CHAPTER 9 IMPLEMENTATION PLAN FOR THE PROJECT

9. IMPLEMENTATION PLAN FOR THE PROJECT

9.1 Scope of the Project

The scope of work and type of the structures to be provided under the project are investigated and studied by the Team considering the precise data of natural condition and current construction condition in and around the Jakarta Megalopolis from the view points of both technical and economical issue. The cost estimate of the project is conducted in this Chapter based on the revised and updated type of structure/facilities from the original project proposed in the Feasibility Study 2003.

The major work item of the project with revised quantities and the original quantities stipulated in the Loan Agreement (L/A) are enumerated in Table 9.1.1. The length of existing breakwater –Dam Tengah- proposed to be demolished is increased from the original slightly as shown in the Table. The item of Dam Tengah-2 and navigation aids system are newly added in the list in accordance with the revised plan.

The volume of dredging quantity from the navigation channel and turning basin for the widening of channel improvement are slightly decreased from the original plan as shown in the table.

Table 9.1.1 Comparison with Quantities for Major Work of the Project

No.	Description	Unit	Original Plan (Loan Agreement)	Revised Plan (Team Study)
Package 1 – Channel and Basin Improvement				
(1)	Breakwater (Dam Tengah)			
	New Construction (Dam Tengah-1)	m	1,445	1,243
	New Construction (Dam Tengah-2)	m	-	318
	Demolition of Existing Portion	m	1,390	1,605
(2)	Breakwater (Dam Barat)			
	New Construction	m	200	100
	Demolition of Existing Portion	m	305	225
(3)	Channel Improvement by Dredging			
	Total Dredging Volume	m^3	8,255,000	8,078,000
	Navigation Aids	LS	-	1
Package 2 – Port Inner Road Improvement				
(1)	Inner Port Road Improvement	LS/m	1	3500
(2)	Flyover Construction	LS/m	1	650
(3)	Utilities	LS	1	1

9.2 Schedule for the Project

(1) Project Implementation Plan

The project consists of Package 1 “Channel and Basin Improvement” and Package 2 “Port Inner Road Improvement”. The construction company for the Package 1 of offshore work shall be selected through the process of International Competitive Bidding (ICB) and the contractor of Package 2 shall be selected through the method of Local Competitive Bidding (LCB) in accordance with the guideline of JBIC Loan Agreement (Japan Bank for International Cooperation) signed in March 31, 2004.

When the total project schedule is made up, the commencement date of Package 1 shall follow the duration of pre-qualification and tender period which is to be conducted in the first stage of project. The ICB period is scheduled for 18 months approximately or more consistent with the JBIC guide line. The typical procedure of ICB is indicated in Table 9.2.1 for instance.

Table 9.2.1 Standard Process of Pre-Qualification and Tender Procedure

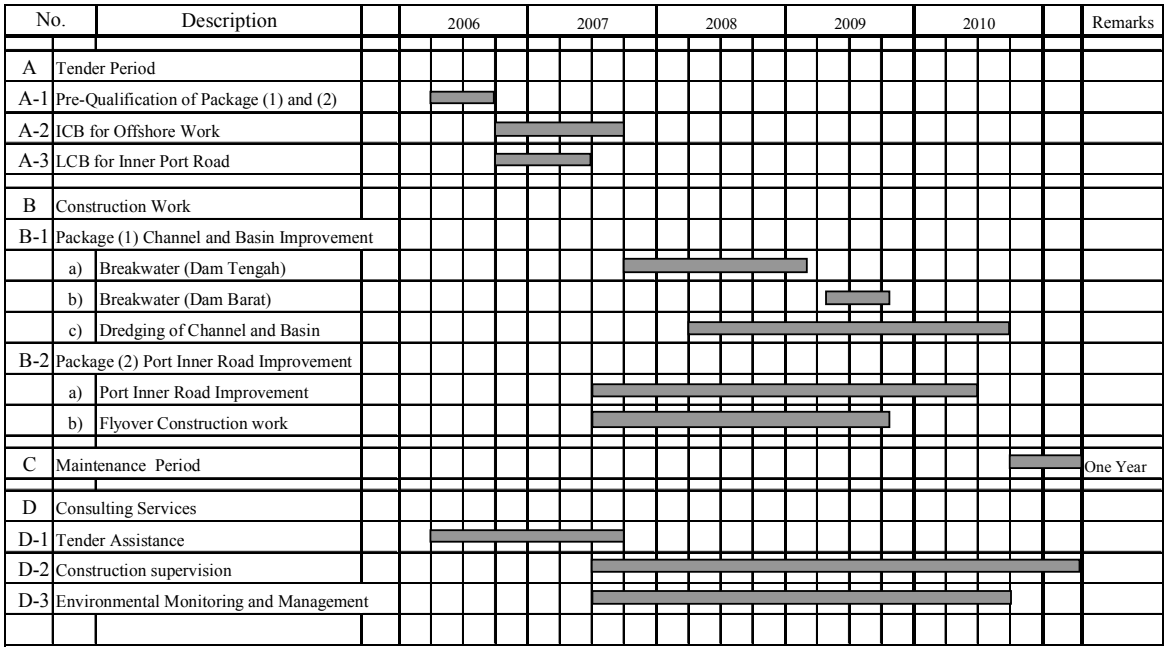
No.	ICB Tender Procedure	Year	1st Year												2nd Year						
		Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
1	Announcement and Closing Pre-Qualification																				
2	Evaluation of Pre-Qualification in Indonesia																				
3	JBIC Concurrence on PQ Evaluation																				
4	Tender Call and Closing Tender																				
5	Evaluation of Tender in Indonesia																				
6	JBIC Concurrence on Tender Evaluation																				
7	Contract Negotiation																				
8	JBIC Concurrence on Contract																				
9	Opening of Letter of Credit																				

The duration of each construction work is shown in the Table 9.2.2 and the 5 years of total project schedule is proposed in Table 9.2.3. The details of construction schedule are discussed and prepared in the Chapter 6 of this report.

Table 9.2.2 Required Construction Period

No	Work Item	Construction Period (Approximate)
Package (1) Channel and Basin Improvement		
1	Construction of New Dam Tengah	15 months
2	Demolition of Existing Dam Tengah	9 months
3	Construction of New Dam Barat	6 months
4	Demolition of Existing Dam Barat	4 months
5	Dredging Cannel and Basin	31 months
Package (2) Port Inner Road Improvement		
5	Construction of Port Inner Road	36 months
6	Construction of Flyover	28 months

Table 9.2.3 Master Construction Schedule



(2) Financial Plan

The project cost is estimated and summarized in Table 9.2.4. The total amount of project is estimated at Rp 1,117.9 billion (Yen 11.76 billon) shown in the table. The details of the project cost are calculated and shown in Clause 9.3 of this Chapter 9.

Table 9.2.4 Project Cost

Yen 1.0 = Rp 95.00

No.	Description	Foreign Portion	Local Portion	Total Project Cost	
		(Yen)	(Rp)	(in Rp)	(in Yen)
1	Construction Work	1,189,969,110	916,073,498,320	1,029,120,560,000	10,832,848,000
2	Engineering Services	581,085,020	33,613,025,000	88,816,101,900	934,906,000
3	Total	1,771,054,130	949,686,523,320	1,117,936,661,900	11,767,754,000

The JBIC loan does not cover the entire project cost. The categorized project components which will be provided whether under the JBIC Loan or Government of Indonesia are shown in the Table 9.2.5.

Table 9.2.5 Project Component Provided by JBIC Loan (Assumed)

No	Project Component	Eligibility of JBIC Loan
1	Construction Work Package (1) Channel and Basin Improvement Package (2) Port Inner Road Improvement	Eligible
2	Consultancy Service	Eligible
3	Physical Contingency	Eligible
4	Price Escalation	Eligible
5	VAT, Import Duty and Taxes	Non Eligible
6	Land Acquisition, Relocation of Buildings/Shops and related Matters (Compensation)	Non Eligible

9.3 Estimate of the Project Cost

9.3.1 Condition of Construction Environment

(1) Construction Equipment

The leasing market of construction equipment related to the land use items is well developed in Jakarta as stated in the Feasibility Study 2003. Standard market lease prices of equipment are being published every four months through several magazines in Indonesia.

According to the hearing from major construction companies, most of the general construction equipment are available from the leasing market. However, in case of large scale construction project, it is possible to have advantage that the contractor will provide its own construction equipment rather than the leasing market.

It is observed that the floating equipment, particularly the large scale of offshore equipment, does not always exist in Indonesian water due to the small demand of construction activities at sea in Indonesia. It seems that the major offshore construction equipment may be mobilized from abroad except dredging fleet according to our market research. The dredging fleet is expected to be deployed from RT. RUKINDO for the channel dredging work of the project in order to put their experience of dredging work and save the cost of mobilization.

(2) Construction Materials

1) Rubble Stone and Coarse Aggregate

The quarrying industry is developed in the distant area away from Jakarta because Jakarta city is situated in the vast alluvium plain in which area hard rock material exists in deep strata from ground surface. The quarries are located about 50km to 100km distant from Jakarta City and products are transported by dump truck through the road network. Locations of quarry area are indicated in Figure 9.3.1.

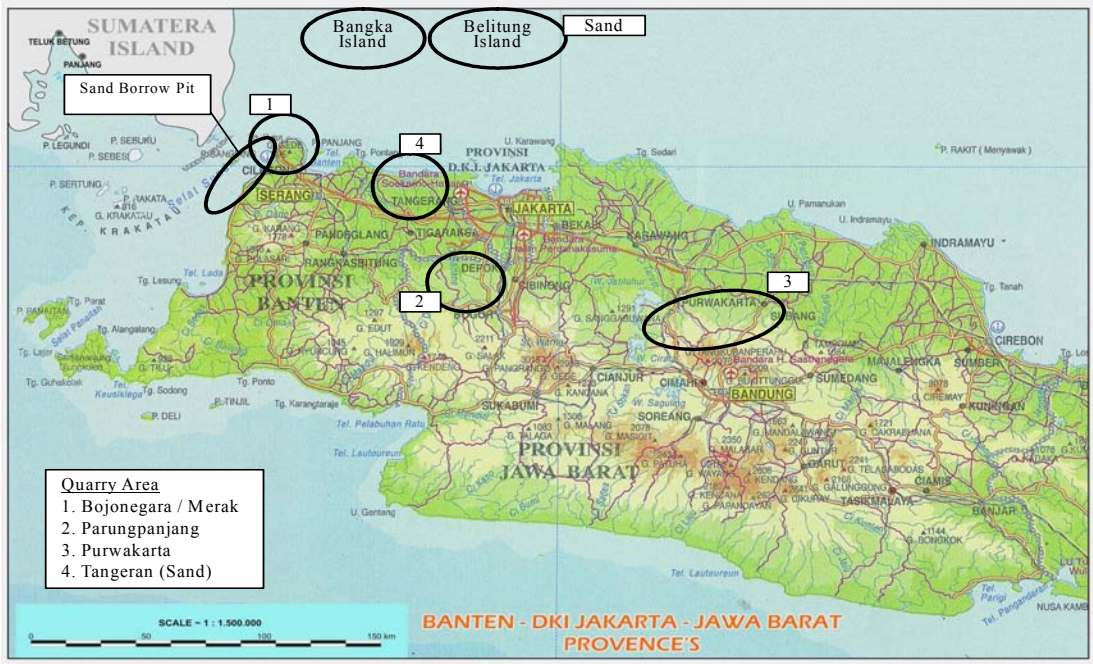


Figure 9.3.1 Location Map of Quarry and Sand Borrow Area

The type of rock is mainly Andesite and many joints are observed on the rock surface. Jumbo breaker is utilized for mining operation at the private quarries because the dynamite products is monopolized by one company, PT Dahana (Persero), related to the military connection and it is difficult to obtain the frequent blasting permission by the private quarry due to the complicated procedure for approval.

Although the any type of stone material such as quarry rock, coarse aggregate for concrete products is produced around Jakarta namely Parungpanjang, Purwakarta, etc. the quantitative graded rock classified into 200kg, 500kg or 1000kg, to be used for the port development project, are produced at the Bojonegara and Merak area located about 120km west of Jakarta.

The site investigation is reported in the Chapter 5 of Volume -2 "APPENDICES".

2) Sand for Concrete Aggregate and Soil Improvement Work

In Tangerang and Bogor regency, there are a lot of companies, who has a mining license for concrete aggregate issued by the West Jawa Province, supply sand to industry area in and around Jakarta. The supply sand to Jakarta from Bangka Island and Belitung Island by large flat barge is also popular business in the concrete industry. Figure 9.3.1 introduces the location of these sand borrow areas in the map of West Jawa.

