-way along the railroad tracks to deter people from trespassing and vandalising the railway

  Following figure shows a typical cross section of the railway track.

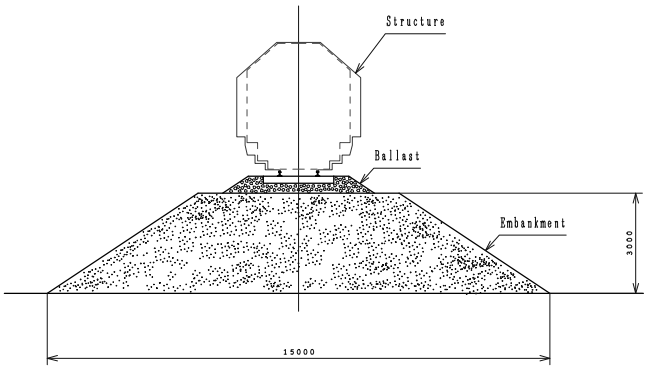


Figure 8.3-6 Typical Cross Section

- Track Works - This single-track branch is provided with 4 intermediate passing loops to allow ascending and descending trains to pass each other. R 54 type rail is proposed.
- Bridge Works - Plate girder bridges with two main plate girders are proposed to cross over waterways. Three span continuous steel plate girder bridges on two concrete piers and two abutments are proposed to cross over the major rivers laid on the project site.
- Signalling and Telecommunication Works - i) Automatic Blocking System based on computer and microwave balise aided system, track circuit, ii) Fiber-and-Copper Cable or Optical Fiber Transmission System, iii) Train Radio System, iv) Telephone Exchange, v) Dedicated Telephone Terminals are proposed.

2) Construction of Stabling Track at Cikarang

- Track Layout of Stabling Yard at Cikarang – Stabling Yard is planned near the junction of Cimalaya new access line to existing track. This location is also planned for depot of commuter train to cope with capacity limits of Jabodetabek. Stabling yard of freight train will be planned adjacent to depot of commuter train and share the connecting track to main line with commuter train. Eight stabling tracks for freight

train and 2 stabling and inspection tracks for locomotive will be provided within yard area of 43,000 sqm (860m x 50 m). Following figure indicates the track layout of Stabling Yard.

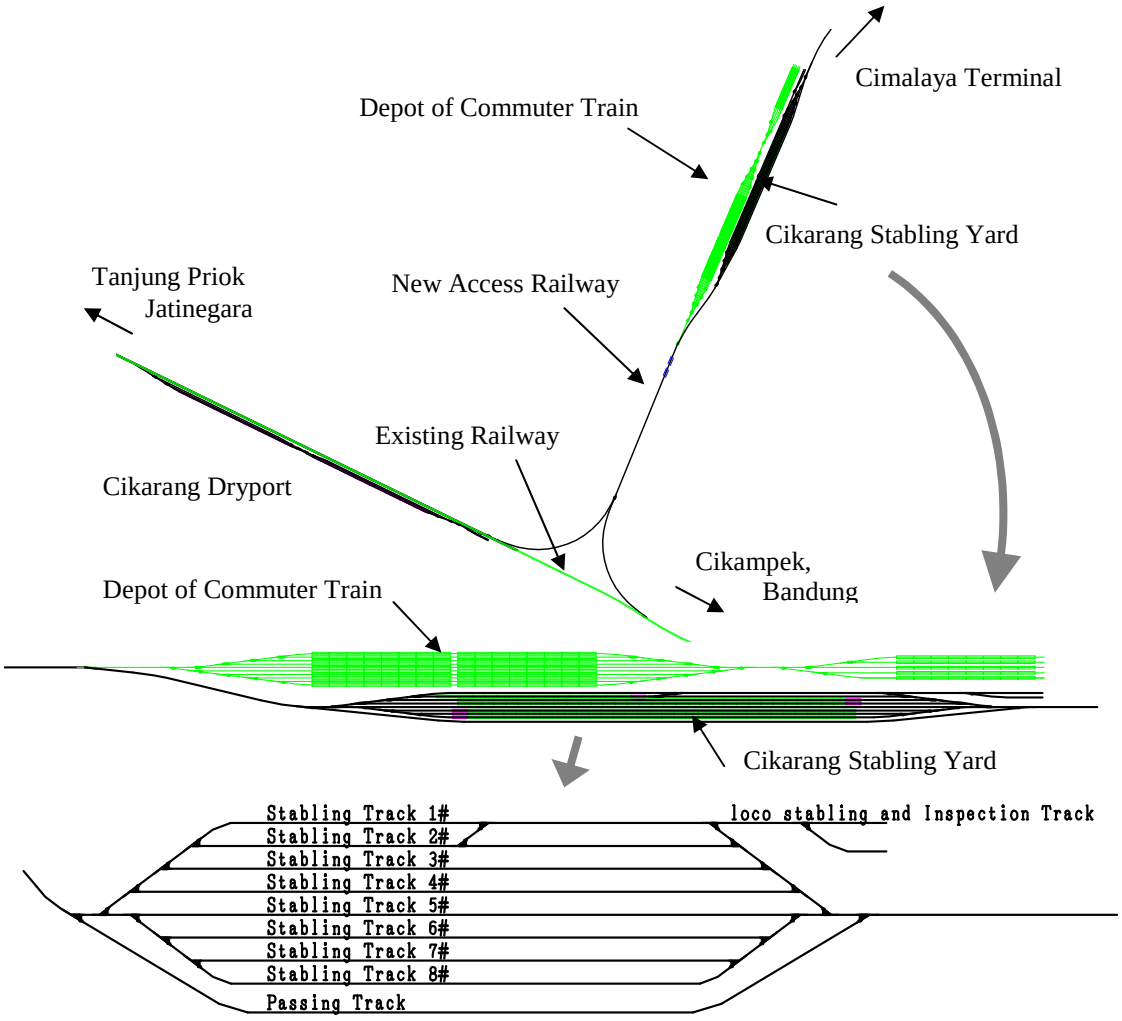


Figure 8.3-7 Stabling Yard of Cikarang

- Civil Works - The construction of the switchyard requires the design and construction of a 43,000 sqm new embankment with the height of 3.0 m. Construction of water supply, drainage and sewerage works to cover the entire site is required. Overall perimeter fence and boundary patrol road shall be provided to cover the entire site for security reasons.
- Building Works - Administration building, signal control room, and inspection shed shall be provided for the operation and maintenance activities undertaken on the premises.
- Signalling and Telecommunication Works - The adjacent facility, being connected to the main line in the same way as at any other station, will require full signalling to be able to handle the traffic in a timely manner and to provide the necessary safety. Control of this yard with full circuiting of the line is assumed in this study.
- Maintenance Facilities - Fabrication and erection of oil storage tank and water tank shall be required. Also, the light maintenance equipment, including inspection pit, overhead crane, underfloor jacks, and spare parts, shall be provided.

3) Construction of Container Terminal at Cilamaya New Terminal

- Track Layout at Cilamaya Container Terminal - The Railhead at Cilamaya Container Terminal consists of 3 rail tracks, with a single-track neck. The two tracks on the east side are used for container handling and the one track on the west side is for access to the other tracks, which are divided into 2 bays each by intermediate crossovers

The preliminary design provides for 2 modules at the ICD site with container yard area of approximately 40,000 sqm (40m x 500m x 2) on the east side of the railhead.

Following figure indicates the track layout of Cimalaya Container Terminal.

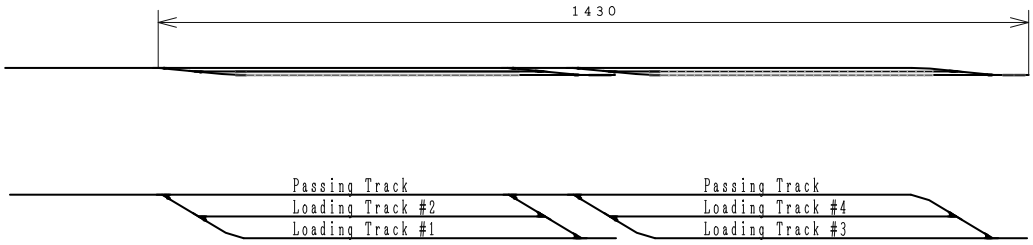


Figure 8.3-8 Track Layout of Cimalaya Container Terminal

- Civil Works – It may be necessary to pave the container yard for 4-high stacking of full containers. Reinforced Concrete (RC) paving 400 mm in depth on a subbase is proposed (this work is included in the works of new terminal development). Construction of water supply, drainage and sewerage works to cover the entire site is required. Overall perimeter fence and boundary patrol road shall be provided to cover the entire site for security reasons.
- Bridge Works – The bridge from landside to Cilamaya New Terminal will cross above the stream where clearance is required below the structure to allow the vessel passage. The single track PC girder bridge with steel piers is proposed. The bridge has span length of 25m and pile length of 30m. Figure 8.2.5 indicates typical cross section of the bridge.
- Building Works - 2 module offices should be built as open plan, with no internal walls, leaving the operators to design and arrange the interiors for their own needs. The office shall provide a Control Room overlooking the container yard with an uninterrupted view.
- Signalling and Telecommunication Works - The railhead proposed for Cilamaya is broadly similar to existing Pasoso. Mobile equipment should be used for container handling and signalling is unnecessary at the railhead itself. Access tracks would though be signalled, together with the small yard and main line connections.

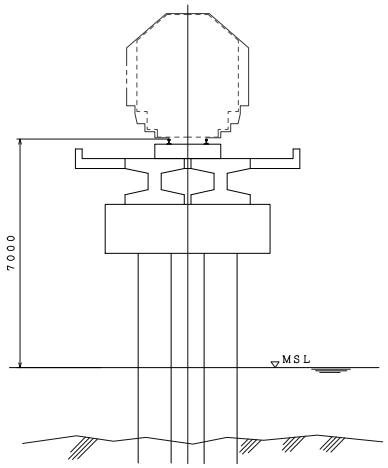


Figure 8.3-9 Cross Section of Bridge

- Container Handling Equipment - Container handling equipment and their quantities are proposed as follows
  . Reach stacker 4
  . Head Truck/Chassis 6

4) Procurement of Rolling Stock

In view of the locomotive traction power and effective length at intermediate crossover tracks, train consist of each section are set as follows.

- Cilamaya New Terminal – Gedebage Dry Port: CC201 + 16 container wagons
- Cilamaya New Terminal – Cikarang Dry Port: CC201 + 32 container wagons

Required number of rolling stock, estimated from the train operation diagram, is given below.

Table 8.3-9 Locomotives and Wagon Requirements by year

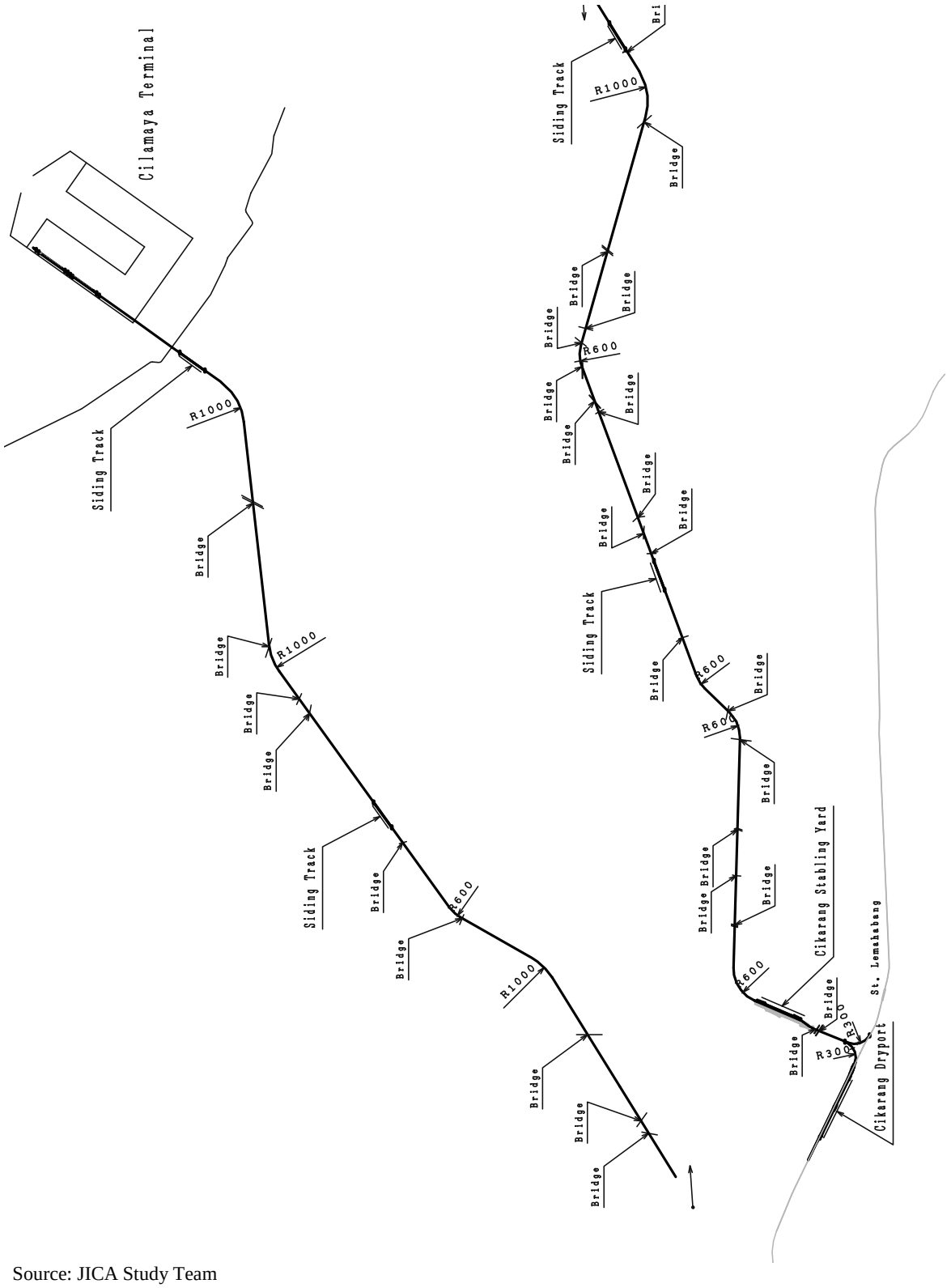
	In operation	Reserved	Total number
Number of Locomotives	14	2	16
Number of Wagons	368	19	387

Source: Study Team Estimate

(5) Construction Schedule

The proposed construction schedule for the project is envisaged as a total of 5 years, 2 years for land acquisition and 3 years of rail access construction.

- Land acquisition 2015 - 2016
- Civil works 2017 - 2019
- Railway E&M works 2018 - 2019
- Rolling stock procurement 2017 – 2019
- Commencement of operation 2020



Source: JICA Study Team

Figure 8.3-10 Route Alignment (Cilamaya – Cikarang Freight Corridor)

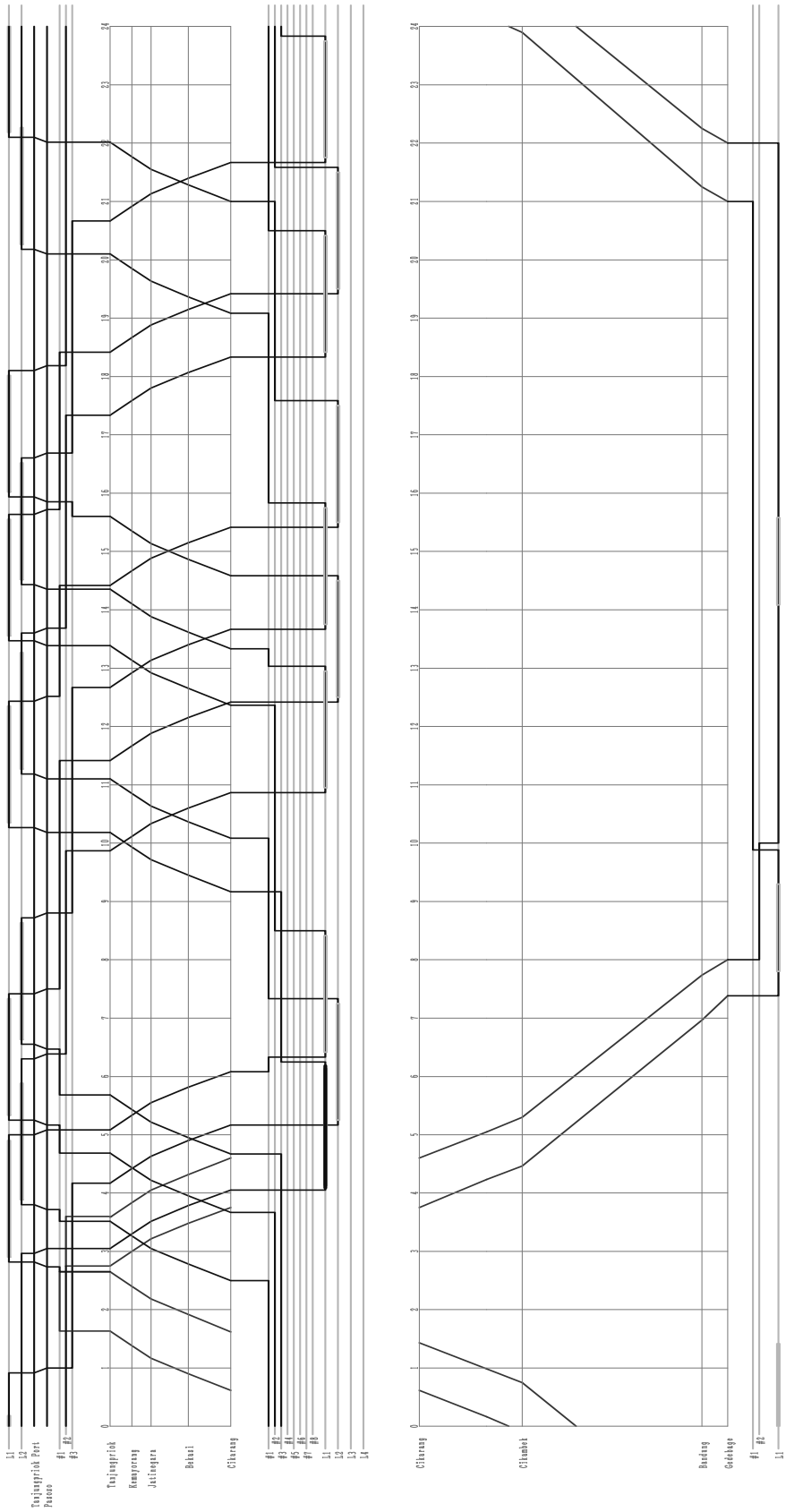


Figure 8.3-11 Train Operation Diagram (Case I Stage 1)

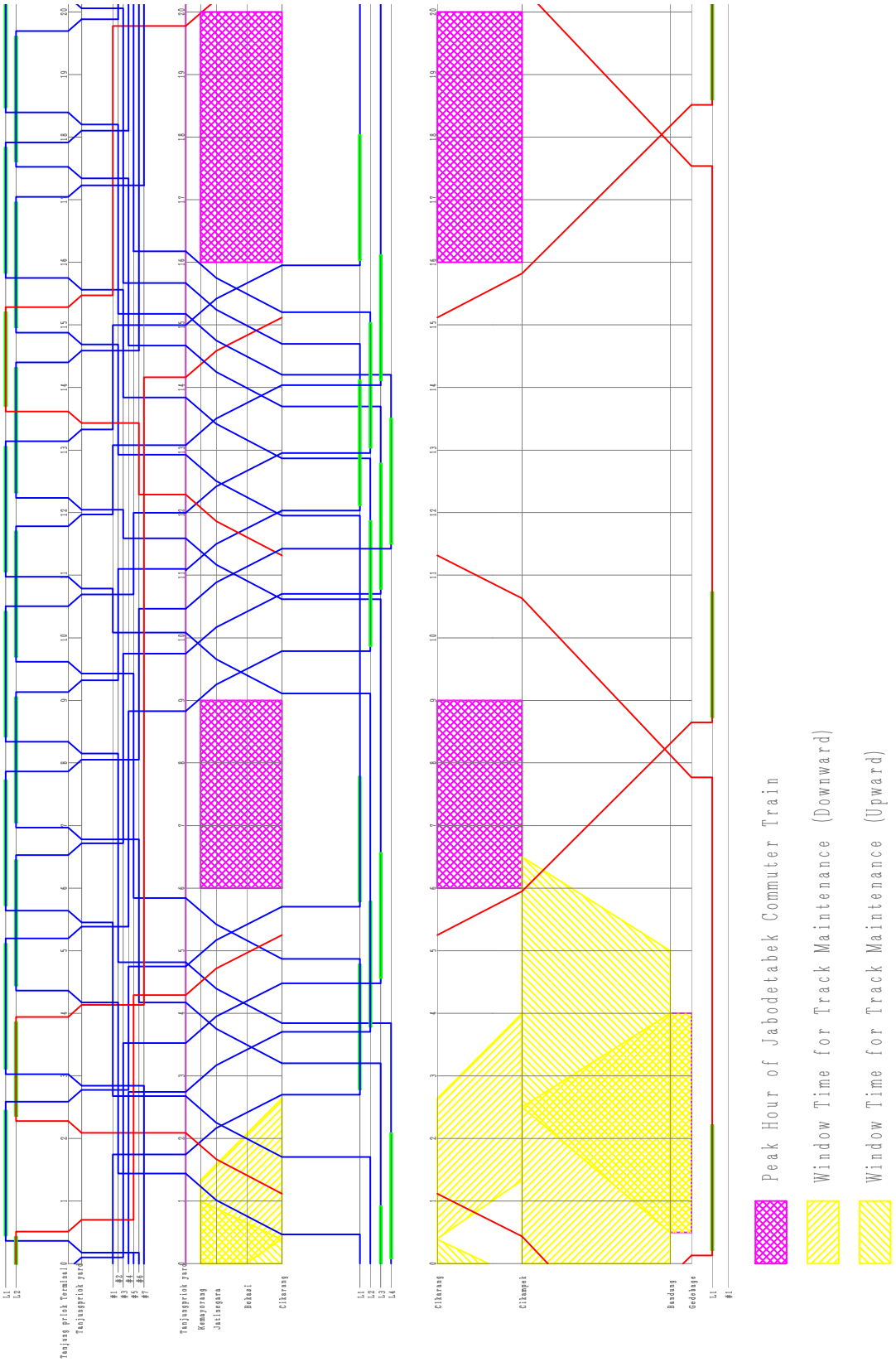


Figure 8.3-12 Train Operation Diagram (Case I Stage 2)

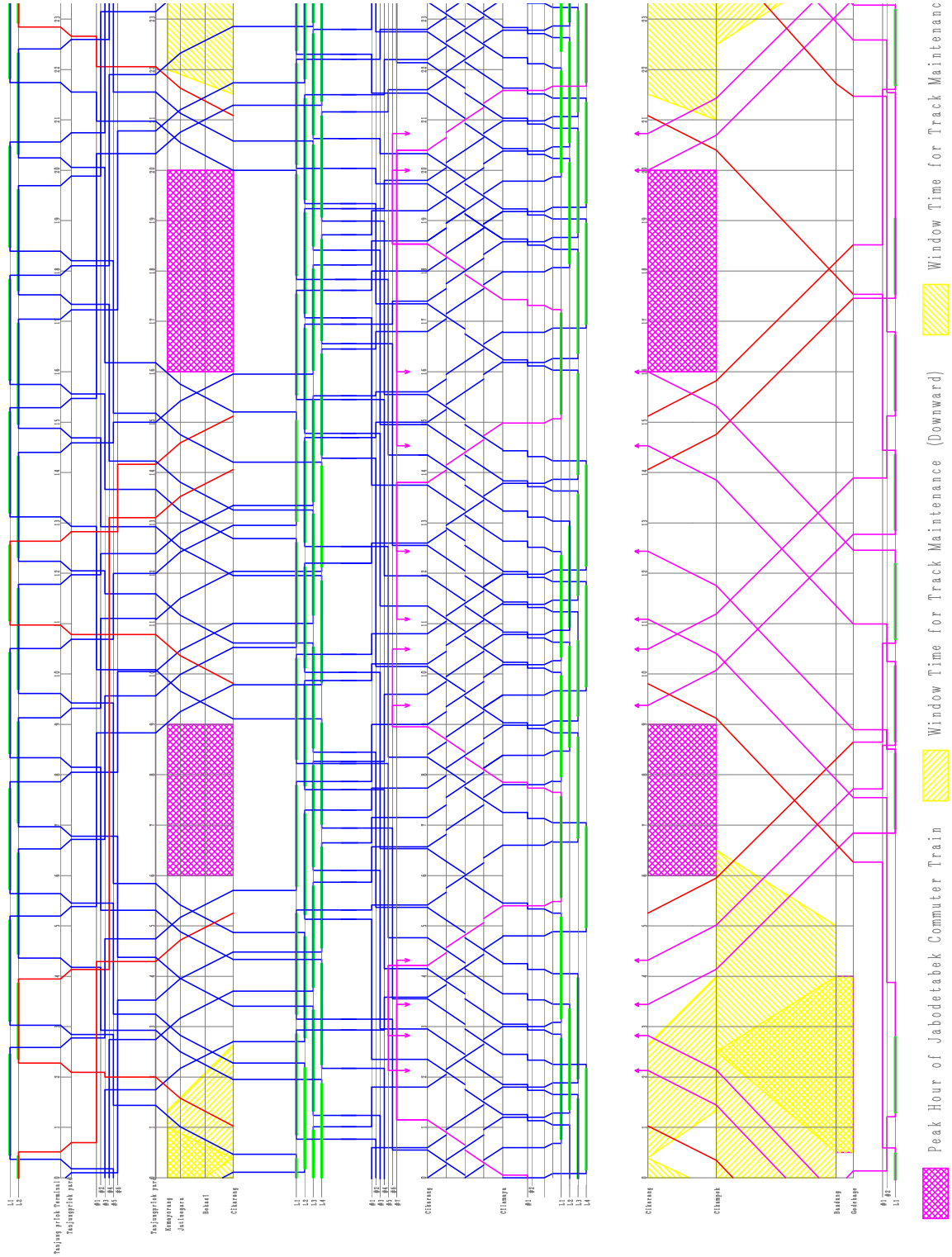


Figure 8.3-13 Train Operation Diagram (Case II)

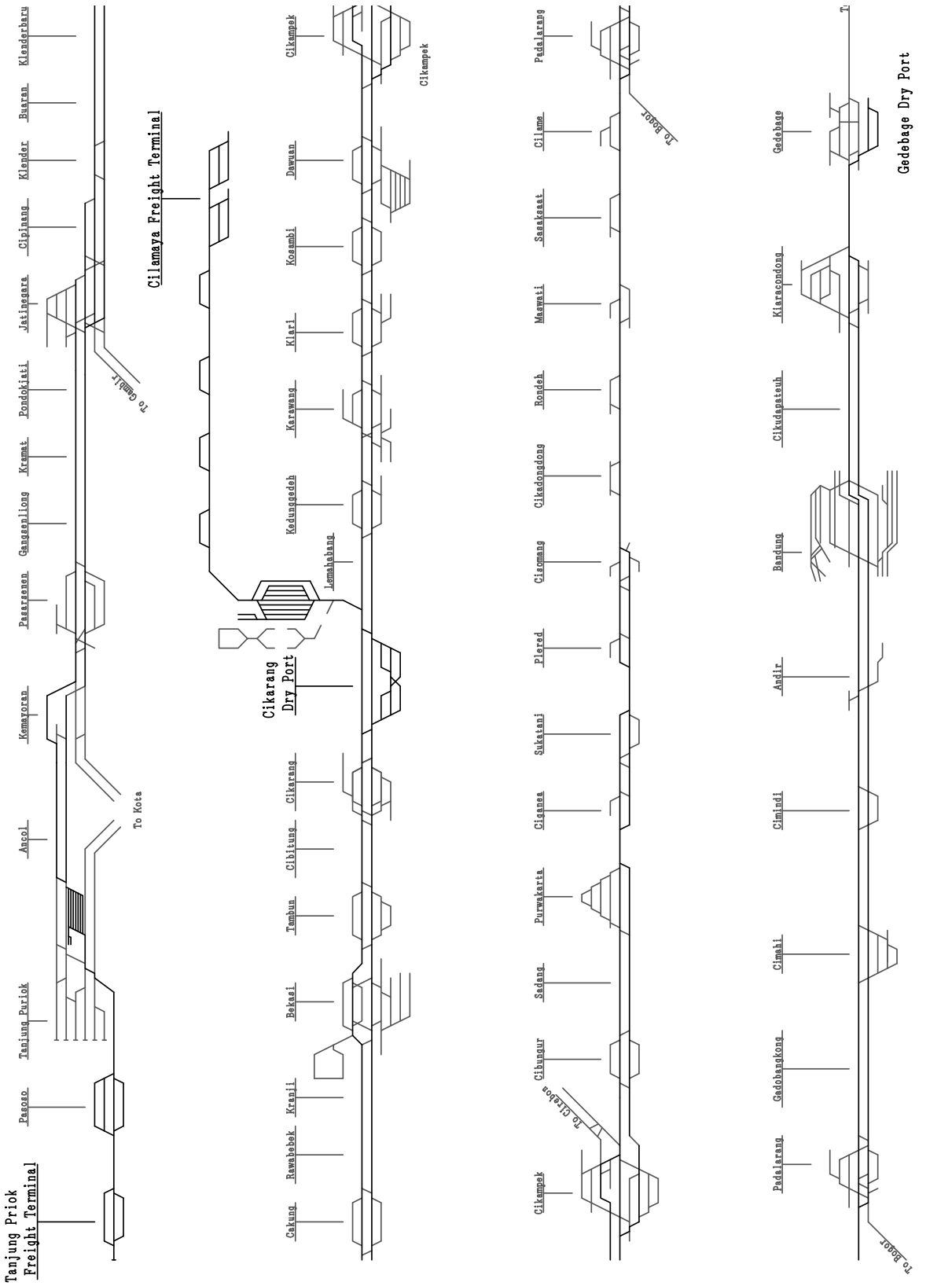


Figure 8.3-14 Track Layout (Entire Project Area)

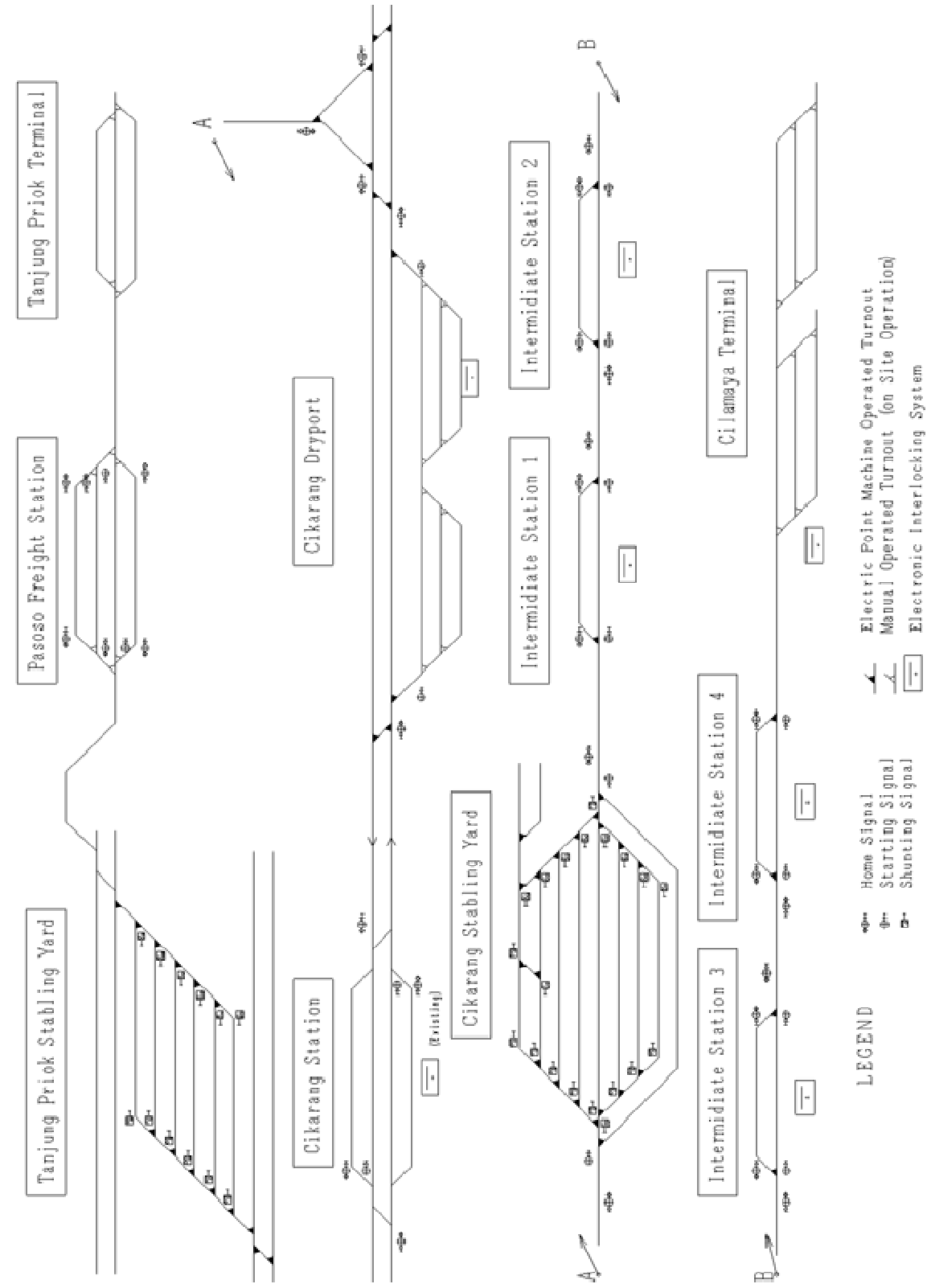


Figure 8.3-15 Signalling Layout Plan

8.4 BASIC STAKEHOLDER ANALYSIS OF RAILWAY FREIGHT BUSINESS

8.4.1 Stakeholders and their Roles

(1) Railhead Operation and Maintenance

At Tanjung Priok loading and unloading of trains is to be undertaken by Pelindo or its subsidiary company (MTI), who is responsible also for movement of containers between the berths and railhead.

At Cilamaya, loading and unloading of trains is to be undertaken by assumed newly appointed terminal operator. The Operator will handle containers at the railway yard behind the container terminal yard. Similarly, an independent operator would be in charge of handling containers at Cikarang Dry-Port.

(2) Railway Operation and Maintenance

An important objective of this project is to ensure that facilities and operating systems are improved and expanded so as to accommodate a significant increase in rail services and achieve higher quality performance. The operation and maintenance is done by PT KA, who is the natural candidate to be in charge of railway freight.

Table 8.4-2 indicates main stakeholders, their roles, costs, and revenues.

8.4.2 Revenue Model

(1) Competitiveness of Railway Freight

The revenue model for this project will be assumed taking into consideration the current pattern of pricing for truck and train cargo transportation. First of all, we verify the competitiveness of railway freight business by comparing its price of transport containers with the price of trucking. In this case, the price estimated is from “door-to-door”, i.e., from port yard to factory.

The total price is the aggregate total of the individual prices of each stake holder. The associated price for trucks is simply the round trip from Depot Yard to factory. Stuffing the TEU and unloading is not included as it is the same for the case of trains and it will not affect the difference in price between the two modes. The price for trucking is shown in Table 8.4-1.

Table 8.4-1 Pricing Breakdown for Trucks

Options	Railway Distance	Truck Round Trip
from/to to/from	*km*	*Rp/TEU*
Tg. Priok – Gedebage	191.5	2,500,000
Tg. Priok – Cikarang	52.0	1,300,000
Cilamaya – Gedebage	178.5	2,000,000
Cilamaya - Cikarang	41.5	1,500,000

Source: Based on interviews with logistic companies

In case of railway cargo, in the current model, most of the TEU are moved one way empty to the factory to be loaded, and then moved full to the port for export, or vice versa in case of import. The price is composed of the following items:

a) For empty TEU:

- Loading/unloading at POO and Dry port
- Handling at POO and Dry port
- Hauling from depot to POO
- Train fee

b) For full TEU

Loading/unloading at POO and Dry port
Handling at POO and Dry port
Hauling from depot to POO
Truck feeder from dry port to factory (round trip)
Train fee

We assume that the direct access project to Tanjug Pirok from Pasoso station will be executed and therefore the current expenses of handling fee and hauling from port container depot to/from Pasoso station will not be considered. Then, the price for railway freight is calculated as shown in Table 8.4-3.

Comparing Table 8.4-1 and Table 8.4-2, it can be stated that the competitiveness of the railway freight business is confirmed as it has a lower price tag than its competitor, trucks.

(2) Project Revenue Scheme

In order to determine the revenue scheme, each individual stakeholder's revenue stream should be indentified. As it will be mentioned in Section 8.5.1, revenue for Investment and also for Equity will be calculated.

The Return on Equity is determined from the viewpoint of the railway operator. Then, it is necessary to determine in detail the scope of responsibilities of said operator. Refer to Figure 8.4-1 showing the boundary of responsibility between the train operator (PT. KA in our case) and the central Government (Directorate General of Railway, DGR).

Capital investment on infrastructure and rolling stock are shown in dark color boxes in this figure, and yellow boxes are representing operation and maintenance expenses. Items below the thick blue line are the responsibility of DGR, and those above the blue line are under PT. KA's scope of responsibility.

For the use of the infrastructure and rolling stock, the railway operator (PT. KA) is obliged to pay a fee to the Government (DGR) called TAC.

The Track Access Charge (TAC) for purpose of calculations was estimated as the average of 5 recent years[1], considering the Public Service Obligations (PSO) and Infrastructure Maintenance and Operation (IMO). Then, the TAC was estimated as 25% of the total O&M costs of the railway company.

[1] *Implementation and Impacts of PSO, IMO and TAC Schemes on National Railway Reform in Indonesia, Journal of the Eastern Asia Society for Transportation Studies, Vol. 8, 2010*

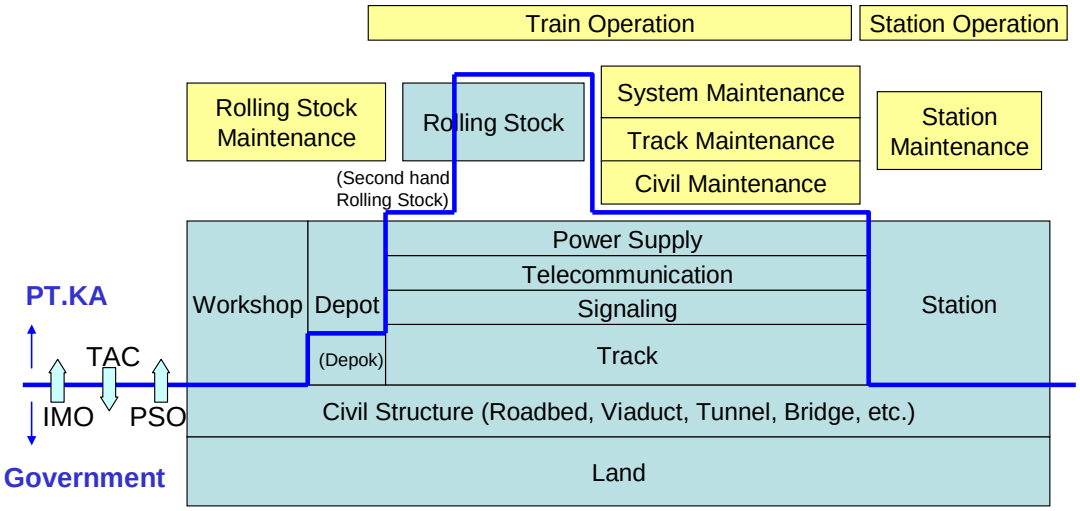


Figure 8.4-1 Current Transportation Arrangement and Stakeholders

A brief description of the roles, costs, and revenues of the main stakeholders in the container business is stated in Table 8.4-2, and the current transportation arrangement and involved stakeholders are indicated, in a schematic form, in Figure 8.4-2.

Table 8.4-2 Stakeholder Analysis: Roles, Costs, and Revenues

Stakeholder	Role	Cost & Revenue
Container Yard Operator (Pelindo, MTI)	Handling TEU at port yard, Lo/Lo, depot management.	Capital investment of handling facilities O&M costs of handling facilities and equipment Revenue for handling, hauling, Lo/Lo, storage.
Central Government Directorate General of Railways	Acquiring ROW, infrastructure, rolling stock	Capital investment of infrastructure, rolling stock, and ROW Revenue : TAC.
Railway Freight Operator (PT. KA)	Transport of TEU by train from port to dry-port.	Capital investment of station facilities O&M costs of all railway facilities and equipment Revenue for transportation by train.
Dry-port Operator	Handling TEU at dry-port yard, Lo/Lo, depot management.	Capital investment of dry-port facilities O&M costs of dry-port handling facilities and equipment Revenue for handling, Lo/Lo, storage.
Truck Feeder	Transport by truck from dry-port to factory, stuffing & unloading.	O&M costs of trucks Revenue for transportation by truck

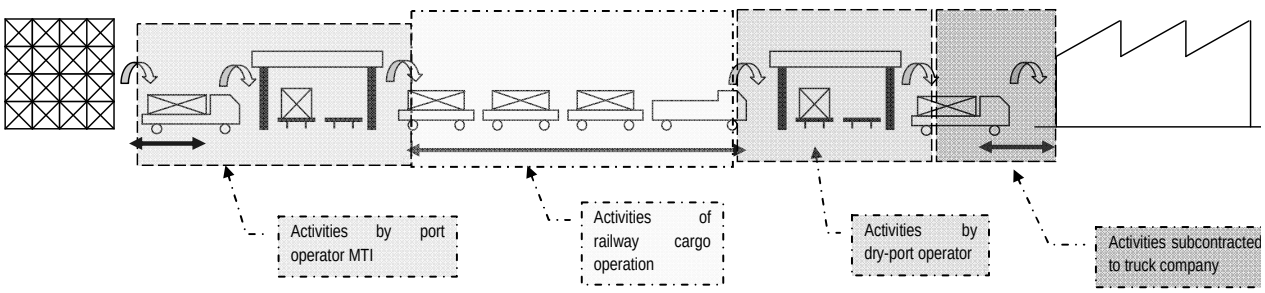


Figure 8.4-2 Current Transportation Arrangement and Stakeholders

Table 8.4-3 Pricing Breakdown for Railway Freight

Options		Train Empty		TEU Empty Lo/Lo	**Subtotal TEU Empty**	Train Full		TEU Full Lo/Lo	**Subtotal TEU Full**	Truck Zone I (10km)	**Total round trip**
from/to	*to/from*	*Rp/TEU/km*	*Rp/TEU*	*Rp/TEU*	***Rp/TEU***	*Rp/TEU/km*	*Rp/TEU*	*Rp/TEU*	***Rp/TEU***	*Rp/TEU*	***Rp/TEU***
Tanjung Priok	Gede Bage	1,300	248,950	187,000	**435,950**	3,000	574,500	168,500	**743,000**	400,000	**1,578,950**
Tanjung Priok	Cikarang	1,300	67,600	187,000	**254,600**	3,000	156,000	168,500	**324,500**	400,000	**979,100**
Cilamaya	Gede Bage	1,300	232,050	187,000	**419,050**	3,000	535,500	168,500	**704,000**	400,000	**1,523,050**
Cilamaya	Cikarang	1,300	53,950	187,000	**240,950**	3,000	124,500	168,500	**293,000**	400,000	**933,950**

8.5 FEASIBILITY ANALYSIS RAILWAY FREIGHT BUSINESS

8.5.1 Introduction

The first parameter to be considered when verifying the feasibility of the railway freight business is to compare its price with the competition, trucks. As seen in Table 8.4-1 and Table 8.4-2, the price of railway freight is cheaper than trucks, and thus it is safe to assume that this mode of transport will be preferred as much as possible, and the only limitation would be the capacity of the railway.

The next parameter to evaluate is the Internal Rate of Return (IRR). In our case two different IRRs are studied: One is the common Return on Investment (ROI_1) considering the entire project, regardless of the ownership of the portions of the revenue, as it is divided into several stakeholders, as indicated in Section 8.4.1. The other is Return on Investment (ROI_2) from the view point of the investment of Railway stakeholder, PT KA, which is assumed to be the operator of the railway portion of the freight business.

The first IRR would be useful when evaluating the entire aggregate project, considering the port and road portions. The second IRR would be more useful to evaluate the financial feasibility of the railway freight business on the isolated view point of the railway operator (PT KA).

There are two cases to be studied:

a) Case 1: Freight from Tanjung Proiok to Cikarang (only cost of railway facilities is included) and from Tanjung Priok to Gedebage, assuming completion of direct access from Pasoso station to JICT. The implementation timeline is from 2011 to 2015, including acquisition of rolling stock.

b) Case 2: Freight from Cilamaya to Cikarang (only cost of railway facilities is included) and from Cilamaya to Gedebage, assuming completion of direct access from Pasoso station to JICT. The implementation timeline is from 2015 to 2020, including acquisition of rolling stock and ROW.

8.5.2 Project Cost Estimate

(1) Total Investment Project Cost

The cost estimation is compiled on a single currency, US Dollars, at an FX rate of 1US$=9000 Rp and 1US$=82 JPY. The construction unit cost is settled based on unit costs of similar projects in Indonesia and other South East Asian countries. The project cost was calculated by using the above unit cost and the numerical value based on the route plan at this time.

The general assumptions for the cost estimation are as follows:

- Engineering Cost - The engineering cost was settled as 6 % of the sum of construction cost excluding land acquisition cost.
- Contingency Cost - The contingency cost was settled as 7 % of the sum of construction cost including land acquisition cost.

- Taxes and Duties - The import tariff was exempted from taxation, as the tariff had been exempted from taxation in case of ODA projects. Value Added Tax (VAT) of 10% was applied according to the tax regulations in Indonesia.
- Cost Estimation - The cost was based on 2010 prices. Total project cost is summarized for Case 1 and Case 2 in Table 8.5-1.

The cost is shown for later use on estimation of Return on Investment (ROI). ROI1 considers total investment cost of the entire project, regardless of the source of funds. On the other hand, ROI_2 considers only investment cost borne by the railway freight operator.

Table 8.5-1 Construction Cost Estimate for Case 1 and Case 2 Project

Item	Cost (ROI1)			Cost (ROI2)	
	Case 1		Case 2	Case 1	Case 2
	US$	*US$*	*US$*	*US$*	*US$*
	Stage 1	*Stage 2*			
1. Civil Works			125,730,200		
2. Building Works	2,430,000		12,110,000	2,430,000	12,110,000
3. Track Works	1,380,000	5,280,000	44,700,000		
4. Signalling Works		24,000,000	21,000,000		
5. Telecom Works			6,830,000		
6. Maintenance Facilities			4,500,000		4,500,000
7. Container Handling	3,600,000		14,400,000		
8. Rolling Stock					
Diesel Locomotives	36,000,000	9,000,000	48,000,000	0	0
Freight Wagons	45,300,000	7,500,000	58,050,000	0	0
Subtotal	*81,300,000*	*16,500,000*	*106,050,000*	*0*	*0*
9. Land Acquisition			13,806,000		0
Construction Cost	***88,710,000***	***45,780,000***	***349,126,200***	***2,430,000***	***16,610,000***
Engineering Cost (6%)	5,322,600	2,746,800	20,119,212	145,800	996,600
Contingency Cost (7%)	6,209,700	3,204,600	24,438,834	170,100	1,162,700
Taxes and Duties (10%)	8,871,000	4,578,000	33,532,020	243,000	1,661,000
Total Investment Cost	***109,113,300***	***56,309,400***	***427,216,266***	***2,988,900***	***20,430,300***

Source: Study Team Estimate

(2) Investment Cost Disbursement Scheduled

1) Case 1

The project investment schedule is envisaged as a total of 5 years, including 3 years for rolling stock acquisition, starting in 2011. The schedule of project investment cost disbursement is presented in Table 8.5-2. This table shows clearly the two stages in which Case 1 is envisioned. Stage I, from 2011-2015 has a total investment of US$109,113,300; and Stage II has a cost of US$ 56,309,400.

According to equity, separate tables are used to show cost disbursement for ROI_1 and ROI_2.

Table 8.5-2 Investment Cost Disbursement Schedule for Case 1

Year	Cost Item ROI1 Case 1						Total
	ROW	Rolling Stock	Tg Prk - Ckr	Engineering	Contingency	Taxes	
				6%	7%	10%	
2011				0	0	0	0
2012		16,260,000		975,600	1,138,200	1,626,000	19,999,800
2013		32,520,000	3,705,000	2,173,500	2,535,750	3,622,500	44,556,750
2014		32,520,000	3,705,000	2,173,500	2,535,750	3,622,500	44,556,750
2015				0	0	0	0
2016							
2017							
2018							
2019			14,640,000	878,400	1,024,800	1,464,000	18,007,200
2020		16,500,000	14,640,000	1,868,400	2,179,800	3,114,000	38,302,200
Total	0	97,800,000	36,690,000	8,069,400	9,414,300	13,449,000	165,422,700

Year	Cost Item ROI2 Case 1						Total
	ROW	Rolling Stock	Tg Prk - Ckr	Engineering	Contingency	Taxes	
				6%	7%	10%	
2011				0	0	0	0
2012				0	0	0	0
2013			1,215,000	72,900	85,050	121,500	1,494,450
2014			1,215,000	72,900	85,050	121,500	1,494,450
2015				0	0	0	0
2016							
2017							
2018							
2019							
2020		0		0	0	0	0
Total	0	0	2,430,000	145,800	170,100	243,000	2,988,900

Source: Study Team Estimate

2) Case 2

The project investment schedule is envisaged as a total of 5 years, 2 years for land acquisition and 3 years of rail access construction, starting in 2015. The schedule of project investment cost disbursement is presented in Table 8.5-3.

Accordingly, separate tables are used to show cost disbursement for ROI_1 and ROI_2.