Several hundred thousands m3 of sand may be needed in terms of the soil improvement work of new breakwater foundation under the project. The qualified sand to meet the specification of soil improvement is expected to be obtained from sea bottom at the cheaper price than sandy material from land. It is reported that the sea sand for the reclamation of Merak Mas Port construction was quarried from the borrow area off Cigading. This borrow area has a 40 million m3 of deposit of fine – medium sand according to PT. ASC Nusantara.

3) Concrete Mixing Plant

Concrete mixing plants in the Jakarta City are supplying a quite big amount of fresh concrete regularly to the construction site through the road network with sufficiently stable in quality and well controlled batching plant technically.

The capacity of batching plant of each company is estimated about 300m3 per day in average and stock of cement and aggregates are sufficient for demand according to our interview survey.

4) Other Products of Construction Materials

Almost all the construction materials proposed to be utilized for the project are produced domestically in and around Jakarta Area and it is also possible to procure the project material from the local market any time.

(3) Transportation Method of Rubble Stone from Bojonegara

The construction method of the breakwater is most important factor of the schedule planning because more than ten thousand m3 of rubble stone is required monthly for breakwater construction. Transportation method of rubble stone from Bojonegara is studied in order to obtain the data for discussion about the suitable construction method of rubble mound from viewpoint of economic factor, time requirement and other related matters. The results of study are compiled in Table 9.3.1.

Table 9.3.1 Particulars related to the Transportation Method of Quarry Stone from Bojonegara

No	Particulars	Dump Truck Transportation		Flat Barge Transportation	
		Judge		Judge	
1	Quantity of Graded Rock		190,000m3		190,000m3
2	Performance		460 days net for Placing (400m3/day)		460 days net for Placing (400m3/day)
3	Equipment Needed (from Quarry to Jakarta Site)	○	Normal Equipment Flat Barge (400m3) x 1 Tug Boat (650HP) x 1 Crane Barge (40ton) x 2 Anchor Boat (5ton) x 1 Back hoe x 3 Dump Truck x 14	X	Large Equipment Flat Barge (1600m3) x 2 Tug Boat (1500HP) x 1 Tug Boat (650HP) x 1 Crane Barge (40ton) x 2 Anchor Boat (5ton) x 1 Back hoe x 3 Dump Truck x 3
4	Handling Process	X	4 Steps of Work Dump Truck ↓ Stock Yard in Port ↓ Flat Barge ↓ Place in Final Position	○	3 Steps of Work Dump Truck ↓ Flat Barge ↓ Place in Final Position
5	Weather / Sea Condition	○	Small Influence	X	Important Influence on Plan
6	Management System	○	Simple and Flexible	X	Complicated
7	Stock Yard in Jakarta	X	Required	○	Not required
8	Cost from Quarry to Placing	△	about 220,000 Rp/m3	△	about 227,000 Rp/m3
9	Environment Impact	X	Road congestion Road damage Exhaust gas emission	○	good

The cost difference between the both methods is negligible range according to the study while the transportation costs may be varied depend on the actual site conditions.

The flat barge transportation system is required big investment and long mobilization time in the initial stage of project in order to arrange the large group of floating equipment. It is assumed, that the work process will be affected by the sea weather condition, therefore, the high level of construction management system is required to complete the work on schedule. The advantage of this method does not give additional load to the environmental circumstances namely the road traffic by dump truck and the land acquisition of construction yard.

The dump truck transportation system required large stock yard to receive and sort out the graded rock from quarry near the project site and the road condition around the port will be suffered by the large number of dump truck. However the management system is simple and method of work has flexibility to adjust the construction schedule.

This issue will be decided by the contractor through the site investigation of Bojonegara and Port of Tanjung Priok and be negotiated with IPC-II because the quarry in Bojonegara is belonging to IPC-II and an attractive offer by IPC-II will be proposed probably in order to expedite the development of port of Bojonegara.

(4) Dredging Work

Although the dredging work has a large share in the total construction cost, the significant two elements related to the unit cost of dredging are changed recently. The first issue is the location of dumping area that will be designated newly in longer distance zone from the present area and second issue is the oil price hike imposed after 01st October 2005.

The cost variations due to the changing of two issues are calculated in this section.

The present dumping area is designated at about 14km distant area and new location will be appointed at 27km distance area. Also the price of marine diesel for dredger is increased from 2,200 Rp/liter to 6,200 Rp/liter on 1st October 2005. The background of fuel hike is explained in next section.

The cost variation due to the change of above mentioned factors is calculated for the trench excavation work of the new breakwater foundation as the case study and the results are summarized in Table 9.3.2.

The Figure 9.3.2 shows the calculation basis of cycle time for dredging and dumping operation by the proposed dredging fleet consisting of one grab dredger, two pusher barges and one pusher tug boat. In case of 14km dumping site, 4times of dumping a day is estimated within 12hours tug boat operation. However, in case of 27km dumping site, the dumping operation will be reduced to 3times and operation time of tug boat is increased 18hours from 12 hours.

The dredging cost, therefore, increased by 1.76 times from the previous condition before September 2005. The fuel hike push up the dredging cost by almost 22% according to the case study.

Table 9.3.2 Case Study on Cost Variation of Trench Excavation Work by Grab Dredger

Case	Option		Unit Cost (Rp/m3)			Ratio
	Price of Marine Diesel	Dumping Area	Dredging	Dumping	Total	
1	2,200Rp/l	Distance: 14km	30,403	24,060	54,463	100
2	6,200Rp/l	Distance: 14km	36,426	29,803	66,229	122
3	2,200Rp/l	Distance: 27km	40,537	34,929	75,466	139
4	6,200Rp/l	Distance: 27km	48,568	47,346	95,914	176

Note: Unit Cost means net cost without site expenditure and overhead

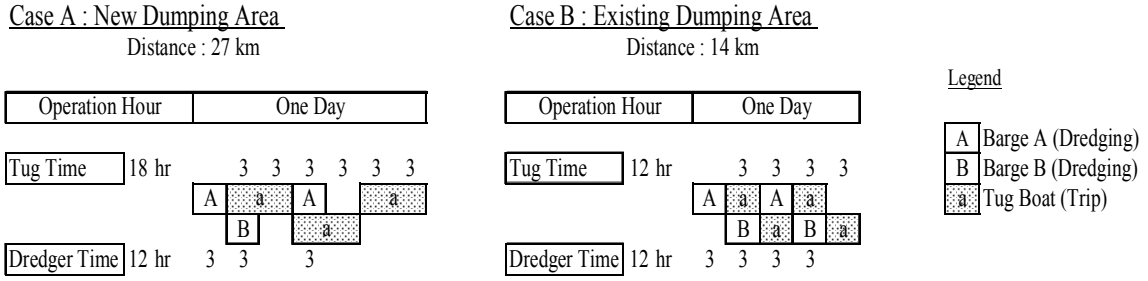


Figure 9.3.2 Cycle Time of Dredging and Dumping Operation

9.3.2 Basis of Construction Cost

(1) Unit Cost of Works

1) The Timing of Cost Estimation

The project cost is estimated based on the prices as of end October 2005. Therefore, the fuel prices after hike are adopted for both the construction equipment on land and the construction fleet at sea.

The unit price of material, labor and equipment are obtained through the team study conducted in mid to end of 2005. However, the prices of some item are not increased by end of November 2005 due to the government policy or control but be intimated the raising soon. The prices of local construction cost in this study, therefore, are raised by 5% as the spot inflation factor in order to absorb the potential price up of construction cost estimated at end November 2005.

The average conversion rates of foreign currency during August, September and October 2005 is adopted for the cost estimation as described in the next section.

2) Construction Equipment

The cost of both land use equipment and offshore equipment for the project are calculated based on the leasing basis applying the purchase price of new equipment in Jakarta, the depreciation cost factor, quantity of fuel consume, sundries and cost of operator with consideration of the construction method of the related works. As the results, the unit cost of offshore equipment is apparently equivalent to about 80% of the standard price in Japanese market. The proposed daily rates are listed in Table 9.3.3.

Table 9.3.3 (1) Unit Price for Construction Work – Equipment on Land

CODE	I T E M	TYPE	HP	CAPACITY	EQUIPMENT COST	
					(Hour)	(Day)
EL - 01	Bulldozer, 15 ton	Cat D6G	100.0	10 ton	Rp 355,300	Rp 2,487,100
EL - 02	Bulldozer, 21 ton	Komatsu D85E-SS-2	150.0	15 ton	Rp 402,100	Rp 2,814,700
EL - 03	Wheel Loader, 1.5 m3	Cat 924 GZ	110.0	2.1 m3	Rp 322,100	Rp 2,254,700
EL - 04	Wheel Loader, 2.6 m3	Komatsu WA180-3	160.0	2.2 m3	Rp 423,700	Rp 2,965,900
EL - 05	Wheel Loader, 3.0 m3	CAT 938G II	200.0	2.8 m3	Rp 486,100	Rp 3,402,700
EL - 06	Crawler Crane, 40 ton	-	150.0	40 ton	Rp 720,300	Rp 5,042,100
EL - 07	Crawler Crane, 100 ton	-	250.0	100 ton	Rp 1,937,100	Rp 13,559,700
EL - 08	Motor Grader (125 HP)	Cat 120 H	125.0	3658 mm	Rp 359,600	Rp 2,517,200
EL - 09	Motor Grader (140 HP)	Komatsu GD511-A	140.0	3710 mm	Rp 400,100	Rp 2,800,700
EL - 10	Excavator, 0.6 m3	CAT 311CU	110.0	0.6 m3	Rp 294,000	Rp 2,058,000
EL - 11	Excavator, 1.0 m3	Komatsu PC200-7	160.0	0.93 m3	Rp 399,200	Rp 2,794,400
EL - 12	Hydraulic Breaker, 600 kg	-	160.0		Rp 389,000	Rp 2,723,000
EL - 13	Tandem Compactor, 4-10 ton	CAT CB335D	40.0	3.5 ton	Rp 172,300	Rp 1,206,100
EL - 14	Tandem Compactor, 8-18 ton	-	90.0	14 ton	Rp 262,900	Rp 1,840,300
EL - 15	Vibro Compactor, 10 - 22 ton	-	132.0	11 ton	Rp 383,100	Rp 2,681,700
EL - 16	Tyre Roller, 8 - 15 ton	Cat PS-150B	70.0	12.94 ton	Rp 291,800	Rp 2,042,600
EL - 17	Asphalt Finisher, 2.5 - 3.8 m	Nigata	36.5	80 ton/hr	Rp 323,800	Rp 2,266,600
EL - 18	Dump Truck, 8 ton	-	225.0		Rp 297,900	Rp 2,085,300
EL - 19	Dump Truck, 20 t/ 10 TRES	Nissan Diesel TV-22	334.0	20 ton	Rp 421,800	Rp 2,952,600
EL - 20	Tandem Roller, 10.7 ton	Bomag BW 202 AD-2	105.0	10.7 ton	Rp 327,400	Rp 2,291,800
EL - 21	Air Compressor, 129 CFM	Sullair 130H	7.0	130 CFM	Rp 67,100	Rp 469,700
EL - 22	Air Compressor, 180 CFM	Sullair 200H	19.0	200 CFM	Rp 86,400	Rp 604,800
EL - 23	Generator Set, 100 KVA	CAT GEP100	125.0	100 KVA	Rp 185,100	Rp 1,295,700
EL - 24	Generator Set, 200 KVA	Komatsu	265.0	200 KVA	Rp 397,500	Rp 2,782,500
EL - 25	Concrete Pump, 68 m3/hr	-	173.0	68 m3/hr	Rp 462,600	Rp 3,238,200
EL - 26	Hydraulic Truck Crane, 22 ton	Tadano TL-200E	225.0	22 ton	Rp 558,800	Rp 3,911,600
EL - 27	Hydraulic Truck Crane, 33 ton	Tadano TL-300E	270.0	33 ton	Rp 722,400	Rp 5,056,800
EL - 28	Pneumatic Tyre Roller, 9.4 ton	Bomag BW 24R	100.0	9.4 ton	Rp 300,700	Rp 2,104,900
EL - 29	Vibratory Soil Compactor, 10.4 ton	Bitelli C 100 Type ALDT	104.6	10.4 ton	Rp 255,000	Rp 1,785,000
EL - 30	Pile Driver Crawler D35 (40t lift)	-	119.0	3.5 ton	Rp 1,037,700	Rp 7,263,900
EL - 31	Asphalt Distributor, 25 L/min	-	3.6	25 lit/min	Rp 32,500	Rp 227,500
EL - 32	Agitator (Concrete Mixer 6m3)		335.0		Rp 511,400	Rp 3,579,800
EL - 33	Truck (Flat Bed)		317.0	40 ton	Rp 476,200	Rp 3,333,400
EL - 34	Truck Crane 15 ton		230.0	15 ton	Rp 540,600	Rp 3,784,200

Note: Unit costs include fuel, operator and consumable items

Table 9.3.3 (2) Unit Price for Construction Work – Floating Equipment

No	Description	Origin	Unit Rate	Operation		Working Daily Rate			
	Type of Fleet		Binding	Per Hour	(hr/day)	Foreign Portion	Local Portion	Cost Total (equivalent)	
			Per Day	(Rp/hr)		Yen/day	Rp/day	Yen/day	Rp/day
			(Rp/day)						
FE-1	Trailing Suction (8,000m3)	Foreign	256,087,000	12,667,000	22	7,108,985	247,320,000	9,712,353	922,673,575
FE-2	Trailing Suction (4,000m3)	Jakarta	149,384,000	7,389,000	22	-	494,858,900	5,209,041	494,858,900
FE-3	Grab Dredger (1,600HP)	Foreign	35,156,000	1,883,000	12	987,875	33,643,980	1,342,022	127,492,105
FE-4	Grab Dredger (1,600HP)	Foreign	35,156,000	1,883,000	20	1,146,419	55,428,300	1,729,875	164,338,105
FE-5	Hopper Barge 1,300m3	Foreign	10,579,000	-	one day	111,362	540,000	117,046	11,119,390
FE-6	Tug Boat 1500HP	Foreign	7,586,000	352,000	12	484,271	30,448,440	804,781	76,454,185
FE-7	Tug Boat 1500HP	Foreign	7,586,000	352,000	20	513,885	50,417,400	1,044,594	99,236,475
FE-8	Tug Boat 650HP (8hr)	Jakarta	2,597,000	228,000	8	-	13,637,810	143,556	13,637,810
FE-9	Tug Boat 200HP (8hr)	Jakarta	1,062,000	93,000	8	-	5,226,540	55,016	5,226,540
FE-10	Diver Boat 65HP	Jakarta	620,000	59,000	8	-	2,908,860	30,620	2,908,860
FE-11	Crawler Crane Barge 50ton	Jakarta	4,332,000	209,000	8	-	8,450,560	88,953	8,450,560
FE-12	Crawler Crane Barge 100ton	Jakarta	7,916,000	498,000	8	-	15,203,780	160,040	15,203,780
FE-13	Anchor Boat 90HP (5ton)	Jakarta	2,047,000	205,000	8	-	5,616,090	59,117	5,616,090
FE-14	Anchor Boat 250HP (15ton)	Jakarta	6,045,000	605,000	8	-	15,077,830	158,714	15,077,830
FE-15	Flat barge 500ton	Jakarta	1,621,000	-	one day	-	2,341,000	24,642	2,341,000
FE-16	Flat Barge 1000ton	Jakarta	2,861,000	-	one day	-	3,986,000	41,958	3,986,000
FE-17	Flat Barge 1600m3	Jakarta	4,178,000	-	one day	-	5,303,000	55,821	5,303,000
FE-18	Passenger Boat 60HP	Jakarta	246,000	28,000	8	-	1,783,580	18,775	1,783,580

Note: Unit costs include fuel, operator and consumable items
Conversion rate : Yen 1.0 = 95.00

3) Construction Materials

The latest market price of construction materials in Jakarta was investigated through a questionnaire survey to the factories by the Study Team. The Study Team has also collected the prices of construction materials which were adopted in the actual projects curried out in the port and data given in the previous study or literature are summarized in Table 9.3.4. The Price of materials applied to this project is enumerated in right end column of Table 9.3.4.

Table 9.3.4 Unit Price for Construction Work – Materials

No	ITEM	UNIT	CONSTRUCTION MATERIAL					
			2002 JICA Study	2003 (Jan) Local Gov.	2004 Port Project	2005 (Jan) Local Gov.	2005 (Jun - Oct) Price List from Factories	2005 (Oct) This Project
M - 1	Steel Bar (D-16)	Kg	Rp 2,700	Rp 2,848	Rp 4,250	Rp 6,000	Rp 5,150	Rp 6,000
M - 2	Steel Bar (D-22)	Kg	Rp 2,700	Rp 2,894	Rp 4,250	Rp 6,000	Rp 5,124	Rp 6,000
M - 3	Steel Bar (D-29)	Kg	Rp 2,700		Rp 4,250	Rp 6,000	Rp 5,202	Rp 6,000
M - 4	Steel Bar (material with cut and bend)	Kg						Rp 8,630
M - 5	Structural Steel	Kg	Rp 6,000	Rp 5,200		Rp 7,000	Rp 5,300 - Rp 7,500	Rp 7,000
M - 6	Steel Sheet Pile SP	Kg	Rp 5,400			Rp 6,210		Rp 6,210
M - 7	SP - III	Kg	Rp 5,700			Rp 6,555	Rp 8,100	Rp 8,100
M - 8	SP - IV	Kg	Rp 5,850			Rp 6,727		
M - 9	Steel Pipe Pile	Kg	Rp 4,500			Rp 5,175		Rp 5,175
M - 10	RC Pile; Dia. 500 - 600 mm	M	Rp 200,000		Rp 300,000			
M - 11	Portland Cement (bag)	Ton	Rp 500,000	Rp 580,000	Rp 600,000	Rp 652,000	(Proce/bag x 20) Rp 632,000	Rp 630,000
M - 12	Portland Cement (bulk)	Ton		Rp 350,000		Rp 394,000	Rp 500,000 - Rp 600,000	Rp 600,000
M - 13	Ready Mix Concrete							
M - 14	Strength : 140 Kg/ cm2 (k-175)	M3				Rp 307,050	Rp 310,000	Rp 310,000
M - 15	Strength : 210 Kg/ cm2 (k-250)	M3	Rp 270,000	Rp 292,500	Rp 387,500	Rp 329,250	Rp 335,000	Rp 335,000
M - 16	Strength : 280 Kg/ cm2 (k-350)	M3	Rp 300,000	Rp 331,500	Rp 432,500	Rp 373,750	Rp 365,000	Rp 365,000
M - 17	Form Material; t = 12 mm	M2	Rp 43,500	Rp 27,777		Rp 40,500		Rp 40,500
M - 18	Form Material; t = 15 mm	M2	Rp 52,000	Rp 32,639		Rp 51,297		Rp 53,100
M - 19	Timber 5/7, support	m3					Rp 1,835,000	Rp 1,835,000
M - 20	Bamboo	No					Rp 8,000	Rp 8,000
M - 21	Fine Aggregate	M3	Rp 60,000	Rp 90,000	Rp 105,000	Rp 125,800	Rp 105,000 - Rp 115,000	Rp 125,800
M - 22	Coarse Aggregate	M3	Rp 115,000	Rp 100,000	Rp 102,000	Rp 130,500	Rp 110,000 - Rp 135,000	Rp 130,500
M - 23	Local Sand (Reclamation)	M3	Rp 45,000	Rp 70,000		Rp 116,000	Rp 75,000 - Rp 110,000	Rp 90,000
M - 24	Import Sand (Bangka Island)	M3	Rp 60,000	Rp 90,000		Rp 125,300	Rp 110,000 - Rp 130,000	Rp 125,300
M - 25	Sea Sand (Off Merak)	M3					Rp 100,000	Rp 100,000
M - 26	Cobble Stone	M3	Rp 75,000	Rp 90,000	Rp 95,000	Rp 119,500	Rp 105,000 - Rp 115,000	Rp 119,500
M - 27	Crushed Stone	M3	Rp 115,000	Rp 100,000		Rp 130,500	Rp 75,000 - Rp 100,000	Rp 130,500
M - 28	Rock for Rubble Mound	M3	Rp 75,000	Rp 90,000		Rp 131,900	Rp 95,000 - Rp 115,000	Rp 131,900
M - 29	Sod	M2	Rp 37,500					
M - 30	Geotextile Filter Sheet	M2	Rp 12,000				Rp 54,000	Rp 54,000
M - 31	Asphalt Concrete Mix (Surface Coarse)	Ton	Rp 300,000		Rp 359,200	Rp 540,000	Rp 518,750	Rp 518,750
M - 32	Asphalt Concrete Mix (Binder Coarse)	Ton				Rp 470,000	Rp 443,750	Rp 443,750
M - 33	PC Spun Pile (Class C) Dia 500, L15000	M				Rp 393,000	Rp 448,000	Rp 448,000
M - 34	PC Spun Pile (Class B) Dia 500, L15000	M				Rp 381,000		Rp 381,000
M - 35	Hume Pipe 600mm Type CL-4, 2.45m	No				Rp 1,121,400	Rp 1,012,300 - Rp 690,000	Rp 1,121,400
M - 36	Hume Pipe 800mm Type CL-4, 2.45m	No				Rp 1,903,700	Rp 1,544,800 - Rp 1,114,500	Rp 1,903,700
M - 37	Hume Pipe 1000mm Type CL-4, 2.45m	No				Rp 3,031,100	Rp 2,560,000 - Rp 1,770,000	Rp 3,031,100
M - 38	U-Ditch 800-1000-1200	No				Rp 707,800	Rp 921,250 - Rp 427,500	Rp 707,800
M - 39	U-Ditch 1000-1200-1200	No				Rp 1,189,700	Rp 1,105,500 - Rp 731,000	Rp 1,189,700
M - 40	U-Ditch 1200-1400-1200	No				Rp 1,611,000		Rp 1,611,000
M - 41	Water	M3				Rp 8,500		Rp 8,500
M - 42	Guard Rail and Post	M					Rp 384,500	Rp 384,500
M - 43	Kerb (Type A1)	M				Rp 122,000	Rp 85,500	Rp 85,500
M - 44	Paving Block	M2				Rp 91,700	Rp 66,200 - Rp 99,000	Rp 91,700
M - 45	Earth Work							
	Cutting Soil Manual, deep 2-3 m	M3				Rp 35,691		Rp 35,700
	Filling Soil Manual, distance 100 m	M3				Rp 23,224		Rp 23,300
M-45	Fuel						(2005 Sep) (2005 Oct.)	
F - 1	Gasoline	liter	Rp 1,810			Rp 1,810	Rp 2,400 Rp 4,500	Rp 4,500
F - 2	Car Diesel	liter	Rp 1,800			Rp 1,650	Rp 2,100 Rp 4,300	Rp 4,300
F - 3	Marine Diesel	liter					Rp 2,200 Rp 6,200	Rp 6,200

Note: JICA Study: The Study for Development of the Greater Jakarta Metropolitan Ports in the Republic of Indonesia, Dec. 2003
Local Government: Patokan Harga Satuan Bahan dan Upah Rekerjaan Bidang Pemborongan, Propinsi DKI Jakarta
Port Project: The construction work carried out in the Port of Tanjung Priok by the IPC II

4) Manpower

The cost of manpower adopted for estimate of project cost is investigated. Results are shown in Table 9.3.5 together with the related data from previous projects and study.

The unit costs of manpower in the Table includes the social welfare, overhead and taxes inured by the contractor and spot inflation rate because of the high pressure of wage hike after 01st October 2005. For example, that the minimum wage of labor in Jakarta for next year 2006 is recommended by the local government to be gone up by 15% from January 2006.

Table 9.3.5 Unit Price for Construction Work – Manpower

No	ITEM		BASIC WAGE						UNIT COST
		UNIT	2002 JICA Study	2003 (Jan) Local Gov.	2004 Port Project	2004 Site Record	2005 (Jan) Local Gov.	2005 (Jun) The Project 1	2005 (November) For the Project 2
L - 1	Supervisor	day	Rp 65,000	Rp 47,500	Rp 60,000	Rp 64,800	Rp 53,330	Rp 70,000	Rp 95,000
L - 2	Foreman	day	Rp 65,000	Rp 47,500	Rp 50,000	Rp 50,400	Rp 53,330	Rp 60,000	Rp 90,000
L - 3	Skilled Labor	day	Rp 45,000	Rp 42,500	Rp 40,000	Rp 68,400	Rp 47,140	Rp 50,000	Rp 75,000
L - 4	Common Labor	day	Rp 30,000	Rp 32,750	Rp 30,000	Rp 43,200	Rp 40,950	Rp 40,000	Rp 60,000
L - 5	Scaffolding Man	day	Rp 35,000	Rp 27,950			Rp 34,760	Rp 50,000	Rp 75,000
L - 6	Carpenter	day	Rp 45,000	Rp 30,500	Rp 50,000		Rp 38,254	Rp 55,000	Rp 82,500
L - 7	Mechanic	day	Rp 55,000	Rp 32,750		Rp 72,000	Rp 40,950	Rp 55,000	Rp 82,500
L - 8	Electrician	day	Rp 55,000	Rp 32,750		Rp 68,400	Rp 40,950	Rp 55,000	Rp 82,500
L - 9	Operator (heavy)	day	Rp 70,000	Rp 47,500		Rp 72,000	Rp 53,330	Rp 55,000	Rp 82,500
L - 10	Operator (light)	day	Rp 50,000	Rp 32,750		Rp 43,200	Rp 40,950	Rp 50,000	Rp 75,000
L - 11	Truck Driver	day	Rp 50,000					Rp 50,000	Rp 75,000
L - 12	Welder	day	Rp 55,000	Rp 32,750			Rp 40,950	Rp 55,000	Rp 82,500
L - 13	Steel Fixer	day	Rp 40,000		Rp 35,000			Rp 40,000	Rp 60,000
L - 14	Mason	day	Rp 40,000		Rp 45,000			Rp 40,000	Rp 60,000
L - 15	Painter	day	Rp 40,000	Rp 32,750			Rp 40,950	Rp 40,000	Rp 60,000
L - 16	Plumber	day	Rp 40,000	Rp 27,950	Rp 40,000		Rp 34,760	Rp 40,000	Rp 60,000
L - 17	Surveyor	day	Rp100,000					Rp 140,000	Rp 180,000
L - 18	Assistant Surveyor	day	Rp 50,000					Rp 60,000	Rp 90,000
L - 19	Captain (Tug Boat)	day	Rp100,000					Rp 140,000	Rp 180,000
L - 20	Crew	day	Rp 80,000					Rp 60,000	Rp 90,000
L - 21	Diver	day	Rp200,000					Rp 110,000	Rp 150,000
L - 22	Engineer (Local)	day	Rp114,000					Rp 180,000	Rp 225,000
L - 23	Assistant Engineer	day	Rp 91,000					Rp 130,000	Rp 160,000
L - 24	Secretary	day	Rp 46,000					Rp 100,000	Rp 140,000
L - 25	Assistant Secretary	day	Rp 36,000					Rp 60,000	Rp 90,000
L - 26	Typist	day	Rp 35,000					Rp 50,000	Rp 75,000
L - 27	Clark/Guardsman	day	Rp 35,000					Rp 40,000	Rp 60,000