Table 8.5-3 Investment Cost Disbursement Schedule for Case 2

Year	Cost Item ROI1 Case 2						Total
	ROW	Rolling Stock	Cilamaya	Engineering	Contingency	Taxes	
				6%	7%	10%	
2015	6,903,000			0	483,210	0	7,386,210
2016	6,903,000			0	483,210	0	7,386,210
2017		21,210,000	65,287,100	5,189,826	6,054,797	8,649,710	106,391,433
2018		42,420,000	88,278,060	7,841,884	9,148,864	13,069,806	160,758,614
2019		42,420,000	75,705,040	7,087,502	8,268,753	11,812,504	145,293,799
2020				0	0	0	0
Total	13,806,000	106,050,000	229,270,200	20,119,212	24,438,834	33,532,020	427,216,266

Year	Cost Item ROI2 Case 2						Total
	ROW	Rolling Stock	Cilamaya	Engineering	Contingency	Taxes	
				6%	7%	10%	
2015				0	0	0	0
2016				0	0	0	0
2017			2,422,000	145,320	169,540	242,200	2,979,060
2018			7,094,000	425,640	496,580	709,400	8,725,620
2019			7,094,000	425,640	496,580	709,400	8,725,620
2020				0	0	0	0
Total	0	0	16,610,000	996,600	1,162,700	1,661,000	20,430,300

Source: Study Team Estimate

8.5.3 Project Revenue Estimate

The revenue is estimated separately for both IRRs, on project (ROI_1) and on operator's investment (ROI_2).

In case of ROI_1, all revenue acquired due to infrastructure built under this project is considered as project revenue. Thus, the revenue would not only be the freight fee of rail, but also the handling fee at Cilamaya (Case 2). Trucking feeders' fee is not included.

Since the facilities of Tanjung Priok, Gede Bage, and Cikarang are not part of this project, the revenue generated there is not considered.

Summary of revenues for FIRR on Project (ROI_1) is shown in Table 8.5-4.

Table 8.5-4 Revenue Estimate for Investment (ROI_1)

Options			Unit Price round trip	Quantity	Revenue per section	Revenue per Case	
	from/to	*to/from*	*Rp/TEU*	*TEU/year*	*Million Rp/year*		*Million $/y*
Case 1 *(2015)*	Tanjung Priok	Gede Bage	991,950	23,360	23,172	**114,767**	**12.75**
	Tanjung Priok	Cikarang	392,100	233,600	91,595		
Case 1 *(2020)*	Tanjung Priok	Gede Bage	991,950	35,040	34,758	**172,150**	**19.13**
	Tanjung Priok	Cikarang	392,100	350,400	137,392		
Case 2	Cilamaya	Gede Bage	954,550	70,080	66,895	**280,318**	**31.15**
	Cilamaya	Cikarang	365,450	584,000	213,423		

Source: Study Team Estimate

In case of IRR on investment of operator (ROI_2), the price of transportation of the train (empty and full) only is considered as revenue of the operator, which is obtained from the columns "Train Empty" and "Train Full" of Table 8.4-2. Summary of revenues for ROI_2 is shown in Table 8.5-5.

Table 8.5-5 Revenue Estimate for Equity (ROI_2)

Options			Unit Price round trip	Quantity	Revenue		
					per section	per Case	
	from/to	*to/from*	*Rp/TEU*	*TEU/year*	*Million Rp/year*		*Million $/y*
Case 1 *(2015)*	Tanjung Priok	Gede Bage	823,450	23,360	19,236	**71,469**	**7.94**
	Tanjung Priok	Cikarang	223,600	233,600	52,233		
Case 1 *(2020)*	Tanjung Priok	Gede Bage	823,450	35,040	28,854	**107,203**	**11.91**
	Tanjung Priok	Cikarang	223,600	350,400	78,349		
Case 2	Cilamaya	Gede Bage	767,550	70,080	53,790	**158,005**	**17.56**
	Cilamaya	Cikarang	178,450	584,000	104,215		

Source: Study Team Estimate

8.5.4 Financial Analysis

The purpose of the financial analysis is to verify the feasibility of the freight railway transport from Cilamaya New Port to the Cikarang dry port project from viewpoint of business enterprise and as project investment. As mentioned above, the FIRR on ROI_1 of the project and on investment of the operator (ROI_2) are calculated.

(1) Premises

1) Methodology

As an evaluation method of financial analysis, financial internal rate of return (FIRR) is to be adopted. FIRR is equivalent present value of net investment income, the discount rate that equals the sum of expenditures by the following equation:

$$\sum_{t=0}^{n} \frac{(Bt - Ct - It)}{(1 + FIRR)^t} = 0$$

N : analysis period (first year: t = 0)
Bt : income per year
Ct : expenditure per year
It : investment cost per year

2) Period of Project

Analysis should be extended during the construction period plus another 30 years of operation after inauguration.

3) Value

Project value should be the year of 2009.

As mentioned before, 10% of VAT was considered for domestic currency portion. As to inflation, it is difficult to predict long-term analysis for the project period, so that it has been excluded

from the analysis. Moreover, as financing plans for the purchase of new rolling stock was not available, it was assumed as "cash" basis, i.e., no loan was used.

(2) Financial Costs/Revenues

1) Investment Cost

As to the project investment cost for financial analysis, Table 8.5-1 shows the cost for both, Case 1 and Case 2, and for investment and equity.

2) Operation and Maintenance Costs

Operation and maintenance costs for the railway operator are as shown in the Table 8.5-6.

Table 8.5-6 Annual Operation and Maintenance Costs

Million USD / year

Item	**Case 1** *(2015)*	**Case 1** *(2020)*	**Case 2**
Energy Cost			
Fuel Cost	1.786	2.679	4.195
Power for facilities	0.002	0.002	0.013
Personnel Cost	0.204	0.312	0.312
Maintenance Material Cost			0.000
Civil Infrastructure	0.240	0.360	0.836
Track Work	0.610	0.914	2.124
E&M	0.137	0.205	0.476
Rolling Stock Maintenance	1.173	1.428	1.541
Overhead Cost *(15%)*	0.623	0.885	1.425
TAC *(25%)*	1.194	1.696	2.730
Total Cost	5.969	8.481	13.652

Source: Study Team Estimate

The O&M expenses mentioned before in Table 8.5-6 correspond to those expenses of the railway operator only, i.e., from the view point of investment of PT KA (ROI_2). The O&M Cost for the whole project (ROI_1) shall include the costs of the Tanjung Priok and Climaya handling facilities for Case 1 and case 2, respectively. The total O&M costs for (ROI_1) are shown in Table 8.5-7 below.

Table 8.5-7 Annual Operation and Maintenance Costs (ROI_1)

Million USD / year

Item	**Case 1** *(2015)*	**Case 1** *(2020)*	**Case 2**
Railway O&M Cost (ROI_2)	5.969	8.481	13.652
Ports Handling O&M Costs	0.991	0.991	1.322
Total O&M Cost (ROI_1)	6.960	9.472	14.974

Source: Study Team Estimate

(3) Financial Returns

The financial analysis as FIRR of each case for the Cilamaya port and railway facilities is estimated as shown Table 8.5-8. The breakdown of the cash flow results are shown in the following pages.

Table 8.5-8 Financial Returns of the Project

FIRR	ROI_1	ROI_2
Case 1	3.59%	28.24%
Case 2	0.79%	8.95%

Source: Study Team Estimate

The return on investment of the project for Case 1 is not financially feasible as the increase in revenue due to the project is very limited by the lack of capacity of the main line, and on the other hand, a considerable capital investment is required on rolling stock. In case of considering only the return on investment of operator, the result is financially feasible (28.2%); this is because the revenue can easily cover the O&M costs, and the investment costs are minimal for the rail operator.

The return on investment of the project for Case 2 is not financially feasible as the financial return is lower than benchmark interest rate in Indonesia (reported at 6.75%)[2], since although the revenue is more than double covering the O&M costs, the investment cost is very large. In case of considering only the return on equity, the result shows that the project is financially feasible (almost 9%), and yields an acceptable profit to the train operator.

[2] *The Central Bank of Republic of Indonesia*

Table 8.5-9 Return on Investment of Project (Case 1) - Below

Table 8.5-10 Return on Investment of Project (Case 2) - Above

	Year		Cost Capital US$	Cost O&M US$	Revenue US$	Net Flow US$
1	-6	2014	0			0
2	-5	2015	7,386,210			(7,386,210)
3	-4	2016	7,386,210			(7,386,210)
4	-3	2017	106,391,433			(106,391,433)
5	-2	2018	160,758,614			(160,758,614)
6	-1	2019	145,293,799			(145,293,799)
7	1	2020		14,973,537	31,146,407	16,172,870
8	2	2021		14,973,537	31,146,407	16,172,870
9	3	2022		14,973,537	31,146,407	16,172,870
10	4	2023		14,973,537	31,146,407	16,172,870
11	5	2024		14,973,537	31,146,407	16,172,870
12	6	2025		14,973,537	31,146,407	16,172,870
13	7	2026		14,973,537	31,146,407	16,172,870
14	8	2027		14,973,537	31,146,407	16,172,870
15	9	2028		14,973,537	31,146,407	16,172,870
16	10	2029		14,973,537	31,146,407	16,172,870
17	11	2030		14,973,537	31,146,407	16,172,870
18	12	2031		14,973,537	31,146,407	16,172,870
19	13	2032		14,973,537	31,146,407	16,172,870
20	14	2033		14,973,537	31,146,407	16,172,870
21	15	2034		14,973,537	31,146,407	16,172,870
22	16	2035		14,973,537	31,146,407	16,172,870
23	17	2036		14,973,537	31,146,407	16,172,870
24	18	2037		14,973,537	31,146,407	16,172,870
25	19	2038		14,973,537	31,146,407	16,172,870
26	20	2039		14,973,537	31,146,407	16,172,870
27	21	2040		14,973,537	31,146,407	16,172,870
28	22	2041		14,973,537	31,146,407	16,172,870
29	23	2042		14,973,537	31,146,407	16,172,870
30	24	2043		14,973,537	31,146,407	16,172,870
31	25	2044		14,973,537	31,146,407	16,172,870
32	26	2045		14,973,537	31,146,407	16,172,870
33	27	2046		14,973,537	31,146,407	16,172,870
34	28	2047		14,973,537	31,146,407	16,172,870
35	29	2048		14,973,537	31,146,407	16,172,870
36	30	2049		14,973,537	31,146,407	16,172,870
Total			427,216,266	449,206,115	934,392,213	0.79%

	Year		Cost Capital US$	Cost O&M US$	Revenue US$	Net Flow US$
1	-4	2011	0			0
2	-3	2012	19,999,800			(19,999,800)
3	-2	2013	44,556,750			(44,556,750)
4	-1	2014	44,556,750			(44,556,750)
5	1	2015	0	6,959,700	12,751,835	5,792,135
6	2	2016	0	6,959,700	12,751,835	5,792,135
7	3	2017	0	6,959,700	12,751,835	5,792,135
8	4	2018	0	6,959,700	12,751,835	5,792,135
9	5	2019	18,007,200	6,959,700	12,751,835	(12,215,065)
10	6	2020	38,302,200	9,472,450	19,127,752	(28,646,898)
11	7	2021		9,472,450	19,127,752	9,655,302
12	8	2022		9,472,450	19,127,752	9,655,302
13	9	2023		9,472,450	19,127,752	9,655,302
14	10	2024		9,472,450	19,127,752	9,655,302
15	11	2025		9,472,450	19,127,752	9,655,302
16	12	2026		9,472,450	19,127,752	9,655,302
17	13	2027		9,472,450	19,127,752	9,655,302
18	14	2028		9,472,450	19,127,752	9,655,302
19	15	2029		9,472,450	19,127,752	9,655,302
20	16	2030		9,472,450	19,127,752	9,655,302
21	17	2031		9,472,450	19,127,752	9,655,302
22	18	2032		9,472,450	19,127,752	9,655,302
23	19	2033		9,472,450	19,127,752	9,655,302
24	20	2034		9,472,450	19,127,752	9,655,302
25	21	2035		9,472,450	19,127,752	9,655,302
26	22	2036		9,472,450	19,127,752	9,655,302
27	23	2037		9,472,450	19,127,752	9,655,302
28	24	2038		9,472,450	19,127,752	9,655,302
29	25	2039		9,472,450	19,127,752	9,655,302
30	26	2040		9,472,450	19,127,752	9,655,302
31	27	2041		9,472,450	19,127,752	9,655,302
32	28	2042		9,472,450	19,127,752	9,655,302
33	29	2043		9,472,450	19,127,752	9,655,302
34	30	2044		9,472,450	19,127,752	9,655,302
Total			165,422,700	271,609,742	541,952,973	3.59%

Table 8.5-11 Return on Investment of Operator (Case 1) - Below

Table 8.5-12 Return on Investment of Operator (Case 2) - Above

Year			Cost: Capital	Cost: O&M	Revenue	Net Flow
			US$	US$	US$	US$
1	-5	2015	0			0
2	-4	2016	0			0
3	-3	2017	2,979,060			(2,979,060)
4	-2	2018	17,581,620			(17,581,620)
5	-1	2019	17,581,620			(17,581,620)
6	1	2020		13,651,938	17,556,078	3,904,141
7	2	2021		13,651,938	17,556,078	3,904,141
8	3	2022		13,651,938	17,556,078	3,904,141
9	4	2023		13,651,938	17,556,078	3,904,141
10	5	2024		13,651,938	17,556,078	3,904,141
11	6	2025		13,651,938	17,556,078	3,904,141
12	7	2026		13,651,938	17,556,078	3,904,141
13	8	2027		13,651,938	17,556,078	3,904,141
14	9	2028		13,651,938	17,556,078	3,904,141
15	10	2029		13,651,938	17,556,078	3,904,141
16	11	2030		13,651,938	17,556,078	3,904,141
17	12	2031		13,651,938	17,556,078	3,904,141
18	13	2032		13,651,938	17,556,078	3,904,141
19	14	2033		13,651,938	17,556,078	3,904,141
20	15	2034		13,651,938	17,556,078	3,904,141
21	16	2035		13,651,938	17,556,078	3,904,141
22	17	2036		13,651,938	17,556,078	3,904,141
23	18	2037		13,651,938	17,556,078	3,904,141
24	19	2038		13,651,938	17,556,078	3,904,141
25	20	2039		13,651,938	17,556,078	3,904,141
26	21	2040		13,651,938	17,556,078	3,904,141
27	22	2041		13,651,938	17,556,078	3,904,141
28	23	2042		13,651,938	17,556,078	3,904,141
29	24	2043		13,651,938	17,556,078	3,904,141
30	25	2044		13,651,938	17,556,078	3,904,141
31	26	2045		13,651,938	17,556,078	3,904,141
32	27	2046		13,651,938	17,556,078	3,904,141
33	28	2047		13,651,938	17,556,078	3,904,141
34	29	2048		13,651,938	17,556,078	3,904,141
35	30	2049		13,651,938	17,556,078	3,904,141
	Total		38,142,300	409,558,125	526,682,347	8.95%

Year			Cost: Capital	Cost: O&M	Revenue	Net Flow
			US$	US$	US$	US$
1	-4	2011	0			0
2	-3	2012	0			0
3	-2	2013	3,708,450			(3,708,450)
4	-1	2014	3,708,450			(3,708,450)
5	1	2015	0	5,968,500	7,940,972	1,972,472
6	2	2016	0	5,968,500	7,940,972	1,972,472
7	3	2017	0	5,968,500	7,940,972	1,972,472
8	4	2018	0	5,968,500	7,940,972	1,972,472
9	5	2019	0	5,968,500	7,940,972	1,972,472
10	6	2020	0	8,481,250	11,911,459	3,430,209
11	7	2021		8,481,250	11,911,459	3,430,209
12	8	2022		8,481,250	11,911,459	3,430,209
13	9	2023		8,481,250	11,911,459	3,430,209
14	10	2024		8,481,250	11,911,459	3,430,209
15	11	2025		8,481,250	11,911,459	3,430,209
16	12	2026		8,481,250	11,911,459	3,430,209
17	13	2027		8,481,250	11,911,459	3,430,209
18	14	2028		8,481,250	11,911,459	3,430,209
19	15	2029		8,481,250	11,911,459	3,430,209
20	16	2030		8,481,250	11,911,459	3,430,209
21	17	2031		8,481,250	11,911,459	3,430,209
22	18	2032		8,481,250	11,911,459	3,430,209
23	19	2033		8,481,250	11,911,459	3,430,209
24	20	2034		8,481,250	11,911,459	3,430,209
25	21	2035		8,481,250	11,911,459	3,430,209
26	22	2036		8,481,250	11,911,459	3,430,209
27	23	2037		8,481,250	11,911,459	3,430,209
28	24	2038		8,481,250	11,911,459	3,430,209
29	25	2039		8,481,250	11,911,459	3,430,209
30	26	2040		8,481,250	11,911,459	3,430,209
31	27	2041		8,481,250	11,911,459	3,430,209
32	28	2042		8,481,250	11,911,459	3,430,209
33	29	2043		8,481,250	11,911,459	3,430,209
34	30	2044		8,481,250	11,911,459	3,430,209
	Total		7,416,900	241,873,750	337,491,329	28.2%

8.6 RECOMMENDATION

The return on investment of the project for Case 2 is not financially feasible as the financial return is lower than benchmark interest rate in Indonesia (reported at 6.75%)[3], since although the revenue is more than double covering the O&M costs, the investment cost is very large. In case of considering only the return on equity, the result shows that the project is financially feasible (almost 9%), and yields an acceptable profit to the train operator.

Case 1: Recommending Improvement of Railway Freight to Tanjung Priok

The lack of capacity of roads and the large number of small inland container depots (ICD) in the hinterland of the Tanjung Priok Port is creating enormous traffic congestion for the transport of cargo, and beyond that, to non-cargo users in the vicinity of Tanjung Priok and along the expressway of Jakarta.

It is therefore clear that even with an internal return on the investment of only 4%, the benefits brought by the project are remarkable. The most important part is to materialize the direct connection between the railway and JICT, by extending the tracks from Pasoso station to the yard of JICT. This will avoid additional transport by truck (hauling) double handling (loading/unloading) of containers, and thus will reduce the congestion of the container yard.

Case 2: Recommending railway transport access to the new Cilamaya terminal

The railway transport is expected to bring considerable advantages, particularly enhancement of handling capacities of the terminal with the limited terminal facilities and at the same time the railway transport will form basic social infrastructure for regional development.

The railway transport will help to minimize dwelling time of containers in the terminal in cooperation with truck transport by quick dispatch of cargo from the terminal. Subsequently the stock area in the yards will be provided for the next cargoes being unloaded from the ships. As a result, the railway transport will contribute to enhancing the handling capacity of the terminal substantially without investing a large additional amount for expansion of berthing facilities or deepening the channel/berthing area by dredging to accommodate larger container ships.

[3] *The Central Bank of Republic of Indonesia*

CHAPTER 9 PRE-FEASIBILITY STUDY

9.1 Extraction of the Urgent Development Project

The following urgent development project has been selected from the first phased implementation plan in the proposed Master Plan (see 4.7.2 (3) of Chapter 4):

- Construction Project of North Kalibaru Container Terminal Alternative 1, Phase 1

The outlines of the project are shown in the following sections.

9.2 Construction of a Container Terminal

9.2.1 Project Site

The Project site for development of a new container terminal is located at the North Kalibaru area in the Tanjung Priok Port. The scope and site location are shown in Figure 9.2-1.

9.2.2 Project Components

The project is planned to be executed by PPP (Public Private Partner) scheme by sharing the following components among the public and private sectors.

Table 9.2-1 Project Components of Urgent Development Project

Components of Off shore Container Terminal	Responsible of Implementation	
Development of New Container Terminal Facilities	Public sector	Private sector
1. Dredging works for Channel and Turning Basin Depth -15.5m, W=320m Dia=740m	○	
2. Demolishing Existing Breakwater L=3,308m	○	
3. Construction of new Breakwater by recycle of demolished breakwater material L=633m	○	
4. Construction of Seawall (L=1,935m) and Revetment (L=820m) for Reclamation works	○	
5. Reclamation works (DL+3.5m) for 2-terminals	○	
6. Soil Improvement works By public; Seawall; Revetment; Terminal inner road; Stock yard & Public security area.	○	
7. Quay wall construction for 87,000DWT Length=600 m x 2 terminals and Depth -15.5m		○
8. Procurement of Cargo Handling Equipment 6 units of QGC, 16 units of RTG x 2 terminals and others		○
9. Yard Pavement works with Drainage system		○
10. Terminal Inner Road, (3 lanes, 12m width and concrete pavement for heavy loaded trucks)	○	
11. Utility Supply (Power supply and water supply)		○
12. Building works		○
13. Environmental Treatment Facilities	○	
14. Security System Facilities	○	
Access Road /Bridge Development		
1. Access Road and bridge Construction Road (L=0.95 km, 2 lanes) and Bridge (L= 1.1 km, 2 lanes)	○	
Consulting Services; DD, Tender Assist, Construction supervisory	○	

Figure 9.2-1 Project site for development of new container terminal at North Kalibaru

9.2.3 Design of Project Facilities

(1) Off Shore Terminal Facilities

1) Channel and Turning Basin

The expected maximum ship size is the Post-Panamax type (DWT; 87,545, LOA; 318m, Draft; 14.0m, Beam; 40.06m). To allow two-way traffic of 87,000 GT vessels the new navigation channel is set at 310 m in width and 15.5 m in depth.

The water depth for dredging the channel and turning basin has been set at -15.5 m and side slope of the dredging section is assumed to be 1 to 5.The total dredging volume under Phase I project is estimated as 16.184 mil cum.

The existing breakwaters are removed for development of Phase 1 new terminals at NKB. Parts of the new breakwater (total length of 3,609.8m) will be constructed by recycling demolished material.

A new rubble mound type breakwater with PVD foundation soil improvement is planned at the depth of around 4 m and distance of about 740m away between the planned new off shore container terminal and New Dam Tengah breakwater to be constructed by URPT under the Phase 1 Project. Typical cross section of the new breakwater is shown in Figure 9.2-1.

2) Preliminary Design of Quay wall Structure

Adopting the design criteria as described in 5.1.2 (2), the quay wall structure is designed with concrete deck on steel pipe pile at the design depth of -15.5 m and crown height of +3.50m; length is 600m x 2 terminals and width is 35m.

3) Container Yard Development by Seawall and Revetment

Adopting design criteria and concept of accepting overtopping local waves as described in 5.1.2 (4) the seawall and revetment to protect reclamation land is designed with steel sheet piles driven to -25m and gravity type (Concrete blocks wall placed on the rubble mound) at the slope of 1:4/3 ~ 2 and to the crown height of +2.50m with PVD for soil improvement. Typical cross section of the new seawall and revetment are shown from Figure 9.2-2 to Figure 9.2-5.

4) Reclamation works

Reclamation works will be carried out by filling material of quarry run and rubble stones takien from the quarry around the project sites. The infill material should be placed from the existing sea bed up to +2.0 m from CDL. Average thickness of reclamation will be 6 to 7 m. The estimated volume for respective phases is 8.29 mil cum. Average elevation of the planned yard after pavement will be +3.5 m (MSL+3.0m).

5) Yard Pavement and Drainage in new terminal area

Based on the operation planning of the yard area and corresponding critical wheel load, the 4 different types of pavement structure (RC concrete, RC concrete block + asphalt, asphalt concrete, Interlocking concrete block) are designed.

6) Terminal Inner Road

The new Kalibaru terminal is expected to handle about 1.9mil TEUs of container in future. The Terminal road is planned to have 12 m width for 3 lanes (2 lanes for through traffic and 1 lane for gate queue) and concrete pavement with gravel foundation to sustain truck wheel load of H22-44. The inner road will surround the reclaimed land outside the container yards.

(2) Design Concept of Access Road Construction

The access road was planned to connect the off shore new terminal at North Kalibaru from the existing arterial road as the Urgent Project of new Container terminal development considering following aspects.

- To be the arterial road due to the need for prompt construction
- To utilize the existing road to minimize resettlement
- To construct a bridge between land and the terminal
- To install a signalized intersection for connecting with the existing road

1) Cross Section of Access road

The estimated traffic volume for the access road is 28,238 PCU/day in 2030. According to the design standards in Indonesian, a lane has a capacity of 18,000 PCU/day. Therefore, a two-lane road is planned for the access road having 7m width for each lane; pavement type is cement concrete. Typical cross section of terminal inner road is shown in Figure 9.2-6.

2) Plan and Profile

Horizontal alignment

Three routes were examined for the horizontal alignment of the access road on the land section. Although the land around the proposed area is administrated by PERINDO 2, the area is occupied by houses, shops, warehouses and a market. As a result of an evaluation of alternative routes and Route 1" Existing access road to Kalibaru port" is selected. The total length of the access road is 2.1 km; road sections comprise 950 m and bridge sections 1,100m.

Vertical alignment

The road height should be almost the same as the ground level, about 1.5 to 3.0 m above M.S.L. For the bridge section, the road is raised to secure the vertical clearance of 5.0m from HWL for small boats passing under the bridge.

Bridge Structure

A PC- I shape-girder bridge with a 35m span, which is the same type of standard span bridge as North Kalibaru, is applied for the bridge parts of the planned access road. The section of bridge has 14 m width for two lanes with concrete slab on the PC girder. The length of the bridge is 1,100m. Typical cross section of the access road bridge is shown in Figure 9.2-7.

It is planned that the RC concrete pier structure supported by cast-in site concrete piles to be driven to -20 m-25m depth from the RC footing structure is constructed at every 35 m as foundation of girder bridge.

9.2.4 Cost Estimates

Project cost estimate is carried out for the urgent development of the Container Terminal at North Kalibaru.

The work items and their quantities, construction costs are given in the following Table 9.2-3.