Note: JICA Study: The Study for Development of the Greater Jakarta Metropolitan Ports in the Republic of Indonesia, Dec. 2003
Local Government: Patokan Harga Satuan Bahan dan Upah Rekerjaan Bidang Pemborongan, Propinsi DKI Jakarta
Port Project: The construction work carried out in the Port of Tanjung Priok by the IPC II
Site Record: The construction work carried out in DKI Jakarta by private companies
The Project 1: The salary paid to the worker from company
The Project 2: The unit cost paid to the Contractor from Client including the salary hike after oil price increase in Oct. 2005.

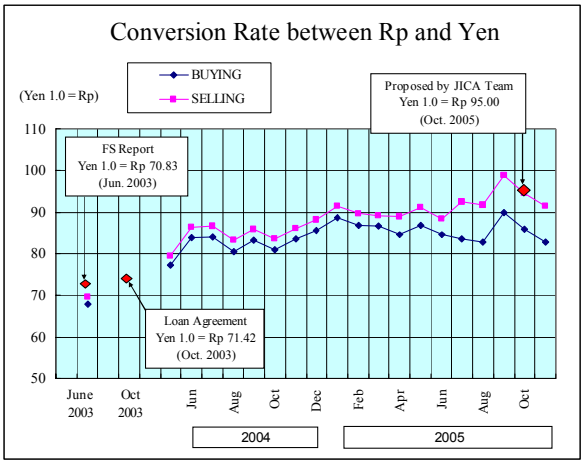
(2) Exchange Rate

The exchange rate between Indonesian Rp and Japanese Yen under Loan Agreement sighed in March 2004 is adopted Yen1.0=Rp71.42 and the Feasibility Study 2003 December applied same rate of Yen1.0=Rp70.83. The conversion rate of selling was Rp79.65 at that time in 2003 according to the bank record.

The conversion rate of bank record in last one year (2004/2005) are collected and compiled in Figure 9.3.3. The following exchange rates are proposed for the project consistent with the average rate of last 3 months in August, September and October 2005 as shown in Figure 9.3.3.

Rp 1.0 = Yen 0.010526 (Yen 1.0 = Rp 95.00)

US$ 1.0 = Rp 10,500 (US$ 1.0 = Yen 110.52)



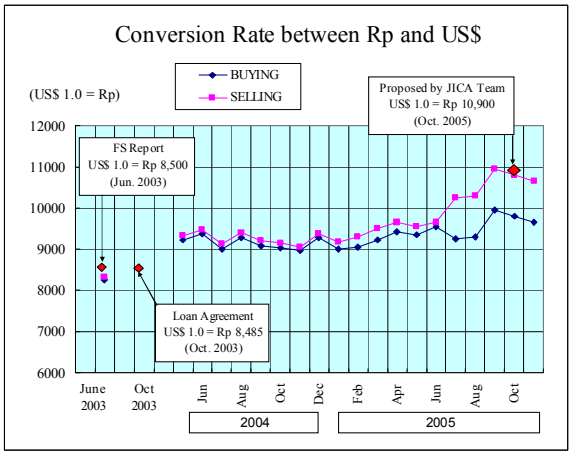


Figure 9.3.3 Conversion Rate of Bank Record and Exchange Rate for the Study

(3) Escalation Factor

1) General

Under the Construction Contract, in terms of the cost variation during the construction period, it is the general rule that the project cost is to be altered in accordance with the price change if it exceeds the prospective range. This project shall also reserve the contingency amount as the cost variation at the constant percentage of variation against the basic construction cost of the project.

The prices in Indonesia are on the upward trend and the inflation ratio in 2005 is considered at 8.7% by Bank of Indonesia. The inflation factor of 8% for next year is considered in connection with the preparation of national budget at the Budget Committee.

However, the large reduction of the subsidy on the fuel price from 1st October 2005 by the government causes the increase of fuel prices drastically and the inflation rate of November against last year records by 18.38% according to the Jakarta Post on 5th December 2005.

The other hand, it is required that the factor applicable on the cost variation under the construction contract must be indicated by the official index or recognized index among the public sector. The item-wise statistical price index, which is being periodically published in Indonesia, will be able to apply as the factor of cost variation under the contract.

The construction cost consists of major 4 factors namely labor cost, material cost, fuel cost and equipment cost and it is proposed that the 3 factors except equipment cost mentioned above are designated to be the cost variation factor because of the obvious existence of inflation index from the statistic data published by the official sources.

Generally, the cost of equipment within the construction cost will be estimated on their idea strategically and it might be proposed by the contractor at the tender time considering a few years project period. Also the relationship between the inflation ratio and equipment cost can be normally said rather thin connection in terms of the application as cost variation factor.

The concept of cost variation applicable for the Contract is described in Table 9.3.6.

Table 9.3.6 Concept of Cost Variation Factor

Cost Component		Classification	Percentage (%)			
			Package 1		Package 2	
Local Portion	Material Cost	Escalation Factor	12	45%	38	70%
	Labor Cost		4		12	
	Fuel Cost		29		20	
	Equipment Cost	Fixed Factor	49	55%	30	30%
Foreign Portion			6		0	
			100%		100%	

Package 1 : Channel and Basin Improvement Work
Package 2 : Port Inner Road Improvement Work

2) Percentage applied on Cost Variation

The wholesale price indices of construction materials and equipment published by the Government between 1999 and 2004 are sorted out in Table 9.3.7 and Figure 9.3.4. The trend of price index of construction materials is downward from 11.04% of 1999/2000 to 6.49% of 2002/2003 continuously but this descent has stopped in 2004. The index of construction equipment is fluctuated between -2.84% and 8.56% reflection of the demand of market.

In connection with the estimation of project cost, the inflation percentage during the construction period is assessed as 10% annually in constant according to the figures of construction material shown in Table 9.3.7.

Assumed Price Escalation: Foreign Currency 0 %

Local Currency 10.0 % annually

Table 9.3.7 Wholesales Price Indices of Construction Materials

[Unit: %]

No.	Item	1999/00	2000/01	2001/02	2002/03	2003/04	1999/04 Avrage	Price Index for Project
1	Quarrying	9.68	16.81	11.87	6.75	5.42		
2	Ply wood	8.73	5.35	3.49	2.45	8.68		
3	Asphalt	14.92	14.64	12.05	6.24	4.86		
4	Oil refinery industries	30.05	27.89	19.63	12.24	12.53		
5	Cement	6.64	7.88	8.46	5.32	1.68		
6	Iron/Steel basic industries	7.80	6.91	0.62	4.59	33.04		
7	Structural metal materials	-0.57	5.71	3.78	7.81	9.66		
8	Average of Material	11.04	12.17	8.56	6.49	10.84	9.82	10.0%
9	Machine and equipments	3.55	8.56	-2.84	0.32	4.21		
10	Average of 8&9	7.29	10.37	2.86	3.41	7.52	7.86	

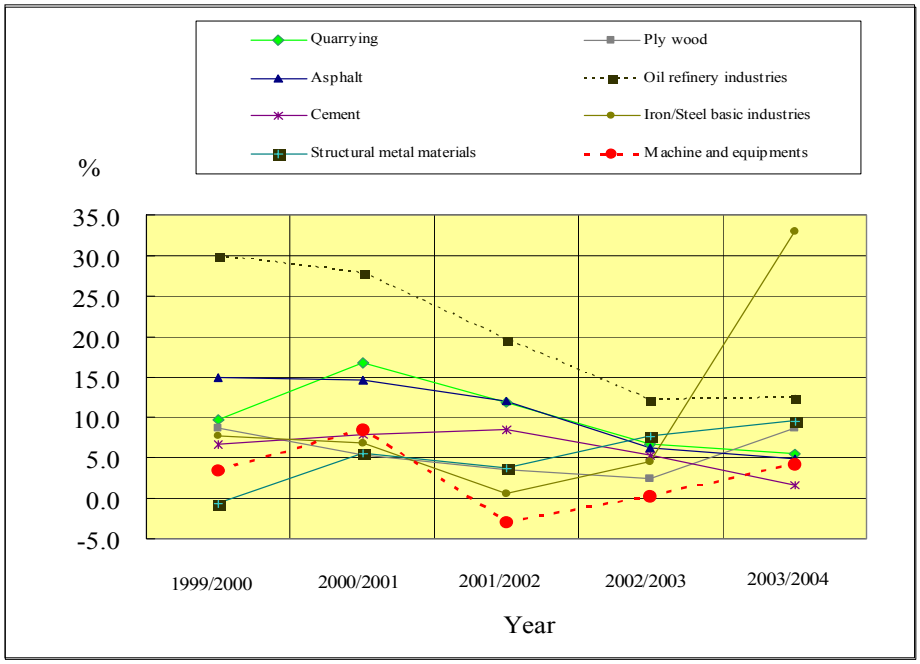


Figure 9.3.4 Wholesale Price Indices of Construction Material

(4) Physical Contingency

The 5% of construction cost with escalation amount is estimated and provided in the total project cost in order to reserve an amount as the physical contingency cost to cope with the increment of construction quantity, minor design change, additional work, etc. during the process of project implementation.

Another 5% of construction cost with escalation amount is also considered as the cost for precautionary measure against the envisaged environmental adverse effects particularly happen during the dredging work of channel improvement.

Some sediment samples contaminated by heavy metal, such as Hg and Cd were found from the proposed dredging area through the Team Study carried out in June 2005 and October 2005. Although the amounts of heavy metals detected were not exceeded the serious level to consider the adoption of special protection on the dredging works, the provision of contingency amount is proposed in order to attend the special measure for environmental issue in case of the indicator exceed the specified level guided by World Bank through the periodical monitor program.

This contingency amount will be utilized not only against the sediment contamination but also for the measures of turbidity by dredging, dust and noise protection under the road improvement work, etc. in terms of environmental mitigation work.

9.3.3 Project Cost Estimate

(1) Construction Cost

The construction costs are estimated for Package 1 “Channel and Basin Improvement” and Package 2 “Port Inner Road Improvement” as shown in the **Table 9.3.8.** The project cost for Package 1 and Package 2 are amounted Rp 689.8 billion (Yen 7.26 billion) and Rp 103.1 billion (Yen 1.08 billion) respectively including the site expense and overhead of the contractor, but except the contingencies.

Table 9.3.8 Construction Cost

Package 1 - Channel and Basin Improvement — Yen 1.0 = Rp. 95.00 — as of Oct. 2005

No.	Description	Unit	Quantity	Unit Price	Amount	
				(Yen)	(Yen)	(Rp)
Direct Cost						
1	General (Mobi/Demobi, Site, Environment, etc.)	LS	1		248,310,536	23,589,500,900
2	Demolition and Channel Clearance		1		26,175,663	2,486,688,000
3	Breakwater					261,681,822,800
3A	Demolition of Dam Tengah	m	1,605	262,240	420,895,200	39,985,044,000
3B	Demolition of Dam Barat	m	225	410,310	92,319,733	8,770,374,600
3C	New Dam Tengah-1	m	1,243	1,541,783	1,916,436,618	182,061,478,700
3D	New Dam Tengah-2	m	318	424,603	135,023,789	12,827,260,000
3E	New dam barat	m	100	1,898,702	189,870,163	18,037,665,500
4	Channel Improvement by Dredging		8,078,000	517	4,177,953,389	396,905,572,000
	(Access Cannel, North Channel, Central Basin)					
5	Navigation Aids System		1		54,681,326	5,194,726,000
6	Total of Direct Construction Cost				7,261,666,418	689,858,309,700

Package 2 - Port Inner Road Improvement — Yen 1.0 = Rp. 95.00 — as of Oct. 2005

No.	Description	Unit	Quantity	Unit Price	Amount	
				(Yen)	(Yen)	(Rp)
1	General (Mobi/Demobi, Site, Environment, etc.)	LS	1		110,254,226	10,474,151,500
2	Demolition and Site Clearance	LS	1		34,992,000	3,324,240,000
3	Inner Port Road	LS	1		497,502,353	47,262,723,579
4	Flyover	LS	1		337,892,031	32,099,742,923
5	Utilities	LS	1		105,673,187	10,038,952,782
6	Total of Direct Construction Cost (DC)				1,086,313,798	103,199,810,784

(2) Cost of Consultancy Service

The cost of engineering services by the Consultant Firm to assist the tender process for selection of the contractor and supervising the construction work is estimated and the summary of the cost is shown in Table 9.3.9.

The detail schedule for arrangement of engineers and staff personnel and breakdown of cost estimate are indicated in the Chapter 5 of Volume-2 "APPENDICES".

Table 9.3.9 Cost of Consultancy Service

No	Description	MM	Local Portion	Yen Portion	Total	
			(Rp)	(Yen)	(in Yen)	(in Rp)
1	Remuneration					
	A Expatriate	191		477,500,000	477,500,000	
	B Local Engineer	252	7,560,000,000		79,578,900	
	C Supporting Staff	126	1,008,000,000		10,610,500	
	D Office staff	465	1,860,000,000		19,578,900	
	Sub Total		10,428,000,000	477,500,000	587,268,300	55,790,488,500
2	Total of Direct Expense		11,324,400,000	25,900,220	145,104,431	13,784,920,945
3	Total = 1 + 2		21,752,400,000	503,400,220	732,372,852	69,575,409,445

(3) Project Cost

The total project cost including the engineering service and contingencies for both price escalation and physical contingency is estimated and summarized in Table 9.3.10.

Table 9.3.10 Summary of Project cost

Construction Work — Yen 1.0 = Rp 95.00

		Description	Foreign Portion	Local Portion	Total Project Cost	
			(Yen)	(Rp)	(in Rp)	(in Yen)
1	Package 1 - Channel and Basin Improvement					
	(1)	Construction Cost	1,081,790,100	587,088,250,200	689,858,309,700	7,261,666,400
	(2)	Price Escalation (10%)	0	113,419,946,000	113,419,946,000	1,193,894,200
	(3)	Physical Contingency (10%)	108,179,010	70,050,819,620	80,327,825,600	845,556,100
	(4)	Sub Total	1,189,969,110	770,559,015,820	883,606,081,300	9,301,116,700
2	Package 2 - Port Inner Road Improvement					
	(1)	Construction Cost	0	103,199,810,800	103,199,810,800	1,086,313,800
	(2)	Price Escalation (10%)	0	29,086,082,400	29,086,082,400	306,169,300
	(3)	Physical Contingency (10%)	0	13,228,589,300	13,228,589,300	139,248,300
	(4)	Sub Total	0	145,514,482,500	145,514,482,500	1,531,731,400
3	Total	(1 + 2)				
	(1)	Construction Cost	1,081,790,100	690,288,061,000	793,058,120,500	8,347,980,200
	(2)	Price Escalation (10%)	0	142,506,028,400	142,506,028,400	1,500,063,500
	(3)	Physical Contingency (10%)	108,179,010	83,279,408,920	93,556,414,900	984,804,400
	(4)	Grand Total	1,189,969,110	916,073,498,320	1,029,120,563,800	10,832,848,100

Engineering Service — Yen 1.0 = Rp 95.00

		Description	Foreign Portion	Local Portion	Total Project Cost	
			(Yen)	(Rp)	(in Rp)	(in Yen)
1	Engineering service					
	(1)	Remuneration	477,500,000	10,428,000,000	55,790,500,000	587,268,420
	(2)	Direct Expenses	25,900,220	11,324,400,000	13,784,920,900	145,104,430
	(3)	Total of Engineering	503,400,220	21,752,400,000	69,575,420,900	732,372,850
2	Contingency					
	(1)	Price Escalation (10%)	24,858,900	8,804,895,000	11,166,490,500	117,542,010
	(2)	Physical Contingency (10%)	52,825,900	3,055,730,000	8,074,190,500	84,991,490
	(3)	Total of Contingency	77,684,800	11,860,625,000	19,240,681,000	202,533,500
3	Total		581,085,020	33,613,025,000	88,816,101,900	934,906,350

Total Project — Yen 1.0 = Rp 95.00

	Description	Foreign Portion	Local Portion	Total Project Cost	
		(Yen)	(Rp)	(in Rp)	(in Yen)
1	Construction Work	1,189,969,110	916,073,498,320	1,029,120,560,000	10,832,848,000
2	Engineering Service	581,085,020	33,613,025,000	88,816,101,900	934,906,000
3	Total	1,771,054,130	949,686,523,320	1,117,936,661,900	11,767,754,000

(4) Disbursement Schedule

The disbursement schedule of project cost for the Package 1, Package 2 and the consultancy service are calculated separately and shown in Table 9.3.11.

Table 9.3.11 Disbursement Schedule of Project

1. Package 1

No.	Description	Total			2006		2007		2008		2009		2010		2011	
		Local	Foreign	Total	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
		Mil. Rp	Mil. Yen	Mil. Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen
1	Construction Cost - CC	587,088.3	1,081.8	7,261.7			88,063	162	146,772	270	205,481	379	146,772	270		
2	Contingency															
(1)	Price Escalation - PE (L: 10.0%, F: 0%)	113,419.9	0.0	1,193.9			8,322	0	21,862	0	42,914	0	40,323	0		
(2)	Physical Contingency - 10% of (CC + PE)	70,050.8	108.2	845.6			9,639	16	16,863	27	24,839	38	18,709	27		
(3)	Sub Total (B)	183,470.8	108.2	2,039.5			17,960	16	38,725	27	67,753	38	59,032	27		
3	Total Cost Construction Work	770,559.0	1,190.0	9,301.1			106,024	178	185,497	297	273,234	416	205,804	297		

Yen 1.0 = Rp95.00

2. Package 2

No.	Description	Total			2006		2007		2008		2009		2010		2011	
		Local	Foreign	Total	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
		Mil. Rp	Mil. Yen	Mil. Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen
1	Construction Cost - CC	103,199.8	0.0	1,086.3			20,640.0	0.0	30,959.9	0.0	30,959.9	0.0	20,640.0	0.0		
2	Contingency															
(1)	Price Escalation - PE (L: 10.0%, F: 0%)	29,086.1	0.0	306.2			3,034.1	0.0	7,173.4	0.0	10,058.0	0.0	8,820.6	0.0		
(2)	Physical Contingency - 10% of (CC + PE)	13,228.6	0.0	139.2			2,367.4	0.0	3,813.3	0.0	4,101.8	0.0	2,946.1	0.0		
(3)	Sub Total (B)	42,314.7	0.0	445.4			5,401.5	0.0	10,986.8	0.0	14,159.7	0.0	11,766.7	0.0		
3	Total Cost Construction Work	145,514.5	0.0	1,531.7			26,041	0	41,947	0	45,120	0	32,407	0		

3. Total - Construction

No.	Description	Total			2006		2007		2008		2009		2010		2011	
		Local	Foreign	Total	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
		Mil. Rp	Mil. Yen	Mil. Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen
1	Construction Cost - CC	690,288.1	1,081.8	8,348.0			108,703	162	177,732	270	236,441	379	167,412	270		
2	Contingency															
(1)	Price Escalation - PE (L: 10.0%, F: 0%)	142,506.0	0.0	1,500.1			11,356	0	29,035	0	52,972	0	49,143	0		
(2)	Physical Contingency - 10% of (CC + PE)	83,279.4	108.2	984.8			12,006	16	20,677	27	28,941	38	21,656	27		
	Sub Total (B)	225,785.4	108.2	2,484.9			23,362	16	49,712	27	81,913	38	70,799	27		
3	Total Cost Construction Work	916,073.5	1,190.0	10,832.8			132,065	178	227,444	297	318,354	416	238,211	297		

4. Consultancy Service

No.	Description	Total			2006		2007		2008		2009		2010		2011	
		Local	Foreign	Total	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
		Mil. Rp	Mil. Yen	Mil. Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen	Mil Rp	Mil Yen
1	Consulting Service				15		15		20		20		20		10	
	Sub Total	21,752.4	503.4	732.4	3,262.9	75.5	3,262.9	75.5	4,350.5	100.7	4,350.5	100.7	4,350.5	100.7	2,175.2	50.3
2	Contingency				1	1	2	2	3	3	4	4	5	5	6	6
					0.10000	0.01400	0.21000	0.02820	0.33100	0.04259	0.46410	0.05719	0.61051	0.07199	0.77156	0.08700
(1)	Price Escalation (L: 10.0%, F: 1.4%)	8,804.9	24.9	117.5	326.3	1.1	685.2	2.1	1,440.0	4.3	2,019.1	5.8	2,656.0	7.2	1,678.3	4.4
(2)	Physical Contingency (10% of CS+PE)	3,055.7	52.8	85.0	358.9	7.7	394.8	7.8	579.0	10.5	637.0	10.6	700.6	10.8	385.4	5.5
	Sub Total (B)	11,860.6	77.7	202.5	685.2	8.7	1,080.0	9.9	2,019.1	14.8	2,656.0	16.4	3,356.7	18.0	2,063.7	9.9
3	Total Cost of Engineering Services	33,613.0	581.1	934.9	3,948.1	84.2	4,342.9	85.4	6,369.5	115.5	7,006.5	117.1	7,707.1	118.7	4,238.9	60.2

9.4 Evaluation of the Project

9.4.1 Technical Evaluation

The JICA Master Plan has proposed the port developments to be successively implemented to the west and east. The western port expansion plan, however, seems to have slightly run aground due to the current expansion works of the navy base and the fact that the port development plan blueprinted by Jakarta City is still overlapping the JICA Master Plan. The port expansion to the east will require careful consideration to the environmental situation. As such, the port configuration concluded in the detailed design has been prepared as a self-contained development plan, not strongly hinged on the future development scenarios of the port.

The configuration of the port entrance and the alignment of the navigation channel and basins have been determined to the satisfaction of the navigation group of the port. The alignment of the eastern end of New Dam Tengah-1 has been modified from the original plan proposed by the Master Plan Study. The closure of the open gap (New Tengah-2) created between the

existing Dam Citra and New Dam Tengah will eliminate the potential sedimentation in the future, minimizing the financial burden of maintenance dredging to IPC-II.

The field investigation and survey executed by the JICA Study Team have produced sufficient technical information for the detailed design of the Project facilities. It has been considered that the rubble-mound breakwater with sand replacement would be the reliable and low-maintenance economical structure.

The port inner road improvement associated with the construction of the Pasoso flyover will achieve smooth traffic circulation in and around the port. The combined pavement structure of asphalt and concrete in the widened section would be the most realistic solution, and eventually leading to full-concrete-pavement as wished by IPC-II.

To build the Project facilities in the traffic congestion areas of the port, a very tightly-woven construction plans and regulations should be worked out and observed by every party concerned and potential incidents should be nullified.

9.4.2 Economic and Financial Evaluation

Following the concepts of the economic and financial evaluations made in the JICA Feasibility Study on the Urgent Rehabilitation of the Project, economic and financial evaluations were conducted for the Project component, which consists of Channel and Basin Improvement and Port Inner Road Improvement. The economic internal rate of return (EIRR) was estimated at 19%, and the financial internal rate of return (FIRR) at 2.1%.

Though the ongoing development scenario may not the same as envisaged in the Feasibility Study, it can be concluded that economic and financial soundness of the Project can be ensured. The JBIC appraisal earmarked Project cost of 12,052 million JYN.

The detailed cost analysis in the Detailed Design has estimated the Project cost at 11,767 million JYN, which is 285 million JYN lower than the budget. In the meantime, the actual cargo throughputs have exceeded the projected cargo throughputs. In the Feasibility Study, the cargo throughputs was projected at 3.2 million TEU and 3.4 million TEU for 2004 and 2005 respectively, while the actually recorded figures are 3.65 million TEU and 3.9 million TEU, about 14-17% up. These facts fully justify the economic and financial soundness of the Project.