Direct Construction of Cost Stage 1

4,119,988 million Rupiah (457.8 million USD, or 37,454 million Yen)

Direct Construction of Cost Stage 2

2,167,546 million Rupiah (240.8 million USD, or 19,705 million Yen)

The terminal construction cost of Phase 1 is estimated at 7,482,165 million Rupiah (excluding VAT).

Total Project Cost of new terminal development and Access Road construction (including indirect cost of construction, contingency, cost for engineering services and administration, VAT) is estimated as 8,744,074 million Rupiah (around 971.1 million USD, or 79,492 million Yen).

In line with the proposed sharing plan of the project cost between the Public Sector and Private Sector, Table 9.2-2 presents following shares of investment. The detailed breakdown is shown in Table 9.2-6.

Table 9.2-2 Project Cost Share by Public and Private Sectors for Urgent Project at North Kalibaru (unit; million Rupiah)

	Works	Public	Private	Total
1	Construction Cost: Stage 1 of Kalibaru Terminal	2,535,371	1,584,617	4,119,988
		(62%)	(38%)	
2	Construction Cost: Stage 2 of Kalibaru Terminal	582,929	1,584,617	2,167,546
		(27%)	(73%)	
3	General Cost of Terminal Construction works, Mob/Demob etc	155,914	158,461	314,375
		(44%)	(56%)	
4	Project Related Cost, ES cost, Contingency etc	563,331	363,461	926,792
		(61%)	(39%)	
5	Total Construction cost of Terminal Development	3,837,546	3,644,619	7,482,165
		(48%)	(52%)	
6	Construction Cost of Access Road and Bridge at North Kalibaru	466,994	None	466,994
		(100%)	(0%)	
7	Total Construction Cost by Terminals and Access road	4,304,539	3,644,619	7,949,158
		(53%)	(47%)	
8	Total Project Cost including VAT	4,734,993	4,009,081	8,744,074
		(55%)	(45%)	
	In term of USD (million)	525.6	445.5	971.1
	In term of Japan yen (million)	43,045	36,446	79,492

Table 9.2-3 Technical Cost Estimate of North Kalibaru Phase I (Stage 1 development)

Description	Unit	Quantity	Project Cost (1,000 Rupiah)		
			Local Portion	Foreign Portion	Summation
1. General Cost			**137,642,116**	**176,734,572**	**314,376,688**
2. Direct Construction Cost					
2.1 Stage 1 of Construction					
(1) Breakwaters					
Construction					
Dam Tengah Extension	m	640	15,625,390	39,326,760	54,952,150
Demolition					
Dam Citra	m	1,548	21,672,000	32,508,000	54,180,000
Dam Pertamina	m	1,760	31,680,000	47,520,000	79,200,000
(2) Seawalls					
North Seawall	m	1,305	83,144,440	59,862,228	143,006,668
Revetment (West)	m	620	28,013,751	2,402,540	30,416,291
East Seawall	m	630	27,582,414	2,395,968	29,978,382
Revetment (-3 m)	m	200	7,005,414	6,680,543	13,685,957
(3) Port Inner Road	m	1,335	36,700,317	17,293,350	53,993,667
(4) Dredging of Channel and Basin					
Deepening (-14 m ~ -15.5 m)	m^3	4,479,362	146,702,717	193,781,308	340,484,025
Basin in front of New Terminal	m^3	7,701,183	252,219,961	333,160,251	585,380,212
Basin in front of Koja Terminal	m^3	4,003,986	131,133,779	173,216,118	304,349,897
(5) Container Terminal Stage 1					
Quay Wall (-15.5 m)	m	600	190,843,236	89,192,554	280,035,791
Yard Construction					
Reclamation (DL+3.5 m)	m^3	2,475,000	242,523,750	98,072,300	340,596,050
Reclamation (Surcharge 3 m	m^3	990,000	97,009,500	39,228,920	136,238,420
Soil Improvement	m^2	330,000	39,726,115	17,025,478	56,751,592
Stacking Yard Pavement	m^2	134,750	76,807,500	51,205,000	128,012,500
Passage Pavement	m^2	195,250	73,804,500	49,203,000	123,007,500
Terminal Buildings	m^2	6,000	17,568,000	4,392,000	21,960,000
Container Handling Equipment and Operation System			92,294,100	830,646,900	922,941,000
(6) Security and Utility					
Reclamation (DL+3.5 m)	m^3	810,980	79,467,439	32,135,222	111,602,660
Soil Improvement	m^2	70,520	8,489,350	3,638,293	12,127,643
Ground Pavement	m^2	70,520	26,656,560	17,771,040	44,427,600
X -ray Inspection House	l.s.	1	14,400,000	129,600,000	144,000,000
Utility Faclities of Stage 1	l.s.	1	73,828,260	34,831,925	108,660,185
Sub-total of Direct Cost (Stage 1)			**1,814,898,494**	**2,305,089,697**	**4,119,988,192**

Table 9.2-4 Technical Cost Estimate of North Kalibaru Phase I (Stage 2 development)

Description	Unit	Quantity	Project Cost (1,000 Rupiah) Local Portion	Foreign Portion	Summation
2.2 Stage 2 of Construction					
(7) Port Inner Road	m	1,220			
Road Pavement	m^2	21,960	8,300,880	5,533,920	13,834,800
Reclamation (DL+3.5 m)	m^3	164,700	16,138,853	6,526,266	22,665,119
Reclamation (Surcharge 3 m)	m^3	65,880	6,455,541	2,610,506	9,066,048
Soil Improvement	m^2	21,960	2,643,592	1,132,968	3,776,561
(8) Container Terminal 2					
Quay Wall	m	600	190,843,236	89,192,554	280,035,791
Yard Construction					
Reclamation (DL+3.5 m)	m^3	2,475,000	242,523,750	98,072,300	340,596,050
Reclamation (Surcharge 3 m	m^3	990,000	97,009,500	39,228,920	136,238,420
Soil Improvement	m^2	330,000	39,726,115	17,025,478	56,751,592
Stacking Yard Pavement	m^2	134,750	76,807,500	51,205,000	128,012,500
Passage Pavement	m^2	195,250	73,804,500	49,203,000	123,007,500
Terminal Buildings	m^2	6,000	17,568,000	4,392,000	21,960,000
Container Handling Equipment and Operation System			92,294,100	830,646,900	922,941,000
(9) Utility Facility of Stage 2					
Utility Faclities	l.s.	1	73,828,260	34,831,925	108,660,185
Sub-total of Direct Cost (Stage 2)			**937,943,828**	**1,229,601,737**	**2,167,545,565**
Direct Construction Cost (DC; Stage 1 + Stage 2)			**2,752,842,323**	**3,534,691,434**	**6,287,533,757**
3. Project Related Expenses (PE)			**385,397,925**	**494,856,801**	**880,254,726**
(1) Engineering Service	l.s.	1	82,585,270	106,040,743	188,626,013
(2) Contingency	l.s.	1	275,284,232	353,469,143	628,753,376
(3) Administration Cost	l.s.	1	27,528,423	35,346,914	62,875,338
4. Total Construction Cost			**3,275,882,364**	**4,206,282,807**	**7,482,165,171**
VAT			**327,588,236**	420,628,281	748,216,517
Grand Total of Phase I Development			**3,603,470,601**	**4,626,911,088**	**8,230,381,688**

1 USD = 9,000 Rupiah
100 Yen = 11,000 Rupiah

914.5	**million USD**
74,822	**million Yen**

Cost Estimate of Access road construction

The construction cost of Access Road Development with low clearance of 5 m from HWL of Urgent Required Terminal was estimated at Rp. 513,693 million (including VAT) as shown in Table 9.2-5.

Table 9.2-5 Construction cost of access road for North Kalibaru, Alternative 1 Phase 1

Description	Unit	Unit Cost (RP.)	Quantity	Cost Estimate(million Rp)		
				Local Portion	Foreign Portion	Summation
1 GENERAL	l.s		1	**19,229**	**392**	**19,622**
2 Direct Construction Cost						
Road						
a:Earthwork	m3	60,000	5,611	337		337
b:Pavement	m2	500,000	14,425	7,068	144	7,213
c:Drainage	m	1,000,000	1,916	1,877	38	1,916
d:Miscellaneous	l.s	250,000,000	1	212	38	250
e:Pile Slab	m2	4,000,000	630	2,469	50	2,520
Subtotal				**11,963**	**270**	**12,235**
Bridge						
a:Preparation works	l.s	110,000,000,000	1	88,000	22,000	110,000
b:Sub-structure works	m2	5,000,000	18,346	73,384	18,346	91,730
c:Super-structure	m2	8,000,000	18,346	117,414	29,354	146,768
d:Pavement	m2	700,000	14,912	10,229	209	10,438
e:Drainage	m	1,000,000	2,260	1,808	452	2,260
f:Miscellaneous	l.s	19,000,000,000	1	16,150	2,850	19,000
Subtotal				**306,985**	**73,210**	**380,196**
Direct Costruction CostTotal				**318,948**	**73,481**	**392,432**
3 Project Related Expensise						
a Contingency	l.s		1	**31,894**	**7,348**	**39,243**
b Engineering Service	l.s		1	**7,063**	**4,710**	**11,773**
c. Administration Cost				**3,924**		**3,924**
d Sub Total				**42,882**	**12,058**	**54,940**
4. Construction Cost	l.s			**381,058**	**85,931**	**466,993**
5 VAT				**38,105**	**8,593**	**46,699**
6. Total Project Cost	l.s			**419,163**	**94,524**	**513,692**

Table 9.2-6 Proposed Sharing Plan of Project Cost between Public and Private Sectors (1/2)

Description	Unit	Quantity	Project Cost (1,000 Rupiah)		
			Public Investment	Private Investment	Summation
1. General Cost			**155,914,990**	**158,461,698**	**314,376,688**
2. Direct Construction Cost					
2.1 Stage 1 of Construction					
(1) Breakwaters					
Construction					
Dam Tengah Extension	m	640	54,952,150		54,952,150
Demolition					
Dam Citra	m	1,548	54,180,000		54,180,000
Dam Pertamina	m	1,760	79,200,000		79,200,000
(2) Seawalls					
North Seawall	m	1,305	143,006,668		143,006,668
Revetment (West)	m	620	30,416,291		30,416,291
East Seawall	m	630	29,978,382		29,978,382
Revetment (-3 m)	m	200	13,685,957		13,685,957
(3) Port Inner Road	m	1,305	53,993,667		53,993,667
(4) Dredging of Channel and Basin	m^3	16,184,532	1,230,214,134		1,230,214,134
(5) Container Terminal Stage 1					
Quay Wall (-15.5 m)	m	600		280,035,791	280,035,791
Yard Construction					
Reclamation (DL+3.5 m)	m^3	2,475,000	340,596,050		340,596,050
Reclamation (Surcharge 3 m)	m^3	990,000	136,238,420		136,238,420
Soil Improvement	m^2	330,000	56,751,592		56,751,592
Stacking Yard Pavement	m^2	134,750		128,012,500	128,012,500
Passage Pavement	m^2	195,250		123,007,500	123,007,500
Terminal Buildings	m^2	6,000		21,960,000	21,960,000
Container Handling Equipment and Operation System				922,941,000	922,941,000
(6) Security and Utility					
Reclamation (DL+3.5 m)	m^3	810,980	111,602,660		111,602,660
Soil Improvement	m^2	70,520	12,127,643		12,127,643
Ground Pavement	m^2	70,520	44,427,600		44,427,600
X -ray Inspection House	l.s.	1	144,000,000		144,000,000
Utility Faclities of Stage 1	l.s.	1		108,660,185	108,660,185
Sub-total of Direct Cost (Stage 1)			**2,535,371,214**	**1,584,616,976**	**4,119,988,190**
			62%	38%	100%
2.2 Stage 2 of Construction					
(7) Port Inner Road	m	1,220	49,342,527		49,342,527
(8) Container Terminal 2					
Quay Wall	m	600		280,035,791	280,035,791

Table 9.2-7 Proposed Sharing Plan of Project Cost between Public and Private Sectors (2/2)

Description	Unit	Quantity	Project Cost (1,000 Rupiah)		
			Public Investment	Private Investment	Summation
Yard Construction					
Reclamation (DL+3.5 m)	m^3	2,475,000	340,596,050		340,596,050
Reclamation (Surcharge 3 m)	m^3	990,000	136,238,420		136,238,420
Soil Improvement	m^2	330,000	56,751,592		56,751,592
Stacking Yard Pavement	m^2	134,750		128,012,500	128,012,500
Passage Pavement	m^2	195,250		123,007,500	123,007,500
Terminal Buildings	m^2	6,000		21,960,000	21,960,000
Container Handling Equipment and Operation System				922,941,000	922,941,000
(9) Utility Facility of Stage 2					
Utility Faclities	l.s.	1		108,660,185	108,660,185
Sub-total of Direct Cost (Stage 2)			**582,928,589**	**1,584,616,976**	**2,167,545,565**
			27%	73%	100%
Direct Construction Cost (DC; Stage 1 + Stage 2)			**3,118,299,803**	**3,169,233,952**	**6,287,533,755**
			49.6%	**50.4%**	**100%**
3. Project Related Expenses (PE)			**563,331,331**	**316,923,395**	**880,254,727**
(1) Engineering Service	l.s.	1	188,626,013		188,626,013
(2) Contingency	l.s.	1	311,829,980	316,923,395	628,753,376
(3) Administration Cost	l.s.	1	62,875,338		62,875,338
4. Total Construction Cost			**3,837,546,124**	**3,644,619,045**	**7,482,165,170**
VAT			**383,754,612**	364,461,905	748,216,517
5. Access Road Construction in North Kalibaru					
5.1 General			**19,621,578**		**19,621,578**
5.2 Direct Construction Cost					
(1) Road	m	900	12,235,160		12,235,160
(2) Bridge	m	1,200	380,196,400		380,196,400
Sub Total of Direct Construction Cost			**392,431,560**		**392,431,560**
5.3 Project Related Expenses					
(a) Contingency			39,243,156		39,243,156
(b) Engineering Service			11,773,000		11,773,000
(c) Administration Cost			3,924,316		3,924,316
Sub Total of PRE			**54,940,472**		**54,940,472**
5.4. Total Construction Cost of Access Road			**466,993,610**		**466,993,610**
VAT			**46,699,361**	0	**46,699,361**
6. Total of Project Cost (Container Terminal and Access Road)					
6.1 Construction Cost (1+2+5.1+5.2)			3,686,267,931	3,327,695,650	7,013,963,581
6.2 Engineering Service			200,399,013		200,399,013
6.3 Contingency			351,073,136	316,923,395	667,996,532
6.4 Administration Cost			66,799,654		66,799,654
Total of Phase I Development			**4,304,539,734**	**3,644,619,045**	**7,949,158,779**
VAT (10%)			430,453,973	364,461,905	794,915,878
Grand Total Project Cost			**4,734,993,707**	**4,009,080,950**	**8,744,074,657**
Grand Total	in	million USD	**526.1**	**445.5**	**971.6**
	in	million Yen	**43,045**	**36,446**	**79,492**
		Share	54%	46%	100%

9.2.5 Implementation Schedule Urgent Development Project of New Container Terminal

Considering the urgency of each project component and step-by-step development, implementation schedule is made taking into consideration the time required for administrative procedures and in accordance with construction capability.

Urgent Development Scenario at North Kalibaru is presented as follows.

Planned extension of the quay wall in the development of North Kalibaru Phase I is 1,200 m for two terminals and the planned dredging volume to deepen the channel and turning basins up to -15.5 m in the development of North Kalibaru Phase I amounts to 16 million m^3.

In order for the planned container terminal to be operational in the 5th year after L/A (4th year after implementation of construction), the staged development of the container terminal Phase I is taken into consideration.

Phase I development of the North Kalibaru Container Terminal is targeting container throughput of 1.9 million TEU/year (quay wall length: 1,200 m). The construction works are divided into two stages along the length of quay wall (600 m + 600 m). The construction works managed in each stage are assumed as follows.

Stage 1 (2nd – 4th Year)

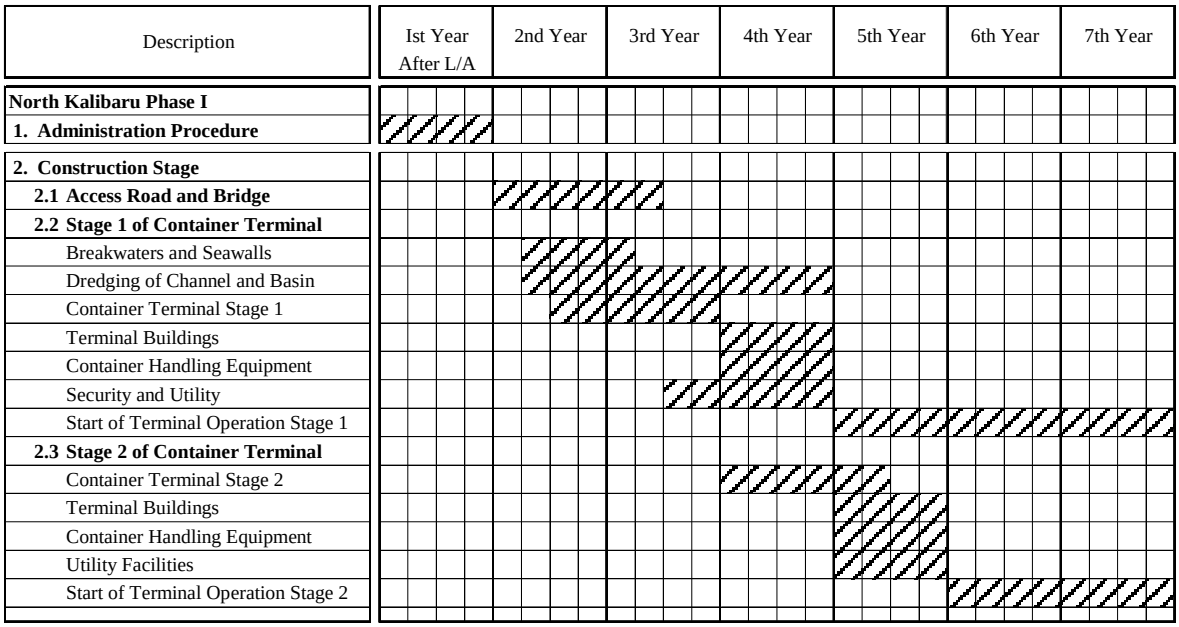
Dredging of channel and basins, demolition of the existing breakwaters, re-construction of breakwaters, construction of protective facilities (seawalls, revetments), construction of quay wall 600 m, reclamation and development of container terminal yard with on land facilities.

Stage 2 (4th – 5th Year)

Construction of Quay wall 600 m, reclamation terminal yard and development of container terminal on land facilities.

Implementation schedule of the Staged development of North Kalibaru Phase I is presented in Table 9.2-8.

Table 9.2-8 Implementation Schedule of Urgent Development Project at North Kalibaru



Access Road and Bridge Construction

The construction of the access road will take about 3.5 years including project preparation, selection of contractor for the works, and 18 months of construction works. The construction of the access road for the urgent development of the new container terminal will start in the second year after the project finance is arranged and works will be completed in the middle of the third year.

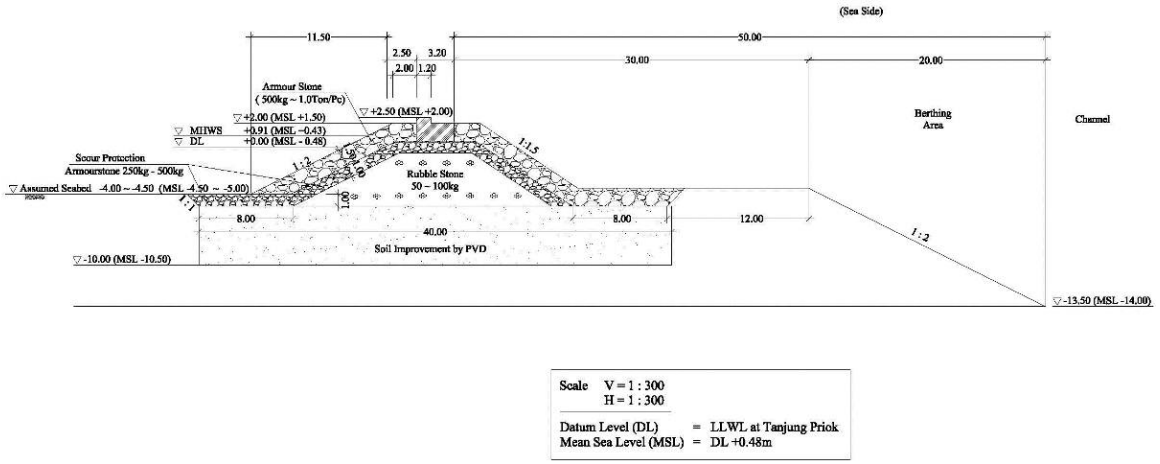


Figure 9.2-2 Typical Section of New Dam Citra Breakwater at North Kalibaru

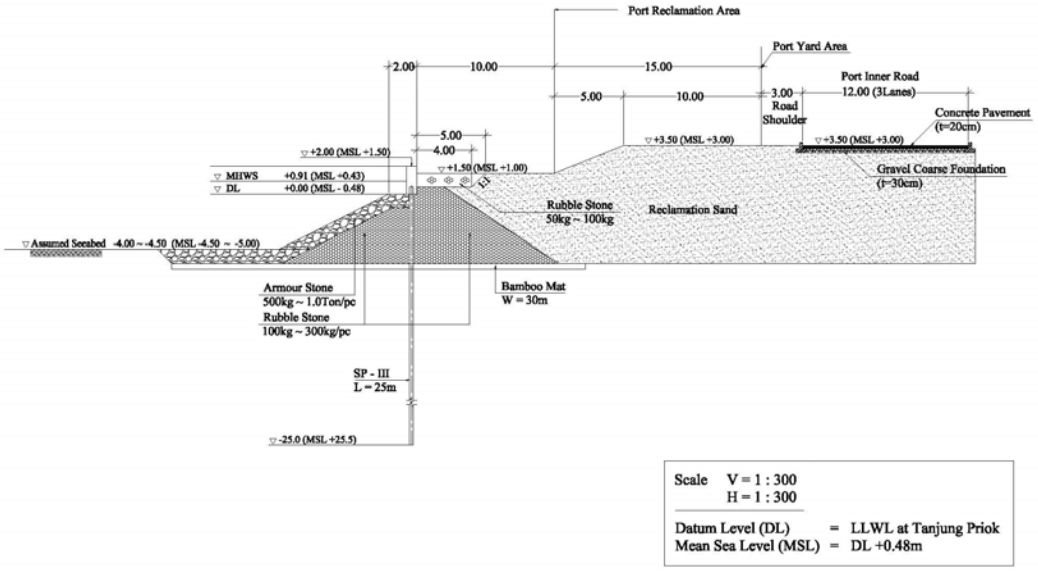


Figure 9.2-3 Typical Cross Section of North Side Seawall at North Kalibaru

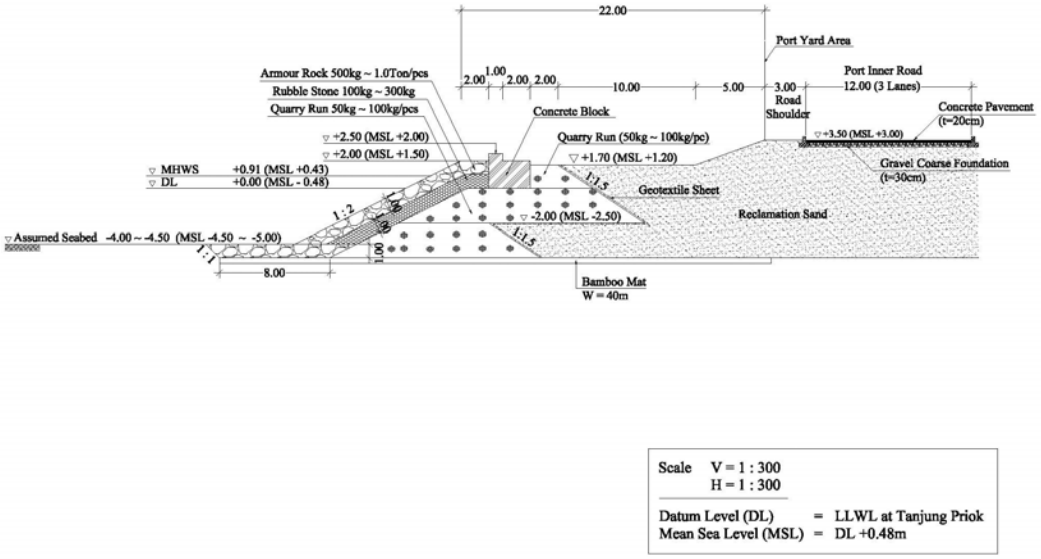


Figure 9.2-4 Typical Cross Section of Revetment of West side at North Kalibaru

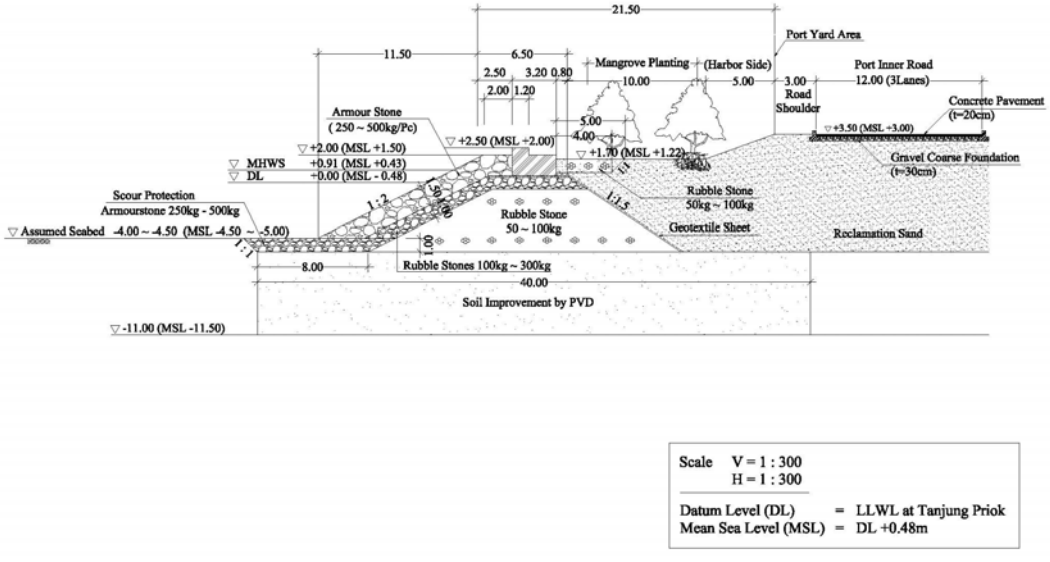


Figure 9.2-5 Typical Cross Section of Revetment of East side at North Kalibaru

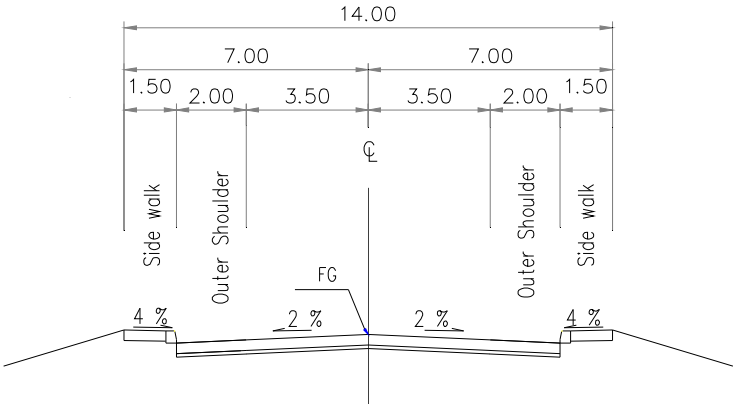


Figure 9.2-6 Typical cross section of Access Road for Phase 1 of North Kalibaru

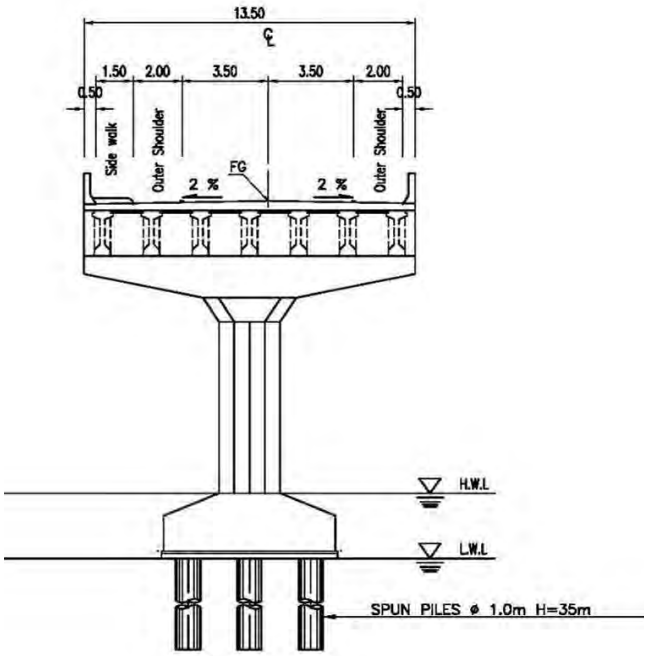


Figure 9.2-7 Typical cross section of Bridge and Pier for Phase 1 of North Kalibaru

9.3 Economic Analysis

9.3.1 Purpose and Methodology of Economic Analysis

(1) Objective

The purpose of this section of the report is to evaluate the container terminal development project at North Kalibaru from the viewpoint of the national economy. The economic analysis is carried out to study economic benefits as well as economic costs arising from the project, and to evaluate whether the benefits of the project exceed those that could be obtained from other investment opportunities in Indonesia.

(2) Methodology

Economic analysis will be carried out according to the following method. The development plan, namely "With the project" case (hereinafter referred to as the "With" case), will be compared to the "Without the project" case (hereinafter referred to as the "Without" case). All of the benefit and cost differences between the "With" case and "Without" case will be calculated in market price, then they will be converted in economic price, or border price.

In this study, the economic internal rate of return (EIRR) is used to evaluate and appraise the economic feasibility of the project. The EIRR is a discount rate which makes the costs and the benefits of the project during the project life equal.

9.3.2 Prerequisites for Economic Feasibility

(1) Base Year

The "Base Year" here means the standard year in the estimation of costs and benefits. In this study, 1st year after Loan Agreement (LA) is set as the "Base Year".

(2) Component of the development plan in the analysis

Main objective of this economic feasibility study is to evaluate the development plan of the new international container terminal, which is assumed to accommodate 1.9 million TEUs of international containers

The project contains dredging of channel and basin up to -15.5 m, construction of breakwaters and two container terminals, and installation of container handling machinery and equipment as well as related other port facilities and systems.

Port access road is an important and indivisible component of the development project, too; therefore both construction cost and maintenance cost of the access road are included in the costs of the project.

(3) Project Life

The period of calculation (project life) in the economic analysis is assumed to be 35 years for the Kalibaru I Development Plan from the starting year (Base Year), taking the depreciation period of the main facilities into consideration.

(4) Foreign Exchange Rate

The exchange rates adopted for this analysis are US$ 1.00 = Rupiah 9,000 and JP\1.0 = Rupiah110, the same rates as used in the cost estimation.

9.3.3 "Without" Case

In the economic analysis, "Without" case plays a very important role because both cost and benefit are measured by the difference between that in the "With" case and that in the "Without" case.

JICA Study Team estimates that the existing Tanjung Priok Terminal can accommodate a maximum of 4.85 million TEUs of international containers although terminal conversion and cargo handling efficiency improvement are required to some extent. In the "With" case, the new container terminal at North Kalibaru will accommodate up to 1.9 million TEUs.

In the "Without" case, international containers will be overflowed after the existing terminals are saturated. There are no extra spaces at Tanjung Priok Terminal for loading and unloading international containers. Tanjung Emas Port is the closest international container port to Tanjung Priok and Tanjung Perak Port is the 2nd largest port in Indonesia after Tanjung Priok. These ports are, however, are being operated at nearly full capacity, the same as Tanjung Priok. Therefore, it is not realistic to set these ports as alternatives to load and unload international containers originated from/destined to Greater Jakarta Metropolitan area.

Consequently alternative ports to accommodate 1.9 million TEU of international containers cannot be found near the Greater Jakarta Metropolitan area, and investors and manufacturers are likely to shift to other promising nations and regions. In such event new development of industrial estates will not be realized because of shortage of export/import capacity at the port.

One possibility is to use Ciwandan Port and Merakmas Port as alternatives of Tanjung Priok port although these two ports are about 120 km away and have only limited container handling capacity. Ciwandan Port has a multi-purpose berth with 203 m in length (-15 m) and Merakmas Port has a same type of berth with 300 m in length (-11 m), and two sets of gantry crane have been installed at each port. Taking these factors into consideration, JICA Study Team assumes in this Economic Analysis that in the "Without" case, a total of 400,000 TEUs of international containers are loaded/unloaded at Ciwandan Port and Merakmas Port and transported by trucks over land to/from consignees and exporters. Container throughputs for "With" and "Without" case are summarized below;

Table 9.3-1 Container Throughput for "With" and "Without" Case

(Unit: '000 TEUs)

Year (after LA)	Estimated Throughput for International Container				
	JCT	"With"	"Without"		Total
		North Kalibaru I	Ports in Banten	Missed Throughput	
1st Year	4,029				4,029
2nd Year	4,460				4,460
3rd Year	4,850				4,850
4th Year	4,850				4,850
5th Year	4,850	858	400	458	5,708
6th Year	4,850	1,245	400	845	6,095
7th Year	4,850	1,632	400	1,232	6,482
8th Year	4,850	1,900	400	1,500	6,869
9th Year	4,000	1,900	400	1,500	7,255
10th Year	4,000	1,900	400	1,500	7,777
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Source: Estimated by the Study Team

Note: Jakarta Container Terminal containing JICT, KOJA and MAL at Tanjung Priok Terminal

9.3.4 Economic Prices

(1) General

For the economic analysis, all prices must be expressed in economic prices, i.e., international prices or border prices. In general, the value of goods quoted at market price does not always represent the economic value of goods. They often include transfer items such as tax, customs duties and subsidies, which do not actually reflect any consumption of resources. Therefore, the market prices shall be converted into economic prices by eliminating these transfer items.

(2) Conversion Factors

1) Standard Conversion Factor (SCF)

Import duties and export subsidies create a price difference between the domestic market and the international market. The Standard Conversion Factor (SCF) is applied to determine the economic prices of certain non-traded goods that cannot be valued at border prices. The SCF makes up for this price difference. The SCF is obtained by the following formula:

$$SCF = \frac{I + E}{(I + Di) + (E - De)}$$

where,
I: Total value of imports (CIF)
E: Total value of exports (FOB)
Di: Total value of import duties
De: Total value of export duties

SCF will become closer and closer to 1.00 as the free trade and open market is realized at the border. It is reported that values of SCF were more than 0.99 during the period 2001 – 2004 in Indonesia as shown in Table 9.3-2. After 2004 then, no revised figures on SCF have been revealed. As Indonesia holds a quite open market policy, it is assumed in this Study that market mechanism is properly functioning; hence SCF is set at 1.0.

Table 9.3-2 Standard Conversion Factor (SCF)

(Unit: Rp. Billion)

Year	2001	2002	2003	2004	2005～2008
Total value of imports (CIF)	506,426	480,815	465,941	632,376	
Total value of exports (FOB)	642,595	595,514	613,721	739,639	
Total value of import duties	9,026	10,344	10,885	12,444	N.A
Total value of export duties	542	231	230	298	N.A
SCF	**0.993**	**0.991**	**0.990**	**0.991**	**N.A**

Source:Caliculated by JICA Study Team using data of World Development Indicators, Wo

The reason why the Standard Conversion Factor in Indonesia is almost 1.0 is due to the lowered custom duties brought about by the following:

- In connection with the trade liberalization policy of the government, import duties

are presently being lowered.
- Tariff rates with ASEAN Countries have been lowered to 0--5% by the year 2003.
- For purposes of industrial development, the Government employs import duties reduction and exemption measures including establishment of bonded areas and bonded warehouse systems for foreign and local investors.

2) Conversion Factor for Consumption (CFC)

This conversion factor is used to convert the market prices of consumer goods into the border prices. The Conversion Factor for Consumption (CFC) is usually calculated in the same manner as the Standard Conversion Factor, replacing total imports and exports by total imports and exports of consumer goods. The CFC is obtained by the following formula.

$$CFC = \frac{Ic + Ec}{(Ic + Dic) + (Ec - Dec)}$$

where, *Ic* : Total value of consumer goods imports (CIF)
Ec : Total value of consumer goods exports (FOB)
Dic : Total value of consumer goods import duties
Dec : Total value of consumer goods export duties

In calculating for the CFC, information on the tariff income for consumer goods is required, but it is not available. However, in Indonesia, the trade value for consumer goods in relation to the total trade amount is in the vicinity of 6% ~ 8% lately, and it is adjudged that market prices of consumer goods are not distorted because of open market policy in the same way as SCF; thus the CFC is set at 1.00.

Table 9.3-3 Import Share of Consumer Goods by CIF Value

Year	2004	2005	2006	2007	2008
Import of Consumer Goods (%)	8.1%	8.0%	7.8%	8.8%	6.4%

Note; Figure 2008 includes bonded zones
Source: Statistical Yearbook of Indonesia

3) Conversion Factor for Skilled Labor (CFSL)

Cost of skilled labor is calculated based on actual market wages, assuming that the market mechanism is functioning properly. However, as the data are domestic prices or market prices, they should be converted to border prices by multiplying by the CFC. The Conversion Factor for Skilled Labor (CFSL) is expressed by the following formula:

$$CFSL = \frac{\textit{Opportunity cost of skilled labor} \times CFC}{\text{Actual market wages of skilled labor}}$$

where, *Opportunity cost of skilled labor / Actual market wages of skilled labor* = 1
CFC : Conversion Factor for Consumption =1.00

4) Conversion Factor for Unskilled Labor (CFUL)

As wage rate is controlled by a minimum wage system and other governmental regulations despite the existence of a large amount of unskilled labors, the wages paid to unskilled labors by a project are generally above the opportunity cost. Hence, these wages (market wages) should not be regarded as the economic value of the unskilled labors. The Conversion Factor for Unskilled Labor (CFUL) is obtained by the following formula:

$$CFUL = \frac{\text{Opportunity cost of unskilled labor} \times CFC}{\text{Nominal wage rate of unskilled labor}}$$

$$= \frac{\text{Provincial Minimum Wage} \times CFC}{\text{Assumed wage rate of unskilled labor}}$$

where, *CFC* : Conversion Factor for Consumption =1.00

In this Study, 0.81 is adopted as the Conversion Factor for Unskilled Labor (CFUL) as shown in Table 9.3-4.

Table 9.3-4 Conversion Factor for Unskilled Labor (CFUL)

Year	2008	2009	2010	Assumed Wage Rate of Unskilled Labor	CFUL
	(IDR/Month)				
Minimum Wage (IDR/Month)	972,604	1,069,865	1,118,009	1,380,000	0.81

Source: JICA Study Team, Wage Rates based on the JAKARTA POST

(3) Conversion to Economic Cost

In this economic analysis, all costs and benefits are assumed to be divided into following four items: transfer items, traded goods and services, non-traded goods and services and labor. The market price of each item except the transfer items is changed to each economic price by each conversion factor corresponding with each item.

First is the transfer item. Import / export duties, other taxes and subsidies are merely transfer items which do not actually reflect any consumption of national resources. Therefore, these transfer items should be excluded in the calculation of the costs and benefits of the project for the economic analysis.

Next, traded goods are expressed at the price of cost, insurance and freight (CIF) for imports and at the price of free on board (FOB) for exports, which are border prices or economic prices themselves. The price of traded services is decided by the international market mechanism functioning properly, which is also expressed in border prices or economic prices.

“Traded goods” are defined as follows: those commodities which are imported or exported, or which would be imported or exported directly or indirectly as a result of a project under consideration being implemented (by Colin M.F. Bruce).

The economic price of the non-traded goods and services are calculated by multiplying the Standard Conversion Factor (SCF). By using the SCF, a difference between the domestic market price and international market price caused by customs duties and/or import/export subsidies can be avoided.

"Non-Traded goods" are defined as follows: those commodities and factors of production which are neither imported nor exported, or which would be neither imported nor exported directly or indirectly as a result of a project under consideration being implemented (by Colin M.F. Bruce).

The CFC is used for converting the price of consumer goods from domestic market price to border price or economic price.

The values of labor are further divided into values of skilled labor and values of unskilled labor. As the market mechanism of skilled labor is assumed to function properly, opportunity cost and market price is equal. The economic price of skilled labor is obtained by multiplying its domestic market price by the Conversion Factor for Consumption (CFC).

The market mechanism of unskilled labor does not function properly. Then, the opportunity costs and the market costs of unskilled labor must be estimated. In this study, unskilled labor is the port construction worker or cargo handling worker. The conversion factor of unskilled labor can be calculated by the market labor wage of the construction sector divided by the provincial minimum wages multiplied by the CFC.

"Opportunity Cost" is defined as follows: the marginal value of a resource, product, factor of production (land, labor, capital, management) or foreign exchange in its next best alternative use (by Colin M.F. Bruce).

9.3.5 Benefits of the Projects

(1) Benefit Items

Following items are identified as economic returns brought about by the implementation of container terminal development project at North Kalibaru (Kalibaru I).

(i) Value added of exporting commodities
(ii) Savings in land transportation cost between terminals and factories/warehouses
(iii) Savings in time cost of cargo on sea and land transportation
(iv) Increase in employment opportunities and income

Item (i) and (ii) are considered countable and the monetary benefits of those items are counted in this economic analysis.

(2) Value added of exporting commodities

1) General

In the "Without" case, no port infrastructure development projects are implemented in the Greater Jakarta Metropolitan area. As shown in Table 9.3-1, after international container terminals at Tanjung Priok Terminal are saturated, only 400,000 TEUs could be handled at Ciwandan Port and Merakmas Port and transported to consignees and exporters. 1,500,000 TEUs of potential export and import containers will be sustained, and Indonesian economy will lose economic benefits, or value added, which could be generated through the international trade.

50% of the 1.5 million TEUs are export containers and rest of them are import containers. Both export commodities and import commodities contribute to generate value added in Indonesia. It can be correctly estimate that almost all of the export commodities in containers are manufactured goods while import commodities include consumer goods as well as parts to be assembled and machinery for construction/manufacturing.

To simplify the calculation of economic benefits, only value added generated from export commodities are counted in this economic analysis. This method will produce a value less than the actual one, and thus can be considered a conservative estimate.

2) Estimation of Average Value of Laden Export Containers (Indonesian Source)

Estimation of amount of value added by exportation through Tanjung Priok terminal requires formation on unit value on commodities in a laden container at the said terminal. However, it is neither easy nor practical to access such information although several statistics on international trade have been published in Indonesia. For instance, average unit value for all aggregated commodities does not necessarily represent values of containerised cargo because value of containerised cargo is usually higher than that of bulk cargo. Values of cargoes declared at seaports are usually lower than those declared at airports.

JICA Study Team obtained statistical data on value and volume of exported commodities declared at Tanjung Priok Terminal during the period 2004 through 2009 as shown in Table 9.3-5. According to this source, unit value of exported commodities through the Tanjung Priok Terminal is US$2,431 per ton in 2009. As it is known that one laden container (TEU) holds 10.51 tons of cargo on average, it can be reasonably estimated that cargo with 10.51 tonnages will have commodity value of US$25,547 on average.

It should be noted that unit value of US$2,431 per ton is overall average of export commodity at Tanjung Priok Terminal, which include bulk cargo such as cement and gypsum. Average unit value of laden container is probably higher than this value.

Table 9.3-5 Unit Value of Export Commodity at Tanjung Priok Terminal

Year		2004	2005	2006	2007	2008	2009
Export	Value (million US$)	21,696.4	24,074.3	26,076.1	28,010.7	31,693.2	32,536.5
	Volume (thousand ton)	16,404.1	15,311.9	16,088.2	16,828.8	14,371.6	13,384.7
	Unit Value (US$/ton)	1,323	1,572	1,621	1,664	2,205	2,431
	Per 10.51 Ton (US$)	13,900	16,524	17,034	17,493	23,176	25,547

Source: JICA Study Team, estimated through Statistical Yearbook Indonesia

3) Estimation of Average Value of Laden Export Containers (Japanese Source)

Bureau of Ports and Harbours, Ministry of Land, Infrastructure, and Transport of Japanese government has been conducting Nationwide International Container Movement Study every 5 years in cooperation with Customs Department, Ministry of Finance.

This study reveals very important information and facts for policy makers and planners on nationwide port development policy, especially for container port, as well as facility planning for individual port. The latest nationwide survey was conducted during the period of 01 November 2008 through 30 November 2008. Every movement of international containers in Japan were reported, recorded and analysed.

According to the survey results, during the said 30 days, a total of 322,600 freight tons of commodities were imported from Indonesia, and their total value (C.I.F.) was \53.3 Billion, which leads to \165,100 per freight ton. It is known that one laden TEU contains 19.9 freight ton on average at major container ports in Tokyo Bay. Therefore, it can be said that commodity value of one laden TEU imported from Indonesia is \3,283,000 on average. Table 9.3-6 shows details on average value of containerised commodities by originating country.

It should be noted that Indonesia export commodities in containers not only to Japan, but also to other nations. Therefore, average commodity value in containers may differ from \3,283,000 per

laden TEU, but its difference is expected to be not significant because according to trade statistics published by Customs of Indonesia, average unit value of export commodity to Japan does not significantly differ from that exported from Indonesia to worldwide.

Table 9.3-6 Unit Value of Laden TEU by Origin

Originating Country	China	USA	Thailand	Korea	Indonesia	Total
Volume ('000 Freight Ton)	4,087.5	733.3	491.3	358.1	322.6	8,276.0
Value (Billion Yen)	727.2	157.3	93.5	86.5	53.3	1,639.2
Unit Value (Yen '000/Freight Ton)	177.9	214.6	190.2	241.4	165.1	198.1
Unit Value (Yen '000/Laden TEU)	3,537	4,267	3,782	4,801	3,283	3,938

Notes: Declared at customs offices in Japan

Freight ton of laden TEU is set at 19.9 based on port statistics of leading major ports in Japan.

Source: Survey Results of Export and Import Container Movement in Japan , Ministry for Land, Infrastructureand Transport of Japan, March 2008. The Table above is compiled by JICA Study Team based on available information.

4) Unit Value of Laden Export Container

Based on two independent data sources explained above, JICA Study Team set at US$30,000/Laden Export TEU for this economic analysis, as shown in Table 9.3-7.

Table 9.3-7 Unit Export Value of Laden TEU

(Unit: US$/Laden TEU)

	Indonesian Source (*)	Japanese Source (**)	JICA Team Estimate
Export from Indonesia	25,547	36,478	30,000

Note (*); Statistical Yearbook of Indonesia 2009, Based on customs declaration documents. Not only containers but other types of cargo are included.

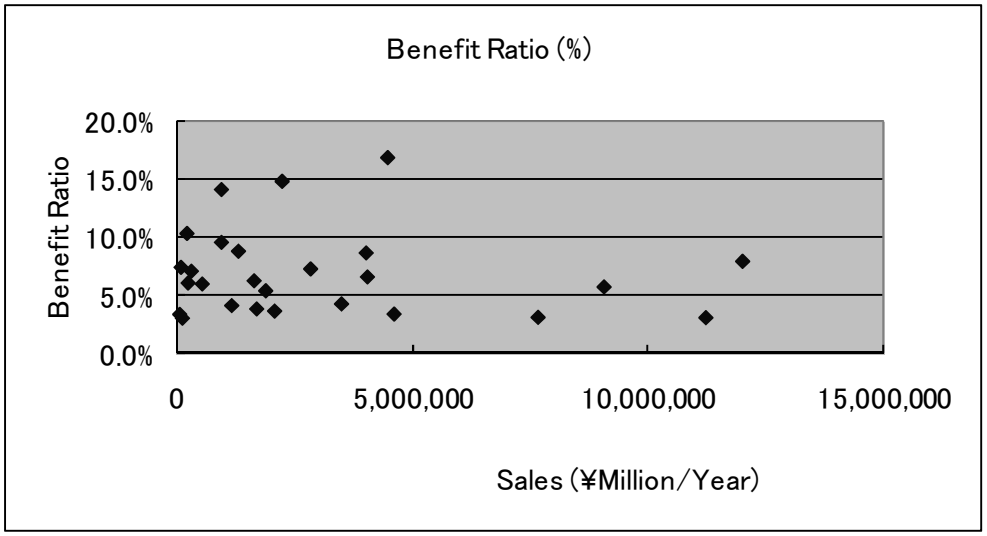
Note (**); Survey Results of Export and Import Container Movement in Japan , Ministry for Land, Infrastructure and Transport of Japan, March 2008. Compiled by JICA Study Team

5) Percentage of Operating Income to Total Sales

In comparison with “Without” case, Indonesian national output is higher by amount of unit export value multiplied by the number of laden export containers (TEU). However, the entire portion of increase is not equivalent to the value added to the Indonesian economy because considerable volumes of national and imported resources have been consumed to achieve this amount of output. What has to be clear for the economic analysis is how many percentage of export value contributes to value added to the national economy. JICA Study Team assumes that percentage of operating income to the total sales is equivalent to the portion of value added to the national economy.

JICA Study Team has collected and analysed information and data on percentage of operating income to the total sale of individual firms and manufacturers including Indonesian companies which JICA Study Team visited for interview in 2010.

Results are summarized in Figure 9.3-1, which shows that percentage of operating income of individual firm varies widely from a few percentages up to 20 percent. Average percentage of the operating income of the about 30 samples is in the vicinity of 7 percent, which is adopted to estimate the value added in this economic analysis.



Source: JICA Study Team

Figure 9.3-1 Percentage of Operating Income to Total Sales

(3) Savings in Land Transportation Cost

1) Container Throughput and Daily Truck Traffic

As shown in Table 9.3-1, it is assumed in this economic analysis that a total of 400,000 TEUs of international containers are loaded and unloaded at Ciwandan Port and Merakmas Port in Banten in the "Without" case while 1.9 million TEUs are handled at North Kalibaru I Terminal in the "With" case.

Daily traffic volume to/from the terminals has also been estimated based on the allocated container throughputs, and 644 trucks per day per one way will be generated, as shown in Table 9.3-8.