9.5 Implementation Organization for the Project

9.5.1 Construction Management Unit of the Project

The implementation of the Project will be coordinated by DGST. DGST stands for Directorate General of Sea Transportation (New name of DGSC). It is understood that Directorate of Port and Dredging of DGST will be involved in the overall coordination of the Project. Under his overall coordination, the Project Officers: one for Package 1 (Channel and Basin Improvement) and another for Package 2 (Port Inner Road Improvement) will be appointed from DGST and IPC-II, respectively. The Project Officer of the DGST also controls the Consultant, who supervises the contractors for Package 1 and 2 as shown in Figure 9.4.1. Under the Project Officers, the Evaluation Teams will be organized.

Tanjung Priok Port is now operated by IPC-II and Tanjung Priok Port. On completion of the Project, these organizations will be directly involved in the maintenance/repair works of the Project facilities. It is recommended that the Evaluation Team of the Package 1 will be staffed from DGST as well as IPC-II/Tanjung Priok Port for smooth operation of the subsequent maintenance operations.

Unlike the Package-1 contract, the works for Package-2 will be staged not only inside the port premise but also outside the port areas, where various kinds of local agencies and private sectors will be directly or indirectly be concerned with the implementation of the Project, including BINAMARGA, PT. KAI, etc. The project management unit headed by the Project officers should coordinate the relationships with these organizations concerned.

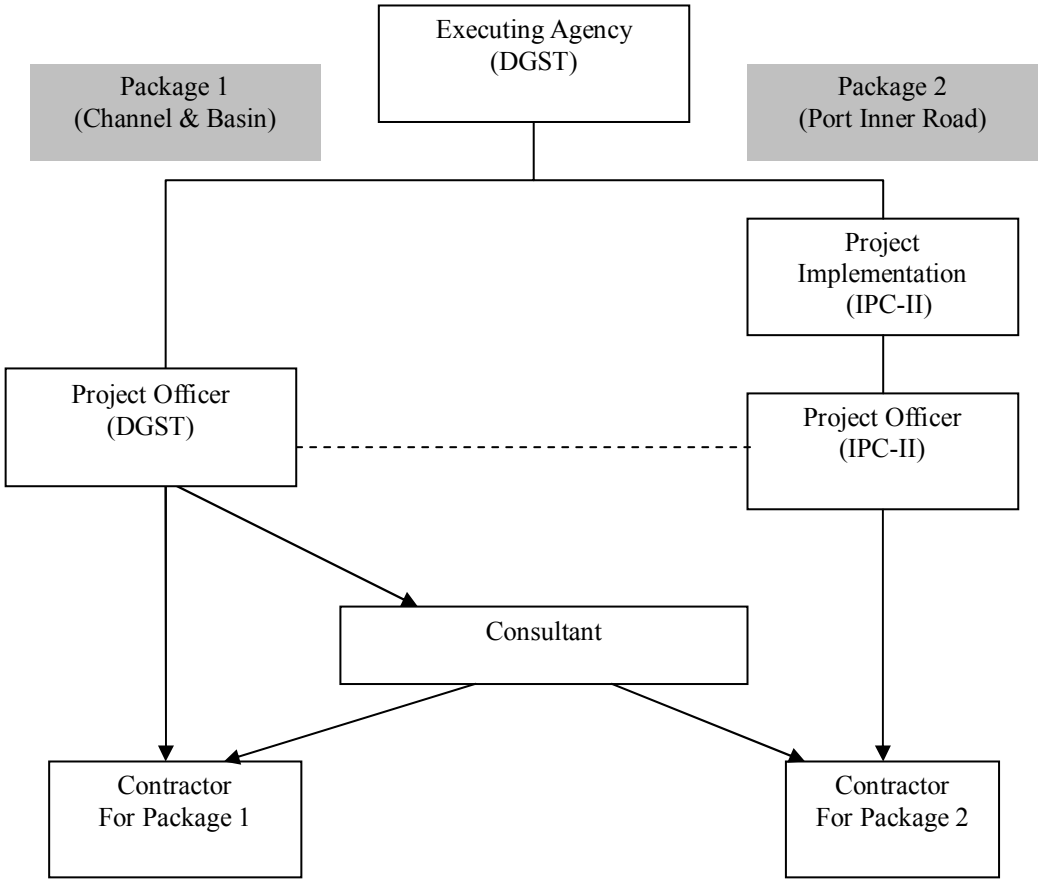


Figure 9.4.1 Construction Management Unit of the Project

9.5.2 Maintenance Works for Project Facilities

(1) Existing Organization and Method of Maintenance Operation

While IPC-II takes overall responsibility for maintenance works for the Project, actual works are entrusted to Tanjung Priok Port Office. Among the organization charts of IPC-II and Tanjung Priok Port shown in Figure-00 and-00, the divisions shadowed in yellow color are involved in the maintenance & repair works for the Project facilities. The major responsibilities imposed on these relevant divisions are summarized below:

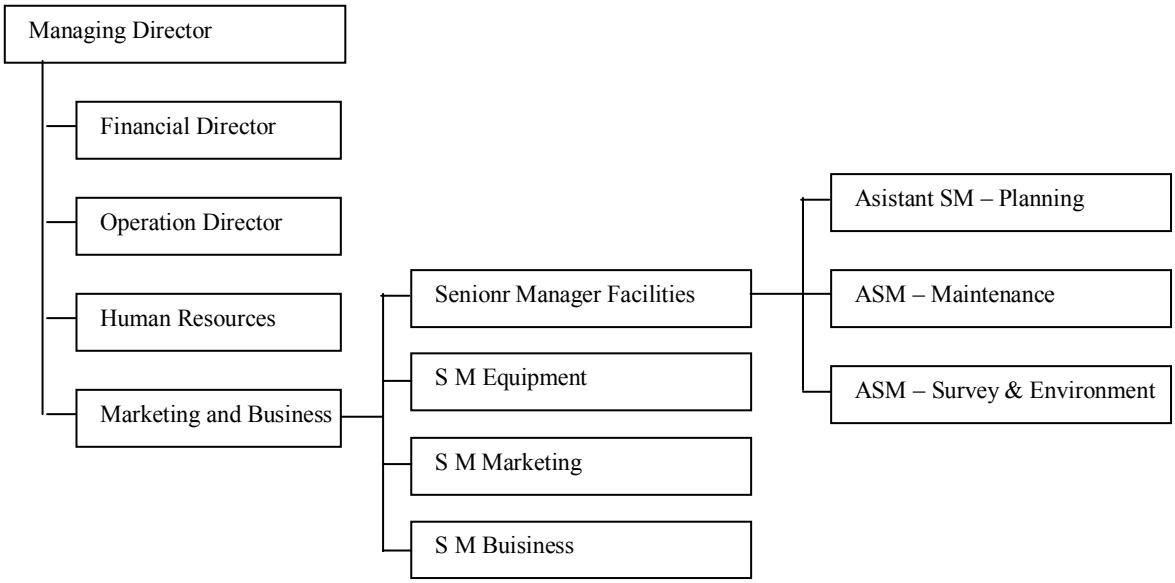


Figure 9.5.1 Organization Chart of PERINDO II

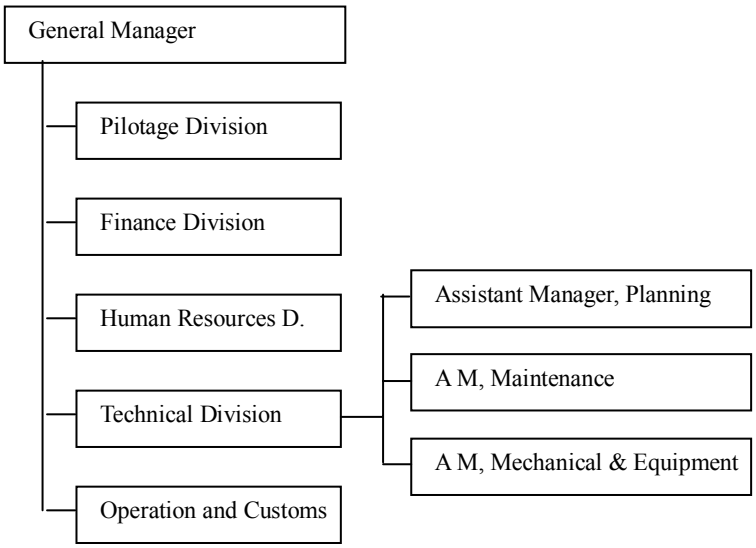


Figure 9.5.2 Organization Chart of Tanjung Priok Port Office

Technical Division of Tanjung Priok Port has three sections, consisting of Planning, Maintenance and Mechanical & Equipment. Among them, Planning Section, based on the past accumulated data and the technical information from the site firstly makes an yearly maintenance plan, including the outline scope and corresponding budget, covering the maintenance dredging in the navigation channel and basin, repair/maintenance of marine structure like breakwaters/piers and onshore facilities like roads and buildings. The above planning procedure is coordinated by General Manager of Tanjung Priok Port, and assisted by Finance Division.

The draft maintenance plan is submitted to IPC-II, addressed to Financial Director and Marketing and Business. Chiefly, Senior Manager Facilities checks the draft maintenance plan under the assistance of Assistant S M-Planning and ASM-Maintenance. In this stage, they evaluate its validity and urgency, compared to the proposals from other IPC-II ports like Padang, Pontianak and Teluk Bayun. In consideration of the possible annual total budget of IPC-II, they refine the Tanjung Priok Port's proposal and firm up the scope of maintenance

works. The quantities of the agreed maintenance works are checked and finalized by ASM Survey & Environment.

Once the maintenance works proposed by the Tanjung Priok Port have been authorized, local tender procedures are followed. For the maintenance dredging work, RUKINDO is a sole dredging contractor. Their contract conditions, including dredging unit costs have already been settled. For other works like repair/maintenance of breakwater and road/bridge are tendered work by work, mostly open-tender and sometimes direct selection depending on the work scale.

(2) Maintenance Requirements for the Project Facilities

After the completion of the Project, IPC-II will take full responsibility for the maintenance and repair of the Project facilities, including both the marine and onshore components. The marine facilities consist of breakwaters, navigation channel and basin, and navigation aids, while the onshore facilities consist of port inner road and flyover.

The JICA Detailed Design Study projected the annual increase in the maintenance dredging volume of about 120,000 m3. This figure is a sort of indicative. Tanjung Priok Port should earmark the budget for the survey and monitor the sedimentation by periodical bathymetric survey and also through the interpretation of the maintenance dredging records. On this basis, IPC-II and Tanjung Priok Port should refine the additional dredging requirement for the existing maintenance dredging plan. When comparing the navigation areas, the dredging requirement in the outer channel (outside the breakwater) is most likely to increase, so that the resulting maintenance dredging cost will increase accordingly.

As indicated in the environmental analysis, highly polluted soils can be found in and around the maintenance dredging areas. In the stage of the maintenance dredging works, if it is found that the dredging materials are more contaminated than allowable level, special treatments would be required as proposed in the environmental study.

It is expected that the newly built breakwaters will experience some settlement. Tanjung Priok port should monitor and keep records of the monthly and yearly settlements, and prepare the annual plan. The temporary breakwater (New Dam Tengah-2) has been designed with a maximum life time of 10 years. During this period, the consolidation settlement will continue, because of the absence of soil improvement. IPC-II should carefully monitor the settlement, and prepare timely maintenance plan, including the re-usage of the demolished materials like concrete blocks.

(3) Maintenance Improvement Plan

It is understood that maintenance works are one of the most important factors to keep the operational levels that have been crystallized and achieved in the Project, and to maintain efficient port operation. The maintenance works should take place to prevent coming damage/obstruction or to restore the damaged parts to original operational levels. The maintenance works need preparation times, budgeting and good quality control. The maintenance works usually cause inconvenience to ongoing operation, sometimes hamper the existing traffic flows.

As the navigation channel and basin will be considerably widened, compared to the existing configuration, the magnitude and extent of the sedimentation are not so clear as experienced before by Tanjung Priok Port and RUKINDO. Though the sedimentation rate has been projected by the numerical modeling analysis, it is sort of indicative figure.

Tanjung Priok Port should conduct bathymetric survey more frequently than before and grasp the general characteristics of sedimentation in and around the port.

The maintenance work should be effectively conducted in close relationship among the planning section, engineering section, survey section, maintenance section and financial section. The survey data (monitoring data) would be the basis for preparing the maintenance plan and design, eventually for budgeting work. It is essential to have a regular joint meeting to grasp the sedimentation in the newly dredged zones and settlement of breakwaters for several years after the completion of the Project.

It is expected that unexpected sedimentation may occur in the navigation areas. If normal procedure for preparation of the budgeting, contracting and mobilization of dredging fleet is applied, dredging for the sedimentation-active zones cannot timely be executed. As such, it is wise to set up a general dredging budget in advance and to simplify the procedure to the dredging works so as to clear away navigational obstacles swiftly, particularly so for the project area after the completion of the Project.

Among the existing breakwaters outside the Project, Dam Citra has been heavily damaged, and its crest portion is almost submerged at high tides. Dam Citra is located in front of the KOJA Container Terminal, so that even if New Dam Tengah has been constructed and provided a good port protection, the waves washing over the submerged breakwater of Dam Citra will aggravate tranquility in the new turning basin that has been provided by the Project.