Regional share of truck volume (vehicle/day) has been estimated considering regional socio-economic indicators such as GRDP, regional population, consumption level, and results of OD traffic surveys conducted in 2002 and 2010. Resultant regional distribution of truck traffic is summarized in Table 9.3-9.

Table 9.3-8 Container Throughput and Daily Traffic at Ports in Banten (Without Case)

Year After LA	4th	5th	6th	7th	8th	9th	10th	-------
Throughput ('000 TEU)	0	400	400	400	400	400	400	-------
Traffic (Trucks Per Day)	0	644	644	644	644	644	644	-------

(Source: JICA Study Team)

Table 9.3-9 Estimated Regional Shares of Port Related Truck Traffic

	Banten	DKI	NE of W. Java	SW of W. Java
Consumer goods	20.3%	36.8%	34.3%	8.5%
Cargoes related to manufacturing industrie	8.8%	17.3%	62.1%	11.8%

Source: JICA Study Team

2) State of the Traffic

Land transportation costs for 400,000 TEUs between the North Kalibaru and shippers /consigners are estimated taking trucking distance and congestion level into consideration, and compared with that of the "Without" case, i.e., alternatively using Ciwandan/Merakmas Ports.

Trucking speed between major industrial parks on the eastern side of the capital region and the Tanjung Priok Port is already less than 20 km per hour. Future traffic volumes and congestion levels around JABODETABEK area in 2011 band 2020 were forecast and updated in "The Detailed Design for Tanjung Priok Access Road" published in 2008. According to the study, as shown in Chapter 4 and reiterated in Table 9.3-10, even opening of JORR and JORR2, the traffic volume will continue to increase and Vehicle Capacity ration (VCR) is beyond 1.0 on the most of roads in 2020.

State of traffic in which V/C ratio is in the range of 0.90-1.0 is described as follows; Operation at or near capacity and therefore volatile because there are virtually no usable gaps in traffic stream (OSPPM, King County, Washington, USA).

Project benefits are summarized in Table 9.3-12.

Table 9.3-10 Forecasted V/C ratio in 2020

Toll Road	Section	V/C in 2020
Jogorawi	J-1	**1.8**
	J-2	**1.7**
	J-3	**1.0**
Jakarta-Cikampec	JC-1	**2.0**
	JC-2	**1.4**
	JC-3	**1.0**
Jakarta-Tangerang	JT-1	**2.1**
	JT-2	**1.8**
	JT-3	**1.2**
Cenkareng Access	CA-1	**1.3**
	CA-2	**1.2**
JIUT	JI-1	**1.7**
	JI-2	**1.3**
	JI-3	**1.7**
	JI-4	0.8
	JI-5	**1.6**
Jakarta-Serpong	SR-1	**1.2**
JORR W1	JW-1	**1.1**
	JW-2	**1.7**
	JW-3	**1.7**
JORR-S	JS-1	**1.7**
	JS-2	**1.9**
	JS-3	**1.8**
JORR-E	JE-1	**1.6**
	JE-2	**1.6**
	JE-3	**1.5**

Toll Road	Section	V/C in 2020
TgPA	TP-1	**1.0**
	TP-2	0.5
	TP-3	0.2
Becakayu	BK-1	**1.6**
	BK-2	0.9
Depok Antasari	DA-1	**1.5**
	DA-2	0.6
2nd JORR	2J-1	0.2
	2J-2	0.4
	2J-3	0.5
	2J-4	**1.1**
	2J-5	**1.3**
	2J-6	**1.1**
	2J-7	**1.0**
	2J-8	**1.0**
DKI Inner Ring Road	IR-1	**1.1**
	IR-2	**1.3**
	IR-3	**1.2**
	IR-4	0.9
	IR-5	0.4
	IR-6	**1.2**
	IR-7	0.8
	IR-8	**1.0**
	IR-9	**1.3**
	IR-10	**1.0**

Source: Design Report for Tanjung Priok Access Road, Ministry of Public Works, 2008

Table 9.3-11 State of Traffic by V/C Ratio Category

V/C Ratio	State of Traffic
0.5-0.75	Travel speed still at or near free flow, but ability to maneuver within the traffic stream is noticeably restricted
0.75-0.9	Travel speeds begin to decline with increasing flows; minor incidents expected to cause queuing
0.90-1.0	Operation at or near capacity and therefore volatile because there are virtually no usable gaps in traffic stream;

Source: OSPPM Home Page, King County

9.3.6 Costs of the Projects

(1) Construction Costs

Construction costs basically consist of costs for breakwaters and seawalls, channel and basin, container terminals (quay wall, yard pavement, and terminal buildings), cargo handling equipment, security and utility, and the project related indirect costs. The cost for the port access road is also one of the important cost components of the project.

The construction cost is firstly estimated by market price. After transfer costs such as VAT are removed, the costs expressed by market price are converted into economic pricing using conversion factors.

(2) Maintenance and Operation Costs

1) Maintenance costs

The annual costs for maintaining the port facilities are estimated as a fixed rate of the initial investment, specifically 0.2% for port infrastructure (breakwaters, seawalls, quay walls, yard pavement, and buildings) and 5% of the original construction costs of the port access road. Annual maintenance costs for cargo handling equipment are estimated at 1% of their initial procurement cost. It is expected that maintenance dredging will be required every five years but its volume will be minimal.

2) Personnel and operation costs

Personnel costs for management and operation of the terminals are estimated for both “With” case and “Without” case. Utility costs including electricity are estimated at 2% of the initial equipment procurement costs.

3) Replacement Cost

Cargo handling equipment will be replaced after its life time is passed. Life time of the equipment is set at individually by types of the equipment: 25 years for quay cranes and 4 years for yard vehicles.

4) Total Costs

The project costs are summarised in Table 9.3-12 in economic pricing.

9.3.7 Evaluation of the Project

(1) Calculation of the EIRR

The economic internal rate of return (EIRR) based on a cost-benefit analysis is used to appraise the economic feasibility of the project. The EIRR is the discount rate which makes the costs and benefits of a project during the project life equal.

It is calculated by using the following formula.

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = 0$$

where, *n*: Period of economic calculation (project life = 35 years)

Bi: Benefits in i-th year

Ci: Costs in i-th year

r: Discount rate

(2) Sensitivity Analysis

In order to see whether the project is still feasible when some conditions change, a sensitivity analysis is made with the following assumptions.

Assumption: Both the costs increase by 10% and the benefits decrease by 10%

(3) Evaluation

EIRR of Kalibaru Phase I project is estimated at 53%. Even in the case in which both the costs increase by 10% and the benefits decrease by 10%, the EIRR of this scenario is estimated at 46.5% （see Table 9.3-13）.

In general, it is said that a project with an EIRR of more than 15% is economically feasible considering the opportunity cost of capital in Indonesia. As for this study, the resulting EIRRs of the project and the worst scenario case are larger than 15%.

This means that the planned project is economically feasible.

Table 9.3-12 IRR of Kalibaru Phase I Project

(Unit: Rp. Billion)

Year	Project Cost					Project Benefit				Net Project Benefit
	Construction Cost	Manag't & Oper'n Cost	Maintenance Cost	Replacement Cost	Sub Total	Value Added	Operation Cost Saving	Land Trans'n Cost Saving	Sub Total	
1st Year	124.8	0.0	0.0	0.0	124.8	0.0	0.0	0.0	0.0	(124.8)
2nd Year	1,589.0	0.0	0.0	0.0	1,589.0	0.0	0.0	0.0	0.0	(1,589.0)
3rd Year	1,669.0	0.0	0.0	0.0	1,669.0	0.0	0.0	0.0	0.0	(1,669.0)
4th Year	2,624.4	0.0	0.0	0.0	2,624.4	0.0	0.0	0.0	0.0	(2,624.4)
5th Year	1,690.1	36.4	27.4	0.0	1,753.9	2,768.7	19.7	170.8	2,959.1	1,205.1
6th Year	144.9	72.9	42.3	0.0	260.0	4,980.1	19.7	170.8	5,170.5	4,910.5
7th Year	0.0	72.9	42.3	0.0	115.2	7,078.2	19.7	170.8	7,268.6	7,153.4
8th Year	0.0	72.9	42.3	11.5	126.7	8,400.1	19.7	170.8	8,590.5	8,463.9
9th Year	0.0	72.9	42.3	14.6	129.8	8,642.0	19.7	170.8	8,832.4	8,702.6
10th Year	0.0	72.9	44.7	3.2	120.8	8,506.5	19.7	170.8	8,696.9	8,576.1
11th Year	0.0	72.9	42.3	0.0	115.2	8,372.0	19.7	170.8	8,562.4	8,447.2
12th Year	0.0	72.9	42.3	58.2	173.4	8,238.7	19.7	170.8	8,429.1	8,255.7
13th Year	0.0	72.9	42.3	58.2	173.4	8,106.8	19.7	170.8	8,297.2	8,123.8
14th Year	0.0	72.9	42.3	14.7	129.9	7,976.3	19.7	170.8	8,166.8	8,036.9
15th Year	0.0	72.9	44.7	14.7	132.3	7,847.6	19.7	170.8	8,038.0	7,905.7
16th Year	0.0	72.9	42.3	11.5	126.7	7,720.5	19.7	170.8	7,910.9	7,784.3
17th Year	0.0	72.9	42.3	11.5	126.7	7,595.3	19.7	170.8	7,785.7	7,659.1
18th Year	0.0	72.9	42.3	0.0	115.2	7,472.0	19.7	170.8	7,662.4	7,547.3
19th Year	0.0	72.9	42.3	249.7	364.9	7,350.7	19.7	170.8	7,541.2	7,176.3
20th Year	0.0	72.9	44.7	307.9	425.5	7,350.7	19.7	170.8	7,541.2	7,115.7
21st Year	0.0	72.9	42.3	58.2	173.4	7,350.7	19.7	170.8	7,541.2	7,367.8
22nd Year	0.0	72.9	42.3	0.0	115.2	7,350.7	19.7	170.8	7,541.2	7,426.0
23rd Year	0.0	72.9	42.3	0.0	115.2	7,350.7	19.7	170.8	7,541.2	7,426.0
24th Year	0.0	72.9	42.3	26.2	141.3	7,350.7	19.7	170.8	7,541.2	7,399.8
25th Year	0.0	72.9	44.7	26.2	143.8	7,350.7	19.7	170.8	7,541.2	7,397.4
26th Year	0.0	72.9	42.3	0.0	115.2	7,350.7	19.7	170.8	7,541.2	7,426.0
27th Year	0.0	72.9	42.3	0.0	115.2	7,350.7	19.7	170.8	7,541.2	7,426.0
28th Year	0.0	72.9	42.3	58.2	173.4	7,350.7	19.7	170.8	7,541.2	7,367.8
29th Year	0.0	72.9	42.3	637.0	752.2	7,350.7	19.7	170.8	7,541.2	6,789.0
30th Year	0.0	72.9	44.7	578.8	696.4	7,350.7	19.7	170.8	7,541.2	6,844.7
31st Year	0.0	72.9	42.3	0.0	115.2	7,350.7	19.7	170.8	7,541.2	7,426.0
32nd Year	0.0	72.9	42.3	11.5	126.7	7,350.7	19.7	170.8	7,541.2	7,414.5
33rd Year	0.0	72.9	42.3	11.5	126.7	7,350.7	19.7	170.8	7,541.2	7,414.5
34th Year	0.0	72.9	42.3	261.2	376.4	7,350.7	19.7	170.8	7,541.2	7,164.8
35th Year	0.0	72.9	44.7	261.2	378.8	7,350.7	19.7	170.8	7,541.2	7,162.3
									IRR =	53.0%

Source: JICA Study Team

Table 9.3-13 Sensitivity Analysis of Kalibaru Phase I Project

(Unit: Rp. Billion)

Cost 10% Up			Benefit 10% Down			Cost 10% Up, Benefit 10% Down		
Cost Sub Total	Benefit Sub Total	Net Project Benefit	Cost Sub Total	Benefit Sub Total	Net Project Benefit	Cost Sub Total	Benefit Sub Total	Net Project Benefit
137.3	0.0	(137.3)	124.8	0	(124.8)	137.3	0	-137.3
1747.9	0.0	(1,747.9)	1,589.0	0	(1,589.0)	1747.9	0	-1,747.9
1836.0	0.0	(1,836.0)	1,669.0	0	(1,669.0)	1836.0	0	-1,836.0
2886.8	0.0	(2,886.8)	2,624.4	0	(2,624.4)	2886.8	0	-2,886.8
1929.3	2,959.1	1,029.7	1,753.9	2,663	909.2	1929.3	2,663	733.8
286.0	5,170.5	4,884.5	260.0	4,653	4,393.4	286.0	4,653	4,367.4
126.7	7,268.6	7,141.9	115.2	6,542	6,426.6	126.7	6,542	6,415.0
139.3	8,590.5	8,451.2	126.7	7,731	7,604.8	139.3	7,731	7,592.2
142.8	8,832.4	8,689.6	129.8	7,949	7,819.4	142.8	7,949	7,806.4
132.9	8,696.9	8,564.0	120.8	7,827	7,706.4	132.9	7,827	7,694.3
126.7	8,562.4	8,435.7	115.2	7,706	7,591.0	126.7	7,706	7,579.5
190.7	8,429.1	8,238.4	173.4	7,586	7,412.8	190.7	7,586	7,395.5
190.7	8,297.2	8,106.5	173.4	7,467	7,294.1	190.7	7,467	7,276.7
142.9	8,166.8	8,023.9	129.9	7,350	7,220.2	142.9	7,350	7,207.2
145.5	8,038.0	7,892.4	132.3	7,234	7,101.9	145.5	7,234	7,088.6
139.3	7,910.9	7,771.6	126.7	7,120	6,993.2	139.3	7,120	6,980.5
139.3	7,785.7	7,646.4	126.7	7,007	6,880.5	139.3	7,007	6,867.8
126.7	7,662.4	7,535.8	115.2	6,896	6,781.0	126.7	6,896	6,769.5
401.3	7,541.2	7,139.8	364.9	6,787	6,422.2	401.3	6,787	6,385.7
468.0	7,541.2	7,073.1	425.5	6,787	6,361.5	468.0	6,787	6,319.0
190.7	7,541.2	7,350.4	173.4	6,787	6,613.7	190.7	6,787	6,596.3
126.7	7,541.2	7,414.5	115.2	6,787	6,671.9	126.7	6,787	6,660.3
126.7	7,541.2	7,414.5	115.2	6,787	6,671.9	126.7	6,787	6,660.3
155.5	7,541.2	7,385.7	141.3	6,787	6,645.7	155.5	6,787	6,631.6
158.2	7,541.2	7,383.0	143.8	6,787	6,643.2	158.2	6,787	6,628.9
126.7	7,541.2	7,414.5	115.2	6,787	6,671.9	126.7	6,787	6,660.3
126.7	7,541.2	7,414.5	115.2	6,787	6,671.9	126.7	6,787	6,660.3
190.7	7,541.2	7,350.4	173.4	6,787	6,613.7	190.7	6,787	6,596.3
827.4	7,541.2	6,713.8	752.2	6,787	6,034.9	827.4	6,787	5,959.7
766.0	7,541.2	6,775.1	696.4	6,787	6,090.6	766.0	6,787	6,021.0
126.7	7,541.2	7,414.5	115.2	6,787	6,671.9	126.7	6,787	6,660.3
139.3	7,541.2	7,401.8	126.7	6,787	6,660.4	139.3	6,787	6,647.7
139.3	7,541.2	7,401.8	126.7	6,787	6,660.4	139.3	6,787	6,647.7
414.0	7,541.2	7,127.1	376.4	6,787	6,410.7	414.0	6,787	6,373.0
416.7	7,541.2	7,124.5	378.8	6,787	6,408.2	416.7	6,787	6,370.3
	IRR =	49.8%		IRR =	49.5%		IRR =	46.5%

(Source: JICA Study Team)

9.4 PPP Scheme and Financial Analysis

9.4.1 Regulatory Framework of PPP for Port Development

(1) Principal Regulations

Basic guideline on public-private partnership (PPP) projects in Indonesia in infrastructure provision is stipulated in Presidential Regulation No. 67, Year 2005. Substance of the regulation is as follows;

- PPP should be established in accordance with fairness, publicity, transparency and competitive circumstance beneficial to both public and private parties.
- Value and/or feasibility of PPP projects should be evaluated by the government in an appropriate manner prior to recruiting the projects.
- Any risks should be borne by a party who can manage the risks more skillfully with less cost than other. Risk sharing scheme should be determined after a mutual agreement has been reached.
- Government support should be limited to projects socially desirable but fiscally non-feasible.
- PPP partners should be selected through competitive bidding.
- PPP projects can be proposed by private entities; however, the project tendering should be conducted under a competitive circumstance when the project is approved by the government.
- Price on PPP projects should be set based on repayment amount of capital cost for the project as well as legitimate profit of the investment.
- PPP projects should be executed by concession contract or by granting business right.

Basic regulatory framework on PPP in Indonesia is set forth in the Presidential Regulations and Ministerial Regulations shown in the table below.

Table 9.4-1 PPP Framework

	Regulations	Contents
1	Presidential Regulation No.42, year 2005	Regulation concerning establishment of KKPPI for accelerating infrastructure provision.
2	Presidential Regulation of the Republic of Indonesia No.67, year 2005	Regulation concerning PPP utilization in infrastructure provision, a principle regulation for driving PPP projects in the country.
3	Presidential Regulation No.36, year 2005	Regulation concerning procedures on acquisition of site for implementation of PPP projects.
4	Presidential Regulation No.65, year 2006	Revised edition of the regulation No.36/'05 concerning the acquisition of site.
5	Ministry of Finance Regulation No.38/PMK.01/2006	Regulation concerning government support and compensation on PPP implementation stipulated by Ministry of Finance.
6	Coordinating Ministry of Economic Affairs (CMEA) Decree as Head of the National Committee for the acceleration of infrastructure provision No. KEP-01/M. Econ/05/2006	Regulation concerning organization and procedures of KKPPI, a core organization for the acceleration of infrastructure provision in Indonesia, stipulated by CMEA.
7	Coordinating Ministry of Economic Affairs (CMEA) Regulation as Head of the National Committee for The Acceleration of Infrastructure Provision No. PER-03/M. Econ/06/2006	Regulation concerning listing and ranking priorities of PPP projects in Indonesia, stipulated by CMEA.
8	Coordinating Ministry of Economic Affairs (CMEA) Regulation as Head of the National Committee for The Acceleration of Infrastructure Provision No. PER-04/M. Econ/06/2006	Regulation concerning evaluation procedures of PPP application for providing government support applied based on Ministry of Finance Regulation No.38/PMK.01/2006.
9	Presidential Regulation No.13, Year 2010	Amendment to the Presidential Regulation, No.67 of 2005 regarding the Cooperation of Government and Business Entity in the Provision of Infrastructure.
10	National Development Planning Agency Regulation No.4, 2010	General Guidance for the Performance of PPP in the Provision of Infrastructures

Source: Amended by JICA Study Team based on the report of the Study on the New Public Private Partnership Strategy for the Port Development and Management in the Republic of Indonesia, 2009, JICA

Among these regulations and decrees, Ministry of Finance Regulation No.38/PMK.01/2006 is the core regulation, together with Presidential Regulation No.67/2005, for accelerating infrastructure development needs using government support to drive the PPP and increase investment in infrastructure provision in Indonesia. This Ministry of Finance regulation stipulates implementation instructions and procedures for the control and management of infrastructure provision risks on PPP projects in Indonesia by the Ministry for granting government support.

(2) Risks and their Compensation

Risks in the context of implementing a PPP project for infrastructure provision in Indonesia are categorized as follows in the regulation.

Political Risk:

The risk that is attributable to policies/actions/decisions by Government or State entities which directly and significantly impose financial losses on a Business Enterprise, including risk of

expropriation, risk of legal or regulatory change, risk of currency convertibility restriction and prohibition of fund repatriation.

Project Performance Risk:

The risk that is associated with project implementation, which among others includes location risk and operational risk.

Demand risk:

The risk that arises as a result of demand for the goods or services produced by a PPP project being lower than agreed.

Scope of infrastructure provision risk management and control including functions and responsibilities of some key organizations are stipulated in the regulation as follows;

- Project planning and technical and financial feasibility evaluation are undertaken by the Technical Department or Institute,
- Evaluation of project feasibility and prioritization with regard to national development priorities are undertaken by KKPPI,
- Evaluation of financial and fiscal risks is undertaken by the Ministry of Finance through its Risk Management Unit.

Type of risks and forms of government support in the infrastructure provision PPP projects are also stipulated in the regulation, as follows;

- Political Risk may be agreed to provide compensation to an asset owner/Business enterprise based on a risk sharing scheme between the Government and Business Enterprise.
- Project Performance Risk caused by delay of land acquisition, increase in land price or delay in approval of commencement of commercial operation, delay in tariff adjustment and changes in the specification of outputs of those already agreed by the Minister/Head of Institute which cause financial loss for the Business Enterprise may also be compensated by extension of the concession period and/or by other means approved by the Minister of Finance or by recalculation of the cost of production.
- When Demand Risk cases have lower revenue than the minimum total revenues guaranteed by the Government as a result of decrease in total demand on which the agreement was based, financial and/or other forms of compensation may be also approved by the Minister of Finance.

(3) Procedures

The procedure for giving Government Support for infrastructure provision PPP projects is stipulated in the regulation as follows.

Related Minister/Head of Institution submits a proposal requesting Government Support to KKPPI.

The Minister/Head of Institution is obliged to undertake an evaluation and calculation of the project feasibility with or without Government Support in risk management and to provide copies of the following documents.

- Pre-feasibility study report
- Plan of the cooperation form
- Plan for project financing and source of funds
- Plan for the tendering of PPP project, including schedule, process and evaluation method

- Documentation of the results of the public consultation

The proposal is evaluated by KKPPI based on the project quality criteria, technical and financial feasibility aspects.

The proposal is delivered by KKPPI to the Minister of Finance after KKPPI's evaluation for the attention of Risk Management Unit (hereinafter referred to as RMU) for their evaluation as to whether the costs and risks arising from the provision of Government Support exceed the capacity limit of the Government (APBN) budget to bear them and/or the proposal documents prepared fulfilling the transparency principle or not.

Once RMU recommends the infrastructure provision PPP project, the Minister of Finance gives in-principle approval for provision of Government Support, an allocation of funds for Government Support will be proposed in the draft Government budget to obtain the approval of the House of Representative (DPR).

Technical Department/Institution carries out bidding or tender process in accordance with applicable regulations once the DPR approves the PPP project in the Budget Law.

Technical Department/Institution delivers the notice of tender result to the Minister of Finance for the attention of RMU once the tender is carried out.

RMU makes certain that the tender process has been conducted fairly before the agreement is signed.

The Minister of Finance gives final agreement for or refuses the giving of Government Support after receiving the recommendation (2nd) of the RMU.

The Minister/Head of Institution or authorized representative signs the corporation agreement after the Minister of Finance gives final agreement for the provision of Government Support.

Figure 9.4-1 shows basic flow of implementation of port PPP projects.

(4) Status of Revision

KKPPI and Risk Management Unit (RMU) has handled many proposals on infrastructure provision PPP project in relation to road and energy sectors since the organizations were established in late 2006; however, none of the proposals under the schemes of these Regulations got final agreement of Government Support on the risks according to an officer of RMU because the statutes stipulated in these Regulations are too general to apply for the projects proposed by various sectors.

Therefore, the Government decided to revise these regulations, Presidential Regulation No.67, 2005 and Ministry of Finance Regulation No.38/PMK.01, 2006, reflecting characteristic features of the sectors related, and simplifying and defining its processes and accountabilities within 2 to 3 months from now on.

In order for creating better and workable system to introduce new public-private partnership to the port development, management and operation, it is necessary firstly to redefine the roles and functions of related organizations including KKPPI (National Committee for the Acceleration of Infrastructure Provision), RMU (Risk Management Unit), MOSOC (Ministry of State Own Company), MOT, DGST and PELINDOs currently involved in the PPP implementation of port sector, reform/amendment of the regulatory framework from currently applied one and institutional reform of related organizations including establishment of Port Authority solely responsible for management and development of each port for the promotion of PPP in general to more suitable and specific one to the development, management and operation of port.

New shipping law is stipulated mainly to separate the regulatory function and operation function of existing IPC aiming to more efficient and effective port development, management and

operation, it does not, however, stipulate necessary regulation on the rules and procedures for the promotion of port concession.

Government Regulation Number 61 year 2009 on new shipping law stipulates as follows:

Article 74

i) Concession are given to Port Enterprises for the operation and/or provision of services of ships, passengers, and goods as referred to in article 69 section (1) which are stipulated in the form of agreement.
ii) The provision of the concession to the Port Enterprises as referred to in section (1) is implemented through tender mechanism according to the provisions of laws.
iii) The period of the concession as referred to in section (1) is adjusted to the returning of investment funds and reasonable profits.
iv) The agreement as referred to in section (1) contains at least:
    a. the scope of the business;
    b. the period of business concession;
    c. initial tariffs and adjustment formula of the tariffs;
    d. rights and duties of all parties including the risks undertaken by all parties in which risks allocation must be based on the efficient and balance risk allocation principles;
    e. standards of services performance as well as procedures of handling public's complaints;
    f. sanctions in case all parties does not fulfill the agreement of the business;
    g. dispute settlements;
    h. discontinuance or termination of business agreement;
    i. the legal system for the business agreement is Indonesian laws;
    j. force majeure;
    k. other changes.

Article 75

i) In case the concession period has been terminated, port facilities as the result of the concession shall be transferred or returned to the port management body.
ii) Port facilities that have been transferred to the port management body as referred to in section i), the management are given to the Port Enterprises for the operation and/or provision of services of ships, passengers, and goods according to the joint utilization through tender mechanism.
iii) Port Enterprises that have been stipulated through auction mechanism as referred to in section ii), in operating their business in the ports shall be according to the provisions of laws.
iv) Joint utilization as referred to in section ii) is given within the period of maximum 30 (thirty) years since the agreement of joint utilization has been signed.

Article 77

The incomes of the concession and the compensation received by Port Authority shall become state incomes in which the utilization should be implemented according to the provisions of laws.

Article 79

Port construction shall only be carried out in accordance with National Port Master Plan and Port Master Plan.

Article 80

i) Sea port construction by port authority shall be carried out after holding the license.
ii) License as referred to in section i) is proposed by port management body to:
    a. the Minister for main ports and feeder ports;
    b. the governor for regional feeder ports; and
    c. the regent/mayor for local feeder ports.
iii) License application as referred to in section ii) should meet the technical requirements of harbor and environmental conservation.

Article 82

i) Harbor technical requirements as referred to in article 80 section iii) and article 81 section iii) consist of:
    a. feasibility study; and
    b. technical design.
ii) Feasibility study as referred to in section i) point a consist of at least:
    a. technical feasibility; and
    b. economical and financial feasibility.
iii) Technical design as referred to in section i) point b consist of at least:
    a. soil condition;
    b. construction;
    c. hydro oceanographic condition;
    d. topography;
    e. placement and construction of Marine Navigational Aids Facilities, navigation channels, and port pool as well as the layout and capacity of the equipments in ports.

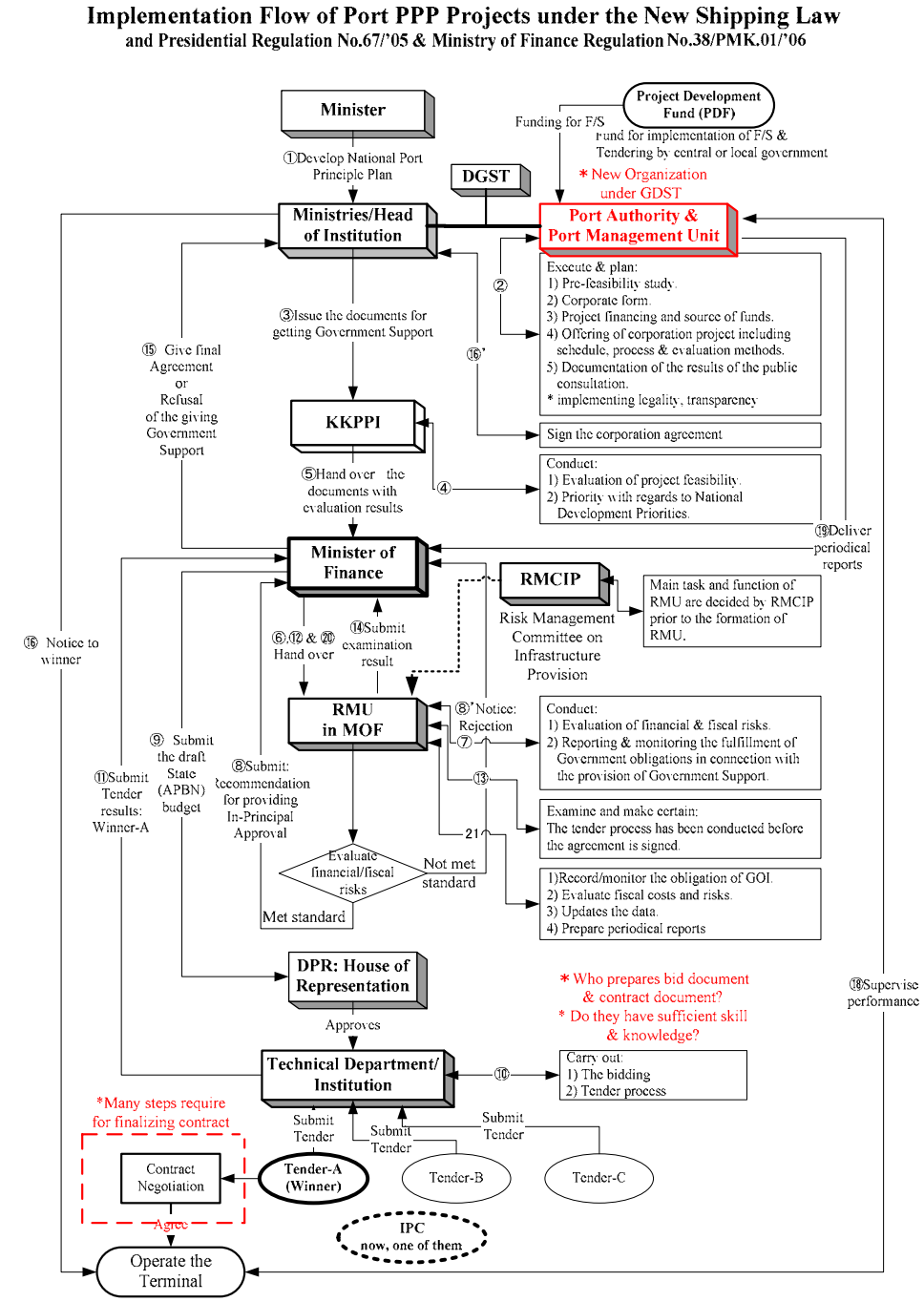
Article 83

Requirements of environmental conservation as referred to in article 80 section iii) and article 81 section iii) are environmental study which is carried out according to the provisions of laws in environment field.

Article 84

In the application as referred to in article 80 section iii) and article 81 section iii) must be enclosed with documents consist of:

a. Port Master Plan;
b. feasibility documents;
c. technical design documents; and
d. environment documents



Source: JICA Study Team

Figure 9.4-1 Implementation Flow of Port PPP Projects under the New Shipping Law

9.4.2 Type of PPP for the Development of North Kalibaru Phase I

(1) Possible type of PPP for North Kalibaru phase I development

Table 9.4-2 shows the typical form of PPP scheme provided in port sector.

Table 9.4-2 Possible PPP Scheme

Authority Type	Description
Agreement	Port-related services provided on port property
Concession Agreement	Commercial use of state property, long-term agreements, typically 30+years
Lease	Fixed term leases typically 10-15 years
Order	Port infrastructure (streets, sewers, etc.) permit with public agencies.
Revocable Permit	Leases that may be revoked with 13-120 days notice. Typically of indeterminate length

Source: JICA Study Team

Shipping law stipulates that the provision of breakwaters, channel and navigation aids is the obligation of the Port Authority and hence Port Business Entity is expected to provide mainly terminal and other ancillary facilities and services when it is expected to be commercially viable.

Hence, PPP scheme to be applied to the development of North Kalibaru phase I should be based on these possible PPP schemes.

In case of Kalibaru Phase I development, IPC2 has already been given permission for development from the Ministry of Transport, although actual approval procedure is not completed yet.

Even for the development of Phase I, required investment cost is rather high and IPC2 seems incapable of raising all the necessary funds on its own and hence the following two PPP schemes will be considered for Phase I development.

- Case 1: Port Authority invests in breakwater, channel and reclamation with soft loan and Private Terminal Operator invests in terminal
- Case 2: Port Authority invests in breakwater, channel with soft loan and Private Terminal Operator invests in reclamation and terminal

(2) Assumptions for the development of North Kalibaru Phase I

Urgent Development Plan

Container terminal development plan as an urgent project is selected as is shown in Figure 9.4-2.

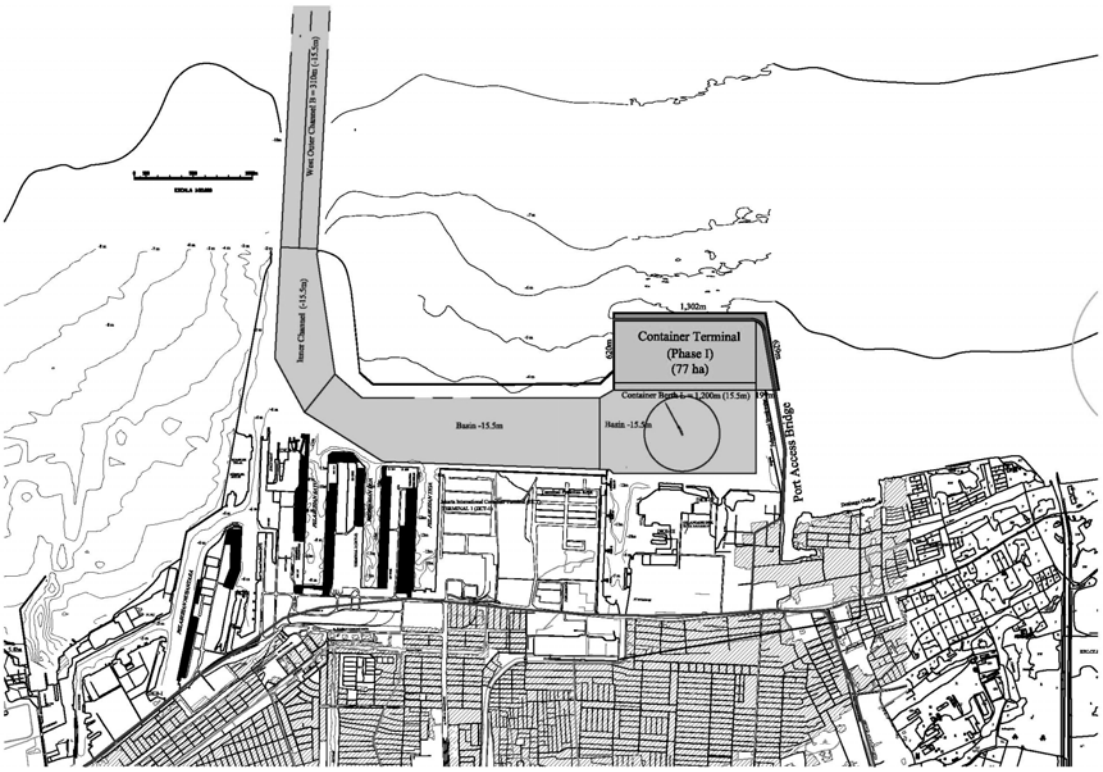


Figure 9.4-2 Urgent Development Plan of Container Terminal in North Kalibaru

Location of phase I container terminal is designed to utilize the relocated breakwater as a part of revetment for reclaimed land for terminal. A part of existing breakwater is under relocation work financed by JICA and then extended part of relocated breakwater is designed on the same line.

According to the new shipping law, provision of channels, breakwater and navigation aids is the obligation of the Port Authority, and hence outer seawall to function as the breakwater together with the relocation of existing breakwater which form revetment for reclaimed land is to be provided by the Port Authority.

Planned capacity of the terminal is set as 1.9 million TEUs with 1200mx-15.5m quay wall.

Considering the estimated vessel size to use the terminal, one unit of terminal to be conceded to the operator is set as 600m (2berths).

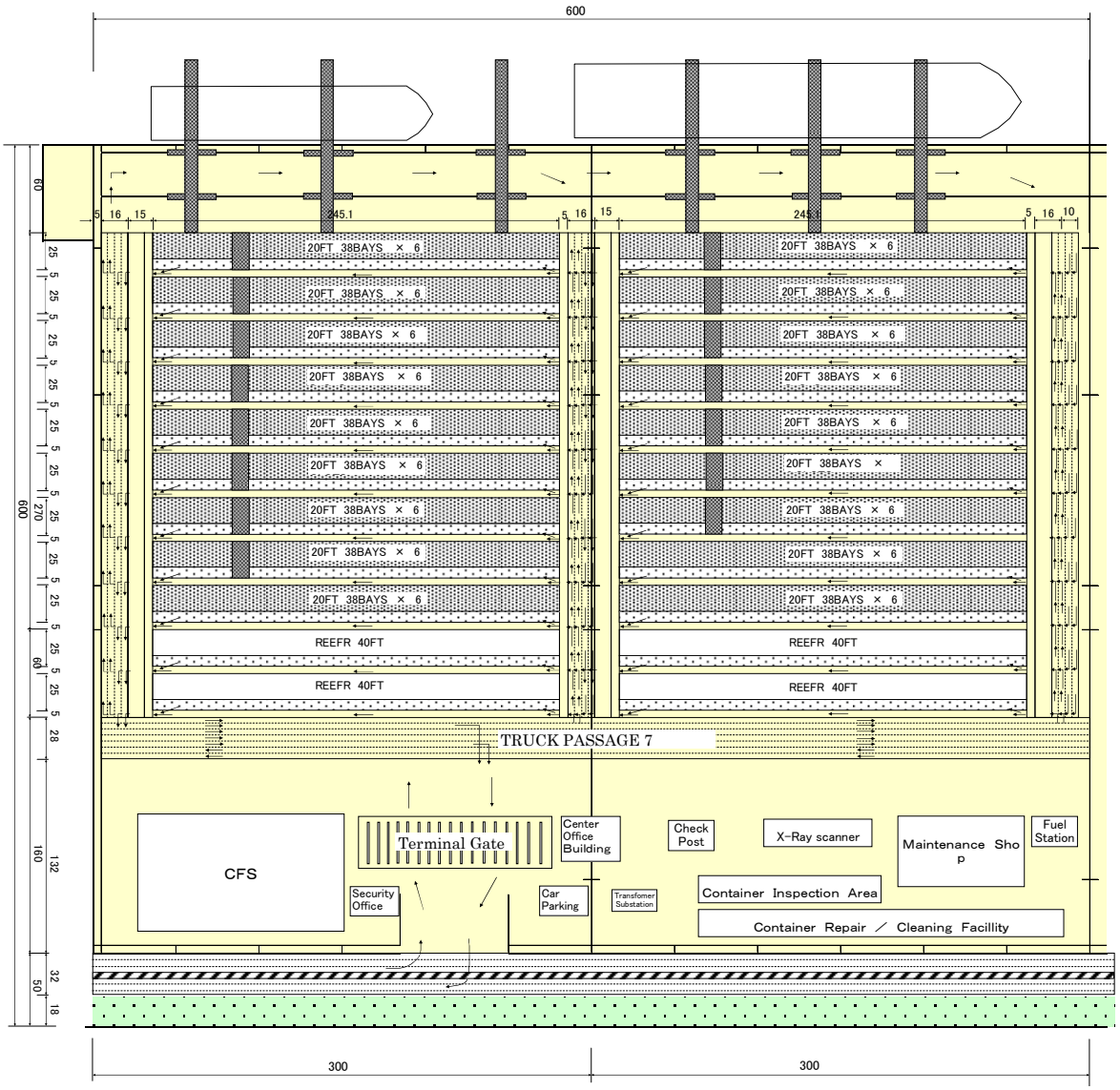


Figure 9.4-3 Container Yard Layout (360m and 240m)

Cost for Phase I Project

Required equipment is shown in Table 9.4-3.

Table 9.4-3 Required Equipment and Cost

Item	Remark	No. of units	Life time	Direct Unit Price(JPY)
Quay cranes 1-6	Replacement	6	25	898,900,200
RTG 1-15	Replacement	15	15	148,058,000
Yard Tractor		36	8	5,889,600
Yard Chassis	20/40/45 correspond	38	15	2,372,200
Top Handler	4 high	3	8	44,990,000
Side Handler	5 high for empty cont.	4	8	22,495,000
Tank Lorry	For fueling	1	10	14,396,800
Bus for Worker	Shuttle service	1	5	2,699,400
M/R Service car	With A. & W.M.	1	8	2,290,400
Forklift 10t	For M/R	6	10	7,198,400
Forklift 3t-5t	For M/R	6	5	4,499,000
Forklift for CFS		0	5	3,272,000
Yard Vehicle	Operation management	15	4	1,145,200
Fire Fighting Vehicle		2	10	17,996,000
Road Sweeper		1	10	14,396,800
CPU System	For operation	1	4	89,980

Source: Estimated by JICA Study Team

Operation Cost

Number of staff and unit wage for Port Authority is assumed as shown in Table 9.4-4.

Table 9.4-4 Number of Staffs and Wage for Port Authority

Port Authority	No. of Staffs	Unit Wage
General Manager	1	10.435
Deputy General Manager	5	8.696
Secretary	1	4.348
Manager	12	6.956
Assist Manager	4	5.218
Stuff	8	3.478
Total	31	

Source: Estimated by JICA Study Team

Number of staff, labors and wages for terminal operator (1 operator) is shown in Table 9.4-5 and Table 9.4-6.

Table 9.4-5 Number of Staffs and Wages for Operator's Office

Terminal Operator Office	No. of Staffs	Unit Wage
CEO (office manager)	1	17.391
CFO (treasurer)	1	17.391
Corporate Securetary	1	6.087
Manager	2	17.391
Assist Manager	13	13.391
Manager	1	17.391
Assist Manager	2	13.391
Manager	1	17.391
Stuff	6	6.087
Manager	1	17.391
Stuff	7	6.087
Total	36	

Source: Estimated by JICA Study Team

Table 9.4-6 Number of Labors and Wages for Operator

Ship, Yard Operation	No. of Staffs	Unit Wage
Boss	16	8.696
G.C. Operator	24	8.695
RTG & Heavy	45	8.695
Lift Equip. Operator		
Tractor Driver	35	2.826
Longshore Worker	100	2.826
Marine Clerk	45	8.696
M & R		
Boss	4	8.696
Mechanic	35	2.826
Electrician	6	2.826
CFS Operation		
Boss	1	8.696
Driver & Worker	33	2.826
Clerk	13	2.826
Total	357	

Source: Estimated by JICA Study Team

9.4.3 Financial Analysis on Proposed PPP Scheme

(1) Assumptions for Financial Analysis

Concession Term and Fees

Concession Fees consist of fixed part and variable part. Fixed part is set as necessary investment cost and repayment of interest by the Port Authority on the initial investment excluding those for breakwater and channel. Variable part is set as 10% of the revenue of terminal operator as a base case.

Variable part of concession fee can be adjusted to balance the financial conditions of TOC and PA throughout the concession period.

Concession period is set as 30 years after operation of the terminal for each of the two operators. (It is assumed that one operator operates two berths (600m) as one unit of terminal.)

Revenues of Port Authority and Terminal Operator

Revenue of Port Authority is concession fees from two operators and light due and harbor due for the use of channel and navigation aids from vessels using North Kalibaru Terminal.

Revenue of Terminal Operator is wharfage, charges for mooring and unmooring, hatch opening and closing, container handling charge, container storage charge, charge for PTI (pre-trip investigation) on reefer container and lift on lift off charge at yard

Financial Resources

Investment cost of the Port Authority is financed by soft loan with condition of 0.3% interest, loan term 30 years and grace period 3 years (considering the average preparation period for tender of construction work after loan agreement) on initial investment excluding VAT and administration cost.

Investment cost of the Terminal Operating Company (Concessionaire) is from its capital cost (30%/40%) and loan from the bank (13% interest, repayment 10years after completion of construction for 70%/60% of total investment cost.

In addition to the above mentioned financial resource of concessionaire, the case of project finance by EXIM bank in which 30% is invested as initial capital and 70% is loan with condition (5% interest, repayment 12 years) is calculated as a reference.

It is, however, difficult for the JV concessionaire of Japanese business entity without endorsement by the government of recipient country.

(2) Cases of Financial Analysis

For the purpose of financial analysis and sensitivity analysis, initial investment cost demarcation between PA and TOC is assumed to be as follows;

PA : breakwater, channel, inner port road, security and utility and (reclamation)
TOC : terminal facilities and equipment including quay wall and (reclamation)

Reclamation is conducted either by PA or TOC.

Hence for the purpose of sensitivity analysis, cases which has combination of financial resources and investment demarcation mentioned above with the variations of demand decrease of 10% and cost increase of 10% (total 18 cases) are calculated. (See Table 9.4-7)

Table 9.4-7 Cases of Financial Analysis

Finance Condition	70/30(13%)	60/40(13%)	70/30(5%)
Reclamation	Base Case		
TOC	Base Case	Case-8	Case-16
PA	Case-1	Case-9	Case-17
Reclamation	Demand -10%		
TOC	Case-2	Case-10	Case-18
PA	Case-3	Case-11	Case-19
Reclamation	Cost +10%		
TOC	Case-4	Case-12	Case-20
PA	Case-5	Case-13	Case-21

Evaluation of cases are conducted using financial indicators of FIRR (financial internal rate of return), profitability (rate of return on net fixed assets), operating ratio, working ratio, debt service covering ratio and retained earnings at the end of concession period.

Possible scheme is firstly selected by evaluating FIRR of both PA and TOC and results are shown in Table 9.4-7.[1]

From this table, the most desirable scheme is considered to be as the case where PMB bears investment cost for reclamation and TOC will provide the financial resource with debt/equity of 60/40 (case-9).

If investment cost for reclamation is born by TOC (case-8), it is difficult to expect reasonable return on investment and TOC will suffer from serious deficit in its accounting for initial years of operation (refer Table 9 & Table 13~Table 30).

Pink colored cells in Table 9.4-8 show the last year of the loss in the profit-loss statement and the last year of the accumulated cash shortage in the cash flow statement of the TOC for case-0, 1, 8, 9.

[1] In evaluating financial viability, it is generally considered to be feasible if FIRR is over the average interest rate, but in this case it is considered that equity should also return to shareholders with a rate at least similar to the interest rate.

From these results, it may be said that if TOC bears the investment cost for reclamation, it would be difficult for TOC to achieve a financially sound operation and still remain competitive with current operators in Tg. Priok terminal.

Table 9.4-8 FIRRs of Both PA and TOC

Finance Condition	Reclamation	Accounting	70/30(13%)	60/40(13%)	70/30(5%)*
TOC	Base Case	PA	4.89%	4.89%	4.89%
		TOC	12.94%	13.16%	13.98%
PA		PA	4.27%	4.27%	4.27%
		TOC	16.92%	17.17%	18.07%
TOC	Demand -10%	PA	4.76%	4.76%	4.76%
		TOC	12.27%	12.48%	13.25%
PA		PA	4.19%	4.19%	4.19%
		TOC	15.89%	16.12%	16.94%
TOC	Cost +10%	PA	4.47%	4.47%	4.47%
		TOC	12.22%	12.43%	13.22%
PA		PA	4.02%	4.02%	4.02%
		TOC	16.15%	16.39%	17.26%

*: Reference only
Source: JICA Study Team

Even in the most desirable scheme case, retained earnings of TOC and PA at the end of concession period shows much imbalance compared with their initial investment cost

	Retained earnings	Initial investment cost
TOC	$756 mil.	$428 mil
PA	$390 mil.	$485 mil.

If the variable portion of concession fee is raised to 15% after years initial operation, imbalance will be much improved without causing any serious problem to TOC.

	Retained earnings	Initial investment cost
TOC	$685 mil.	$428 mil.
PA	$568 mil.	$485 mil.