As such, it is desirable that some of the selected materials from the demolished breakwaters would also be used as maintenance materials for the existing Dam Citra. In this way, the currently executed maintenance works could be assisted.

For the maintenance works of onshore facilities like port inner roads, quality of selected contractors seems reportedly sometimes so poor that the maintenance works cannot be well completed. This is because of the fact that the contract is made on the least-cost basis. It may be wise to set up some pre-qualification procedure to select the well-experienced and well-equipped contractors.

CHAPTER 10 ENVIRONMENTAL STUDY

10. ENVIRONMENTAL STUDY

10.1 General

The area of environmental study is located in DKI Jakarta and Bekasi. Tanjung Priok Port, main site of this project, is located in the northern part of DKI Jakarta, which is the most densely populated area in the country. Two (2) dumping sites of this project, existing and newly proposed, are located off shore in Bekasi.

Tanjung Priok Port was built more than hundred years ago, and it has been playing significant role for the economic activity in and around the metropolitan, DKI Jakarta.

According to a statistic data in 2004, 23,626 persons, consisting of 8,078 male and 15,548 female, are employed by port related companies in Tanjung Priok Port area.

Current handling volume of container cargo in Tanjung Priok Port reaches to 55% of the total volume in the country. This makes port operations busy but inefficient, since basic layout and structure of some port facilities still have been kept original.

As a result, heavy land and water traffic congestion became the primary cause of serious environmental degradation, such as air and water pollution.

In order to ameliorate the above situations, "The Rehabilitation Project of Tanjung Priok Port" has been formulated.

The scope of Urgent Plan of the project, which is covered in this study (JICA D/D Study), is: 1) Relocation of Breakwater, 2) Widening and Deepening of Access Channel and Basin, and 3) Rehabilitation of Inner Harbour Road, including Flyover Structure.

In this report, the main tasks of this chapter are:

- to review the Environmental Impact Assessment (EIA), which was prepared and approved by the Government of the Republic of Indonesia (GOI),
- to conduct environmental conditions survey, including air, water and sediment quality, and benthos survey, to verify present conditions described in the EIA,
- to input necessary requirements to the design of planned facilities from environmental point of view as long as practicable, in order to minimize initial impact on local environment,
- to assess potential impacts of the project and plan mitigation measures, reflecting the final plans of the Study Team and the results of the numerical simulations in this study, and
- to prepare an Environmental Management Plan (EMP) based on the Environmental Management Plan (RKL) and Environmental Monitoring Plan (RPL), which were prepared by GOI, in order to control the potential impacts predicted in the above.

Figure 10.1.1, which was developed based on a satellite image captured on 18 June 2004 by French Satellite SPOT 5, could help develop understanding of economic and environmental aspects in and around the study area.

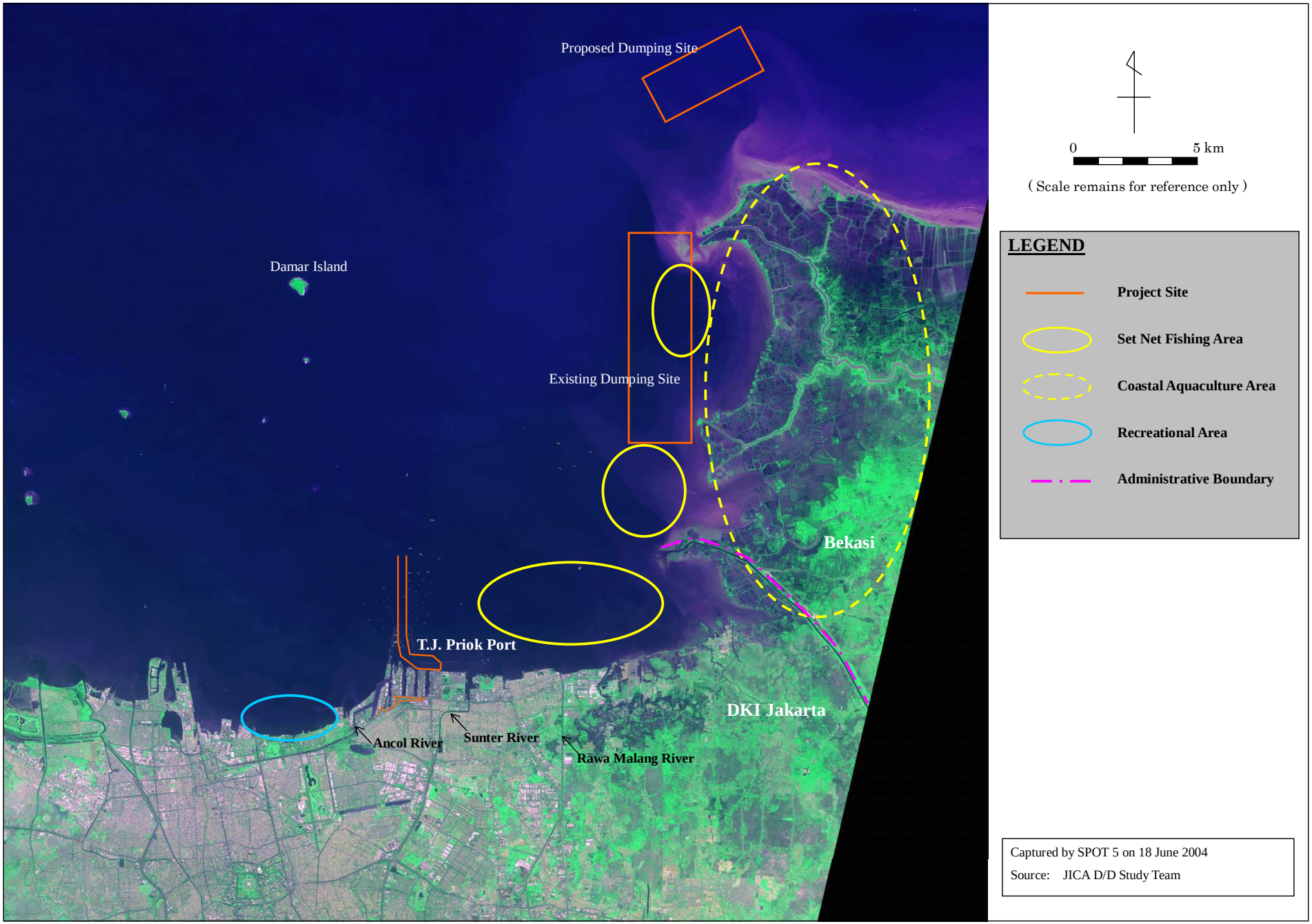


Figure 10.1.1 Satellite Image of Study Area

10.2 Review of Existing Information

In order to grasp the environmental status quo in and around the study area, available information was reviewed.

These are:

- Minutes of Meeting between JBIC and GOI, 30 October 2003,
- Environmental Impact Assessment (EIA) Documents prepared by GOI, and
- Results of previous Environmental Surveys
  (JICA F/S Study and Monitoring Survey conducted by IPC-II).

Their summaries are presented in the following sections.

10.2.1 Review of Environmental Issues described in Minutes of Meeting between JBIC and GOI

A minutes of meeting was made on 30 October 2003, between JBIC and Port and Dredging Directorate General of Sea Communication (DGSC), representative of GOI as project owner. In this minutes, Environmental Issues of the project were explained by DGSC with an attachment, Environmental Check List.

The primary points of explanations are as follows (citation from the minutes).

- DGSC assured that no land acquisition/resettlement would be caused by the implementation of the Project.
- DGSC assured that they would carry out public consultation according to the procedure in Indonesia after the completion of the Detail Design (D/D) without delay.
- DGSC assured that the current sea water quality and the concentration of heavy metals in sea bed material were below the country's standard in the Project site.
- DGSC agree to submit to JBIC the justification of mitigation measures and the results of environmental monitoring in case that the results exceed the standard.

Table 10.2.1 Monitoring Survey described in Minutes of Meeting

Type of Impact	Monitoring Items (* Note)	Monitoring Location	Standard
Sea water quality	Hg, As, Pb, Cr^{6+},Cd	Dredging Site Dumping Site	KEP-02/MENKLH/I/1988
Sea bed material	Hg, As, Pb, Cr, Cd	Dredging Site	TESTING VALUE specified in the Environmental Considerations for Port and Harbour Developments, World Bank Technical Paper No. 126, Transport and the Environmental Series, 1991

*Note: At least these items will be monitored, but monitoring items will not be limited to them
Source: Minutes of Meeting between JBIC and GOI, 30 October 2003

- DGSC assured that dredged materials and soils generated by the construction and maintenance of the Project would be disposed at the identified dumping site used for the current maintenance dredging works in Tanjung Priok Port.

- DGSC assured that the dumping site has enough capacity for dredged materials and soils generated by the Project around 8-10 years after the construction.

In the Check List, there are following confirmations.

- DGSC also assured that it is planned to study an alternative dumping area off shore facing to the Java sea north of the present site. The alternative site has depth of more than -20m and area of more than 1,500 ha. The necessary EIA study for selection of alternative dumping site area will be carried out in due course.
- There are not any sensitive areas in/around the Project area such as mangrove forest or Coral Reef.
- Aquatic and terrestrial fauna/flora are common species such as domestic animals or plantation, which are not found in the channel area where the channel dredging and relocation of breakwater are planned.
- Basically there is not commercial fishing activity around the Project area and within the port area.

10.2.2 Review of Environmental Impact Assessment (EIA) prepared by GOI

(1) Official Procedure for EIA Approval

Responding to the worldwide demand on Sustainable Environmental Management, GOI has amended its EIA law, and the new procedure for EIA approval, which incorporates a policy of public participation, took effect in November 2000. State Ministry of Environment (Menteri Negara Lingkungan Hidup: MENEG LH) is responsible for evaluation and approval of EIA.

Figure 10.2.1 shows general procedure of EIA approval in Indonesia.

In this project, Project owner is DGSC. IPC-II, operator of Tanjung Priok Port, is the responsible party for implementation of Environmental Management Program (EMP).

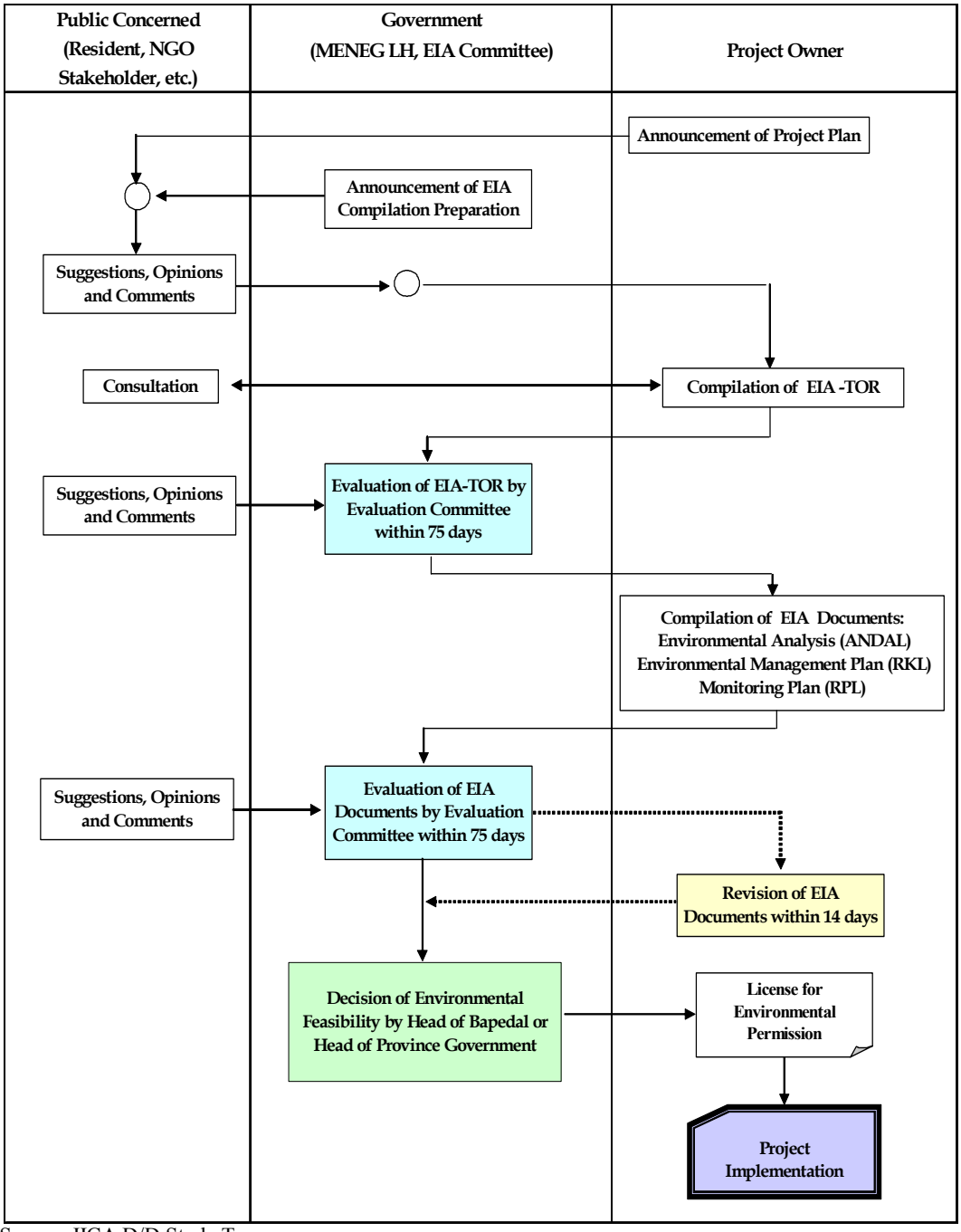
In order to obtain an EIA approval from GOI, DGSC prepared a set of EIA documents, consisting of 1) Environmental Analysis (ANDAL), 2) Environmental Management Plan (RKL) and 3) Environmental Monitoring Plan (RPL). These documents were submitted to Ministry of Environmental for there evaluation on 15 August 2003.