Table 9.4-9 Comparison of the Financial Indicators

INPUTS			Base case								
Financial Indicators			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PROFITABILITY (Net Operating Income/ Net Fixed Assets)													
Rate of Return on Net Fixed Assets (Criterion: over %)		13.00%	6.29%	10.51%	14.36%	14.88%	15.43%	16.02%	16.71%	17.47%	17.83%	18.73%	19.57%
OPERATIONAL EFFICIENCY													
Operating Ratio (Criterion: under 0.7– 0.75)			0.58	0.47	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43
Working Ratio (Criterion: under 0.5– 0.6)			0.31	0.27	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
LOAN REPAYMENT CAPACITY													
Debt Service Coverage Ratio (Criterion: over or over 1.5			0.59	0.85	1.11	1.18	1.26	1.35	1.46	1.59	1.75	1.85	36.44
total concession fee/revenue			14%	13%	12%	12%	12%	12%	12%	12%	12%	13%	13%

INPUTS			case–1								
Financial Indicators			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PROFITABILITY (Net Operating Income/ Net Fixed Assets)													
Rate of Return on Net Fixed Assets (Criterion: over %)		13.00%	8.02%	14.03%	19.64%	20.56%	21.57%	22.69%	24.01%	25.53%	26.16%	28.04%	29.82%
OPERATIONAL EFFICIENCY													
Operating Ratio (Criterion: under 0.7– 0.75)			0.61	0.50	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.46
Working Ratio (Criterion: under 0.5– 0.6)			0.38	0.32	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30
LOAN REPAYMENT CAPACITY													
Debt Service Coverage Ratio (Criterion: over or over 1.5			0.73	1.10	1.46	1.55	1.66	1.77	1.91	2.08	2.29	2.37	34.12
total concession fee/revenue			21%	19%	17%	17%	17%	17%	17%	17%	17%	18%	18%

INPUTS			case–8								
Financial Indicators			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PROFITABILITY (Net Operating Income/ Net Fixed Assets)													
Rate of Return on Net Fixed Assets (Criterion: over %)		13.00%	6.41%	10.72%	14.66%	15.20%	15.78%	16.41%	17.14%	17.94%	18.32%	19.28%	20.18%
OPERATIONAL EFFICIENCY													
Operating Ratio (Criterion: under 0.7– 0.75)			0.58	0.47	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43
Working Ratio (Criterion: under 0.5– 0.6)			0.31	0.27	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
LOAN REPAYMENT CAPACITY													
Debt Service Coverage Ratio (Criterion: over or over 1.5			0.68	1.00	1.30	1.38	1.47	1.58	1.70	1.85	2.04	2.14	36.44
total concession fee/revenue			14%	13%	12%	12%	12%	12%	12%	12%	12%	13%	13%

INPUTS			case–9								
Financial Indicators			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
PROFITABILITY (Net Operating Income/ Net Fixed Assets)													
Rate of Return on Net Fixed Assets (Criterion: over %)		13.00%	8.16%	14.28%	20.01%	20.97%	22.03%	23.20%	24.59%	26.20%	26.87%	28.86%	30.75%
OPERATIONAL EFFICIENCY													
Operating Ratio (Criterion: under 0.7– 0.75)			0.61	0.50	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45	0.46
Working Ratio (Criterion: under 0.5– 0.6)			0.38	0.32	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30
LOAN REPAYMENT CAPACITY													
Debt Service Coverage Ratio (Criterion: over or over 1.5			0.86	1.29	1.70	1.81	1.93	2.07	2.23	2.42	2.66	2.73	34.12
total concession fee/revenue			21%	19%	17%	17%	17%	17%	17%	17%	17%	18%	18%

Table 9.4-10 Financial Statements of TOC for Reclamation by TOC

Statement of Cash Flows ($'000s)

Statement of Cash Flows ($'000s) of Cai Mep	Parameter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Cash Beginning		0	0	0	0	0	-15,160	-17,012	-8,600	1,733	13,995	28,144	44,155	62,121	82,047	102,687	145,930	188,640	231,219
Cash Inflow		0	40,993	157,376	129,160	32,725	44,969	55,054	54,710	54,608	54,448	53,730	53,419	59,255	52,820	54,382	52,248	52,204	51,702
CASH FLOWS FROM OPERATING ACTIVITIES		0	0	0	0	32,725	44,969	55,054	54,710	54,375	54,049	53,730	53,419	53,116	52,820	52,531	52,248	51,972	51,702
Operating Income		0	0	0	0	20,186	32,430	42,515	42,171	41,836	41,510	41,191	40,880	40,577	40,281	39,991	39,709	39,432	39,163
Depreciation (equipment) (for PMB Asset)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (equipment) (Concessionaire)		0	0	0	0	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733
Depreciation (Buildings of PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation Expense (Infrastructures)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (Consulting Service)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (PMB Local Portion)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (Infrastructure of TOC)		0	0	0	0	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748
Depreciation (Building of TOC)		0	0	0	0	58	58	58	58	58	58	58	58	58	58	58	58	58	58
[Total No cash Items included in Net Income (Depreciation)]		0	0	0	0	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539
CASH FLOWS FROM FINANCING ACTIVITIES		0	40,993	157,376	129,160	0	0	0	0	232	399	0	0	6,139	0	1,851	0	232	0
Initial Long-Term Loans (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Loans (PMB Reinvestment)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Loans (PMB Local Portion)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short -Term Loan (PMB)																			
Long -Term Loan (Concessionaire)		0	23,673	87,185	63,667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
long term loan (TOC Reinvestment)?		0	0	0	0	0	0	0	0	232	399	0	0	6,139	0	1,851	0	232	0
Short -Term Loan (Concessionaire)																			
Capitalized Interest (Long-term: Government)		0	0	0	0	0	0	0	0										
capitalized interest (concessionaire)		0	1,539	12,069	23,048	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equity of concessionaire			15,782	58,123	42,445	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash Outflow		0	40,993	157,376	129,160	47,885	46,821	46,642	44,377	42,346	40,299	37,719	35,454	39,329	32,180	11,138	9,538	9,625	9,296
CASH FLOWS FROM INVESTING ACTIVITIES		0	40,993	157,376	129,160	0	0	0	0	232	399	0	0	6,139	0	1,851	0	232	0
Construction in Progress (PMB)	0.00%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitalized Interest (Long-term: Government)	0.00%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acquired (PMB)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
construction in progress (TOC)	100.00%		39,454	145,308	106,111	0	0	0	0	0	0	0	0	0	0	0	0	0	0
capitalized interest (long-term TOC)	100.00%		1,539	12,069	23,048	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acqired Local Portion (PMB)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acquired (Concessionaire)	100.00%	0	0	0	0	0	0	0	0	232	399	0	0	6,139	0	1,851	0	232	0
CASH FLOWS FROM FINANCING ACTIVITIES		0	0	0	0	47,885	46,821	46,642	44,377	42,114	39,900	37,719	35,454	33,190	32,180	9,287	9,538	9,393	9,296
Repayment of Initial Loan Principal (PMB)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Initial Loans (PMB)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Lon-Term Loan Principal (PMB Reinvestment)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Long-Term Loans (PMB Reinvestme	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Lon-Term Loan Principal (PMB Local Portion)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Long-Term Loans (PMB Local Portio	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Initial Loan Principal (TOC)			0	0	0	21,118	21,118	21,118	21,118	21,118	21,118	21,118	21,118	21,118	21,118	0	0	0	0
Repaymeno f Interest on Initial Loans(TOC)			0	0	0	26,767	24,022	21,276	18,531	15,786	13,040	10,295	7,550	4,804	2,059	-0	-0	-0	-0
Repayment of Lon-Term Loan Principal (TOC reinvestment)	100.00%	0	0	0	0	0	0	0	0	0	23	63	63	63	677	677	862	862	885
Repayment of Interest on Long-Term Loans (TOC reinvestmen	100.00%	0	0	0	0	0	0	0	0	0	30	79	71	63	853	765	917	805	723
Repayment of short-Term Loan (PMB)	0.00%																		
Repayment of Interest on Short-Term Loans (PMB)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of short-Term Loan (Concessionaire)	100.00%																		
Repayment of Interest on Short-Term Loans (Concessionaire)	100.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income Tax (Concessionaire only)	100.00%	0	0	0	0	0	1,682	4,248	4,728	5,210	5,688	6,163	6,652	7,142	7,474	7,845	7,758	7,725	7,688
Cash Inflow - Cash Outflow		0	0	0	0	-15,160	-1,852	8,412	10,333	12,262	14,149	16,012	17,966	19,926	20,639	43,244	42,710	42,579	42,405
Cash Ending		0	0	0	0	-15,160	-17,012	-8,600	1,733	13,995	28,144	44,155	62,121	82,047	102,687	145,930	188,640	231,219	273,625

Statement of Cash Flows ($'000s) of Cai Mep	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
Cash Beginning	273,625	315,911	358,106	392,651	426,217	460,125	494,994	530,149	565,629	601,583	638,034	674,958	710,870	733,346	757,486	782,614	808,681
Cash Inflow	51,438	88,331	57,067	50,681	50,439	50,202	52,054	50,086	50,086	50,086	56,225	136,793	50,086	50,086	50,318	50,086	88,689
CASH FLOWS FROM OPERATING ACTIVITIES	51,438	51,180	50,928	50,681	50,439	50,202	49,971	50,086	50,086	50,086	50,086	50,086	50,086	50,086	50,086	50,086	50,086
Operating Income	38,899	38,641	38,388	38,141	37,900	37,663	37,432	37,547	37,547	37,547	37,547	38,697	38,697	38,697	38,697	38,697	38,697
Depreciation (equipment) (for PMB Asset)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (equipment) (Concessionaire)	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	6,733	5,582	5,582	5,582	5,582	5,582	5,582
Depreciation (Buildings of PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation Expense (Infrastructures)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (Consulting Service)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (Infrastructure of TOC)	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748	5,748
Depreciation (Building of TOC)	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
[Total No cash Items included in Net Income (Depreciation)]	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	12,539	11,389	11,389	11,389	11,389	11,389	11,389
CASH FLOWS FROM FINANCING ACTIVITIES	0	37,151	6,139	0	0	0	2,084	0	0	0	6,139	86,707	0	0	232	0	38,603
Initial Long-Term Loans (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Loans (PMB Reinvestment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Loans (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short -Term Loan (PMB)																	
Long -Term Loan (Concessionaire)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
long term loan (TOC Reinvestment)?	0	37,151	6,139	0	0	0	2,084	0	0	0	6,139	86,707	0	0	232	0	38,603
Short -Term Loan (Concessionaire)																	
Capitalized Interest (Long-term: Government)																	
capitalized interest (concessionaire)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equity of concessionaire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash Outflow	9,152	46,136	22,523	17,115	16,530	15,334	16,899	14,606	14,132	13,635	19,302	100,880	27,611	25,946	25,191	24,019	61,632
CASH FLOWS FROM INVESTING ACTIVITIES	0	37,151	6,139	0	0	0	2,084	0	0	0	6,139	86,707	0	0	232	0	38,603
Construction in Progress (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capitalized Interest (Long-term: Government)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acquired (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
construction in progress (TOC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
capitalized interest (long-term TOC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acqired Local Portion (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assets Acquired (Concessionaire)	0	37,151	6,139	0	0	0	2,084	0	0	0	6,139	86,707	0	0	232	0	38,603
CASH FLOWS FROM FINANCING ACTIVITIES	9,152	8,985	16,383	17,115	16,530	15,334	14,815	14,606	14,132	13,635	13,163	14,173	27,611	25,946	24,958	24,019	23,029
Repayment of Initial Loan Principal (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Initial Loans (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Lon-Term Loan Principal (PMB Reinvestment)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Long-Term Loans (PMB Reinvestme	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Lon-Term Loan Principal (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Interest on Long-Term Loans (PMB Local Portio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of Initial Loan Principal (TOC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repaymeno f Interest on Initial Loans(TOC)	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
Repayment of Lon-Term Loan Principal (TOC reinvestment)	885	862	4,537	5,151	5,151	4,537	4,537	4,561	4,561	4,537	4,537	5,151	10,107	9,493	9,493	9,516	9,516
Repayment of Interest on Long-Term Loans (TOC reinvestmen	608	493	5,211	5,419	4,749	4,079	3,490	3,171	2,578	1,985	1,395	1,603	12,205	10,892	9,657	8,454	7,216
Repayment of short-Term Loan (PMB)																	
Repayment of Interest on Short-Term Loans (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Repayment of short-Term Loan (Concessionaire)																	
Repayment of Interest on Short-Term Loans (Concessionaire)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income Tax (Concessionaire only)	7,658	7,630	6,636	6,545	6,630	6,717	6,788	6,875	6,994	7,112	7,230	7,419	5,298	5,561	5,808	6,049	6,296
Cash Inflow - Cash Outflow	42,286	42,195	34,544	33,566	33,908	34,869	35,156	35,480	35,954	36,451	36,923	35,913	22,475	24,140	25,128	26,067	27,057
Cash Ending	315,911	358,106	392,651	426,217	460,125	494,994	530,149	565,629	601,583	638,034	674,958	710,870	733,346	757,486	782,614	808,681	835,738

Balance Sheet ($'000s)

Balance Sheet ($'000s)	Parameter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CURRENT ASSETS	0	0	0	0	0	-15,160	-17,012	-8,600	1,733	13,995	28,144	44,155	62,121	82,047	102,687	145,930	188,640	231,219	273,625
Cash and Cash Equivalent Investments	0	0	0	0	0	-15,160	-17,012	-8,600	1,733	13,995	28,144	44,155	62,121	82,047	102,687	145,930	188,640	231,219	273,625
PROPERTY, PLANT AND EQUIPMENT		0	40,993	198,370	327,529	314,990	302,451	289,911	277,372	265,065	252,925	240,386	227,846	221,446	208,907	198,219	185,680	173,373	160,834
Construction in Progress (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed Assets (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Depreciation (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Fixed Assets (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed Assets (PMB Local Portion)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Depreciation (PMB Local Portion)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Fixed Assets (PMB Local Portion)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction in Progress (TOC)			40,993	157,376	129,160	0	0	0	0	232	399	0	0	6,139	0	1,851	0	232	0
Fixed Assets (Concessionaire)		0	40,993	198,370	327,529	327,529	327,529	327,529	327,529	327,761	328,161	328,161	328,161	334,300	334,300	336,151	336,151	336,383	336,383
Accumulated Depreciation (Concessionaire)		0	0	0	0	12,539	25,079	37,618	50,157	62,696	75,236	87,775	100,314	112,853	125,393	137,932	150,471	163,011	175,550
Net Fixed Assets (Concessionaire)		0	40,993	198,370	327,529	314,990	302,451	289,911	277,372	265,065	252,925	240,386	227,846	221,446	208,907	198,219	185,680	173,373	160,834
TOTAL ASSETS		0	40,993	198,370	327,529	299,830	285,438	281,311	279,105	279,060	281,069	284,541	289,968	303,494	311,594	344,149	374,320	404,592	434,458
CURRENT LIABILITIES		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-Term Borrowings (PMB)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-Term Borrowings (Concessionaire)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LONG-TERM LIABILITIES		0	25,211	124,465	211,180	190,062	168,944	147,826	126,708	105,822	85,080	63,899	42,718	27,676	5,881	7,055	6,193	5,563	4,678
Long-Term Borrowings (PMB from JBIC)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (PMB from Private)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (PMB from Private Local Portion)	0.00%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (Concessionaire)	100.00%	0	25,211	124,465	211,180	190,062	168,944	147,826	126,708	105,822	85,080	63,899	42,718	27,676	5,881	7,055	6,193	5,563	4,678
CAPITAL	0	0	15,782	73,905	116,349	109,768	116,495	133,485	152,397	173,237	195,989	220,642	247,250	275,818	305,713	337,094	368,127	399,029	429,781
Retained Earnings	0	0	0	0	0	-6,581	145	17,136	36,048	56,888	79,639	104,293	130,900	159,468	189,363	220,745	251,778	282,680	313,431
capital			15,782	73,905	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349
TOTAL LIABILITIES AND CAPITAL	0	0	40,993	198,370	327,529	299,830	285,438	281,311	279,105	279,060	281,069	284,541	289,968	303,494	311,594	344,149	374,320	404,592	434,458

Balance Sheet ($'000s)	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
CURRENT ASSETS	315,911	358,106	392,651	426,217	460,125	494,994	530,149	565,629	601,583	638,034	674,958	710,870	733,346	757,486	782,614	808,681	835,738
Cash and Cash Equivalent Investments	315,911	358,106	392,651	426,217	460,125	494,994	530,149	565,629	601,583	638,034	674,958	710,870	733,346	757,486	782,614	808,681	835,738
PROPERTY, PLANT AND EQUIPMENT	148,294	172,906	166,506	153,966	141,427	128,888	118,432	105,893	93,354	80,814	74,414	149,733	138,344	126,956	115,799	104,411	131,625
Construction in Progress (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed Assets (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Depreciation (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Fixed Assets (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed Assets (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Depreciation (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Fixed Assets (PMB Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction in Progress (TOC)	0	37,151	6,139	0	0	0	2,084	0	0	0	6,139	86,707	0	0	232	0	38,603
Fixed Assets (Concessionaire)	336,383	373,534	379,673	379,673	379,673	379,673	381,757	381,757	381,757	381,757	387,896	474,603	474,603	474,603	474,835	474,835	513,438
Accumulated Depreciation (Concessionaire)	188,089	200,628	213,168	225,707	238,246	250,786	263,325	275,864	288,403	300,943	313,482	324,870	336,259	347,647	359,036	370,424	381,813
Net Fixed Assets (Concessionaire)	148,294	172,906	166,506	153,966	141,427	128,888	118,432	105,893	93,354	80,814	74,414	149,733	138,344	126,956	115,799	104,411	131,625
TOTAL ASSETS	464,205	531,012	559,156	580,183	601,552	623,882	648,582	671,522	694,937	718,849	749,372	860,603	871,690	884,442	898,413	913,092	967,363
CURRENT LIABILITIES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-Term Borrowings (PMB)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-Term Borrowings (Concessionaire)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LONG-TERM LIABILITIES	3,792	40,081	41,683	36,531	31,380	26,843	24,389	19,828	15,268	10,730	12,332	93,888	83,781	74,288	65,027	55,511	84,598
Long-Term Borrowings (PMB from JBIC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (PMB from Private)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (PMB from Private Local Portion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Borrowings (Concessionaire)	3,792	40,081	41,683	36,531	31,380	26,843	24,389	19,828	15,268	10,730	12,332	93,888	83,781	74,288	65,027	55,511	84,598
CAPITAL	460,413	490,931	517,474	543,652	570,172	597,039	624,193	651,694	679,669	708,118	737,040	766,715	787,909	810,154	833,386	857,581	882,766
Retained Earnings	344,064	374,582	401,124	427,302	453,823	480,690	507,843	535,344	563,319	591,769	620,690	650,366	671,559	693,804	717,036	741,231	766,416
capital	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349	116,349
TOTAL LIABILITIES AND CAPITAL	464,205	531,012	559,156	580,183	601,552	623,882	648,582	671,522	694,937	718,849	749,372	860,603	871,690	884,442	898,413	913,092	967,363

Table 9.4-11 Financial Indicators for the Best Case-1

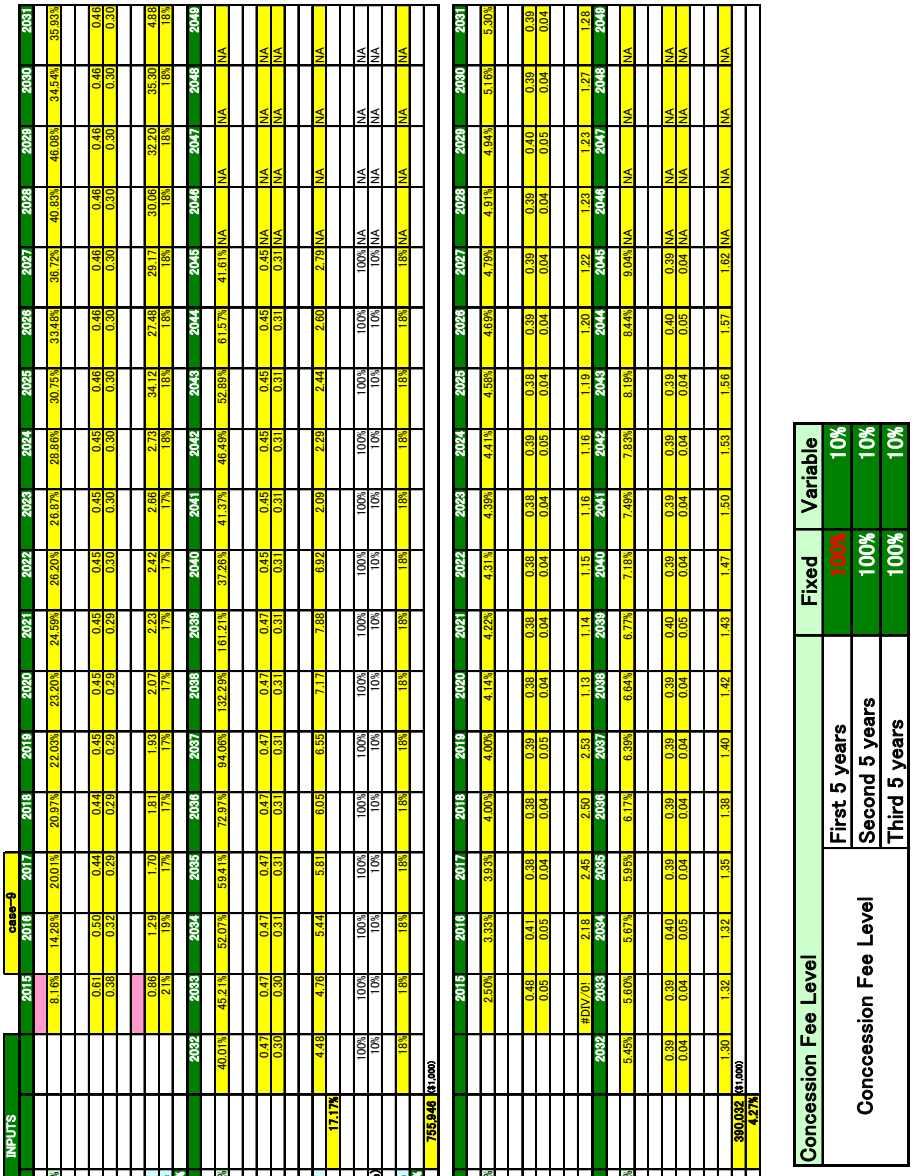
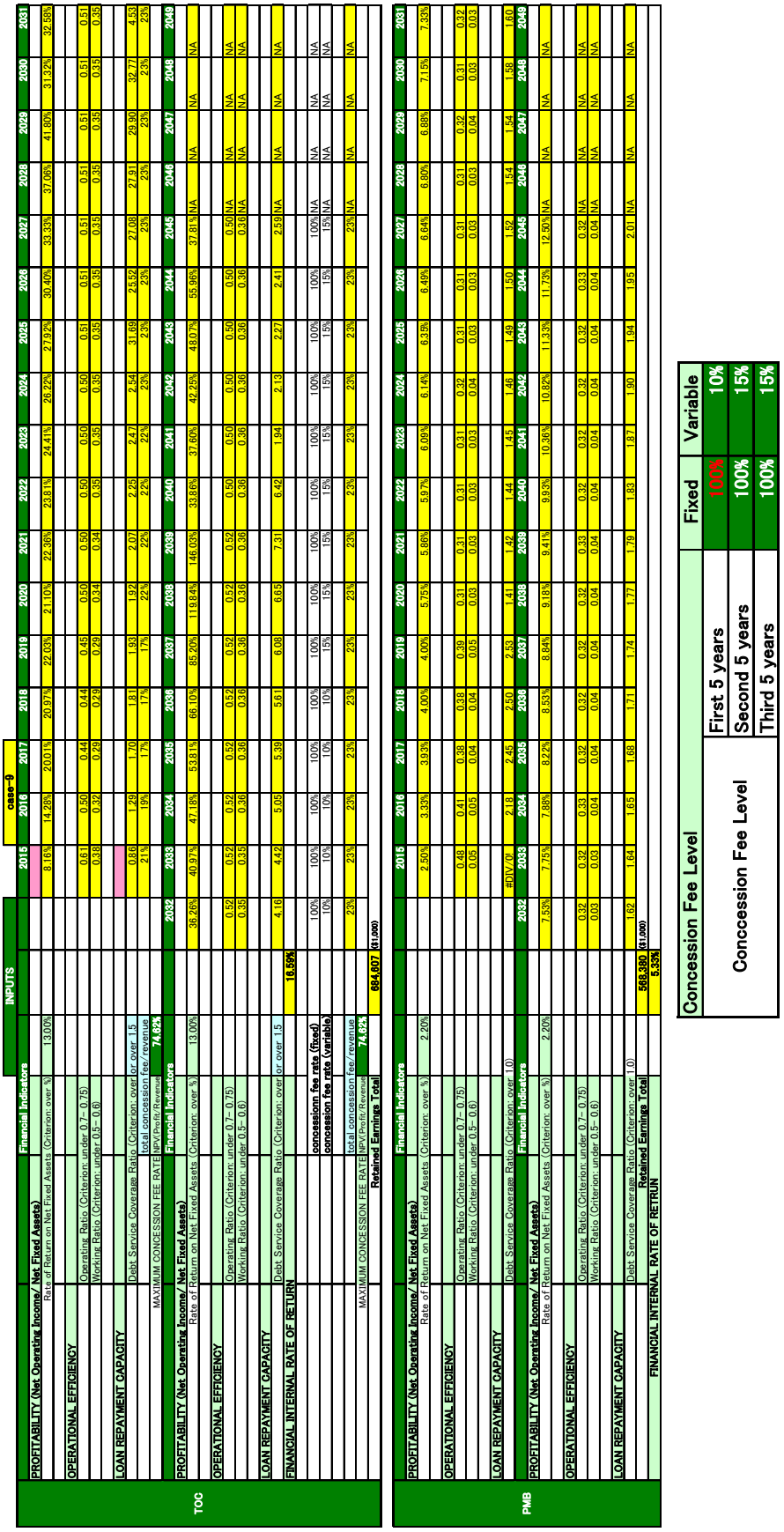


Table 9.4-12 Financial Indicators for the Best Case-2



(3) Recommended PPP Scheme

Considering the stipulation of Government Regulation No.61 year 2009 and results of financial analysis, following scheme is recommended to be applied to the development of Kalibaru Phase I urgent project.

Financial condition applying investment by EXIM bank is the most favorable condition, but it seems to be rather difficult to meet the requirement of EXIM bank to get endorsement by the Government of Indonesia in case of Kalibaru Phase I project.

In many cases of concession, concessionaire is often obligated to maintain debt/equity ratio of 60/40 for the terminal operation avoid serious financial risk and to ensure that the terminal remains public use.

Furthermore, it is reasonable to reserve the proprietorship of terminal land by the public sector considering the concession condition set forth in ii) of Article 71 of Government Regulation No. 61.

In order to balance profitability between TOC and PA and considering the rather unfavorable demand in the initial years of operation, variable portion of concession fee is better to be set as 10% for the first 5 years and 15% thereafter.

Summarizing above, recommended PPP scheme is as follows;

Investment Demarcation	:	PA invest in breakwater, channel and basin, inner road, security and utility facilities and reclamation TOC invest on quay wall and equipment
Financial Scheme	:	PA request soft loan similar to STEP of JICA TOC prepare 40% by its own equity and 60% from commercial bank
Concession Period	:	30 years after commencement of operation with fixed fee of about $5.4mil/year and variable fee of 10% of revenue for the first 5 years and 15% of revenue thereafter.