The Evaluation Committee of this project, which was formed by 16 members representing several parties concerned, was called on 20 November 2003.

Main points discussed and confirmed on the EIA documents in the Evaluation Committee are as follows.

- Scope of the project (Urgent Plan 2008).
- Definition of EIA study area.
- Accuracy of sea current simulation.
- Method of environmental impact prediction.
- Relationship between this project and planed projects in vicinity.
- Basis on selection of newly proposed dumping site and necessity of further environmental impact analysis in detailed design stage.

Reflecting the results of the above discussion, the EIA documents were improved then approved by State Minister of Environment on 26 March 2004



Source: JICA D/D Study Team

Figure 10.2.1 General Procedure of EIA Approval in Indonesia

(2) Summary of EIA Documents

Reviewing the EIA documents, primary points of each document are summarised in the following sections.

It is noted that since no final EIA documents were available in English, translation was made by the study team for their reviewing purpose.

1) Environmental Analysis (ANDAL)

(a) Aims of ANDAL

ANDAL was prepared aiming at:

- to realize present environmental conditions in and around the project area,
- to predict potential impact resulting from the project implementation, and
- to obtain baseline data for Environmental Monitoring Plan (EMP).

The potential impacts were predicted based on the criteria stated in the Government Decree No. 27, 1999.

The criteria are:

- number of affected people,
- distribution of area to be affected,
- intensity of impacts,
- number of environmental component to be affected, and
- characteristics of impacts, such as cumulative, reversible, etc.

(b) Project Boundaries

The project area was identified by the boundaries below.

a) Topographic boundary

- North: Java Sea
- South: RE. Martadinata Street, Enggano Street, Sulawesi Street, Jampea Street and trade area
- West: Breakwater in front of RUKINDO
- East: Kalibaru port area

b) Ecological boundary for dredging and dumping operation

The boundary was set keeping distance of 4,500m from the area of dredging and dumping. Concerning transport route of dredged materials to the dumping area, 500m was kept in both side of the route as the ecological boundary.

Both boundaries were set considering the current velocity of 0.1m/sec for 12 hours in diurnal tide.

c) Administrative boundary

- Village: Tanjung Priok and Koja
- Sub District: Tanjung Priok, Koja and Cilincing
- District: North Jakarta
- Province: DKI Jakarta

(c) Activities around the project areas

The project areas are facing to and surrounded by the following activities.

a) Inside Tanjung Priok Port

Passenger Terminal, Jakarta International Container Terminal (JITC) 1 and 2, and Industrial Area (KBN, DOK Koja III), etc.

b) Outside Tanjung Priok Port

Residential Area (Tanjung Priok Village, Koja Village, Lagoa Village and Kali Baru Village), Bus Terminal, Train Station, Trading Service Area, Restaurant, Container Rental Service Area, Photo Copy Shop, Money Changer, Bar, Café, Discotheque, etc.

c) West side of Tanjung Priok Port

East Ancol reclamation project (500 ha) was announced and will be done by PT. Manggala Kridha Yudha.

(d) Project Component

This project consists of following three (3) components.

a) Dredging

Expansion of the main channel to ensure two (2) way traffic for 50,000 GT container ships. Required dimensions and initial dredging volume are as follows.

- Width: 300 m
- Depth: -14 m
- Estimated dredging volume: 6,305,000 m^3

Expansion of basin to accommodate the container ships at JICT and Kojya Terminal. Required dimensions and initial dredging volume are as follows.

- Radius: 560 m
- Depth: -14 m
- Estimated dredging volume: 1,950,000 m^3

Dumping areas of dredged materials were located on the following coordinates.

- Existing area off shore Mura Gembong village (05°56’09’’LS, 106°59’24’’BT - 06°00’42’’LS, 106°58’30’’BT)
- Proposed new area off shore Tanjung Karawang village (05°51’54’’LS, 106°58’24’’BT - 05°51’04’’LS, 107°00’40’’BT - 05°51’56’’LS, 10°52’52’’LS, 106°56’47’’LS)

The new area has been proposed in order to satisfy the requirements in the Decree of Ministry of Marine Affairs and Fisheries No. Kep. 33/Men/2002, dated 8 August 2002.

The decree says that the areas locating within 2 miles from shore line and shallower than 10 m are protection zone of sea and coastal area. The locations of dumping areas are shown in Figure 10.1.1.

b) Breakwater relocation

Demolition of existing breakwaters

- Central Dam breakwater: 800 m
- West Dam breakwater: 305 m

Construction of new breakwaters

- Central Dam breakwater: 855 m
- West Dam breakwater: 200 m

In order to avoid excessive subsidence and keep structural stability, approximately seven (7) m thick soft soil layer will be replaced.

c) Inner harbour road rehabilitation

In Tanjung Priok Port area, four (4) km long and one (1) ha area of existing road and relating utilities will be rehabilitated.

(e) Planned Construction Schedule

The time schedule of construction and scale of mobilization were planned as follows.

a) Construction schedule

Total period of construction works was estimated for Two (2) and half years as shown in Figure 10.2.2.

Project Component	2006	2007	2008
Mobilization and Demobilization			
Dredging			
Breakwater relocation			
Inner harbour road rehabilitation			

Source: EIA documents prepared by GOI

Figure 10.2.2 Construction Schedule

b) Mobilization in construction stage

Necessary man-power and equipment for construction works of the project components were estimated as shown in Table 10.2.2.

Table 10.2.2 Estimated Mobilizations in Construction Stage

Project Component	Man-power (person)	Equipment (number)
1. Dredging of Channel and Basin	Manager: 1 Technical Expert: 1 Supervisor: 1 Technical Operator 1 Ship Operator 1 Worker: 10 *Total: 15*	Cutter Suction Dredger: 1 Anchor Boat: 1 Hopper Barge: 2 Tug Boat: 2
2. Breakwater Relocation	Manager: 1 Technical Expert: 1 Supervisor: 1 Technical Operator 1 Ship Operator 1 Worker: 15 *Total: 20*	
3. Inner Harbour Road Rehabilitation	Manager: 1 Technical Expert: 1 Supervisor: 1 Technical Operator 1 Worker: 20 *Total: 24*	Dump Truck: 8 Dozer: 2 Excavator: 2 Compactor: 1

Source: EIA documents prepared by GOI

(f) Present Environmental Conditions in around the project area

a) Meteorological Condition

Air temperature, humidity, rainfall and wind data are presented. Their source is statistic data recorded at Climate and Geophysics Station of Kengkareng, 1997-2001. All data typically indicate tropical monsoon climate. The five (5) years data shows dry season between June and September.

b) Geological Condition

Based on the survey results in JICA F/S Study, sub-soil condition in the port area is described. The survey area is covered with very soft muddy clay, approximately 6 m in thickness.

c) Hydrological Condition

Based on the floating survey results in JICA F/S Study, sea current conditions are described. Current pattern, both inside and outside of the port, is backward-forward type.

Result of measurement outside the port during ebb tide shows direction towards northwest with speed of 0.006-0.103 m/s and during flood tide shows direction towards north–northwest with speed of 0.040-0.066 m/s.

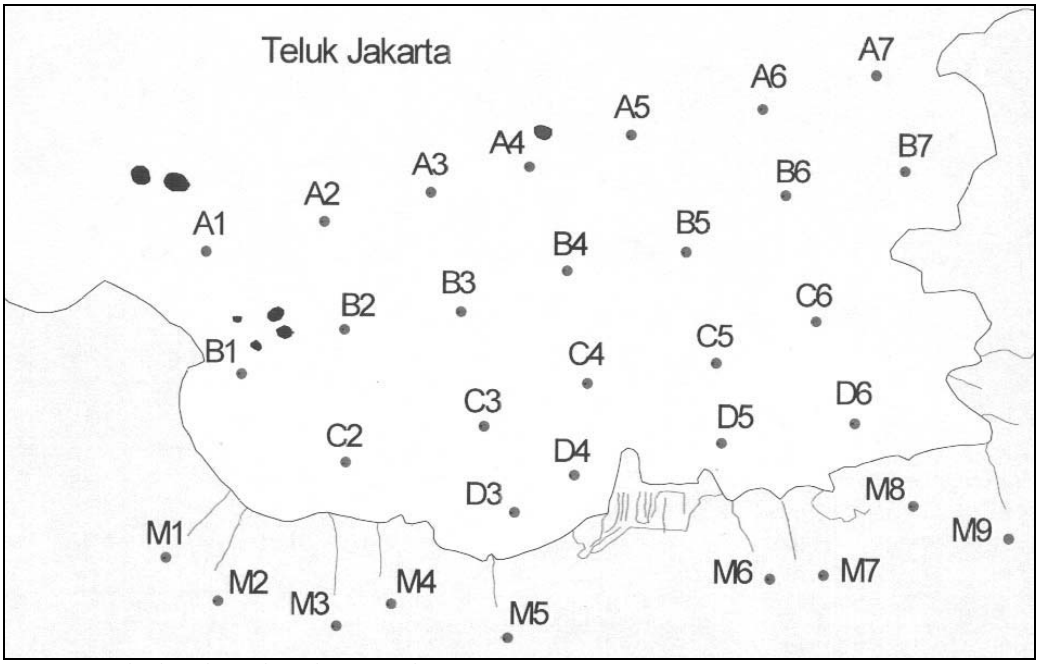
In case of inside the port, during ebb tide shows direction towards southwest with speed of 0.062-0.079 m/s and during flood tide shows direction towards north–northwest with speed of 0.042-0.052 m/s.

Tidal condition in the port is described based on the data recorded at Hydro Oceanography TNI AL Agency. Diurnal tide ranges 90-100 cm in spring tide and 30 cm in neap tide.

d) Physical condition

Present condition of water quality, sediment quality, air quality, vibration and noise, are described based on the survey data in JICA F/S Study. The brief explanation and data are presented in Section 10.2.3 of this report.

In addition, the results of water quality survey, at A7 (approximately 5 km south of the proposed dumping site) shown in Figure 10.2.3, were presented. This survey has being carried out by the local environmental management agency of DKI Jakarta Province. The result says that no parameter exceeds Indonesian Standards except for a value, Phenol.



Source: Web Site of Local Environmental Agency

Figure 10.2.3 Location of Water Quality Survey managed by Local Environmental Agency

e) Biological condition

The results of flora (plant) and fauna (animal) inventory survey in F/S Study of Tanjung Priok Container Terminal Development Plan, April 2000 are presented. In the Study area, 13 and 7 species of flora and fauna species were identified and listed as domestically common species.

As for aquatic biota, the results of plankton, nekton (fish), benthos survey were described.

In the result of plankton survey, locations which indicated high (○), medium (△) and low (×) values in abundance and diversity parameter are shown in Table 10.2.3.

Table 10.2.3 Distribution of High Values in Plankton Survey

Survey Point	Survey Method	Abundance (Individual / m^3)		Diversity	
Phytoplankton					
T-1 East of Pertamina Jetty	Horizontal	7,590	-	3.1008	○
	Vertical	4,600	-	3.5241	○
T-2 Front of Kojya Terminal	Horizontal	7,245	-	3.0098	○
	Vertical	5,980	○	3.6171	○
T-3 Front of Palm Oil Tank Yard	Horizontal	5,405	×	3.3222	○
	Vertical	5,980	○	3.3159	○
T-4 Front of PLTU Power Plant	Horizontal	8,395	○	2.9526	△
	Vertical	5,175	-	3.5214	○
T-5 Outside Port	Horizontal	7,705	-	3.8357	△
	Vertical	4,025	×	3.0142	○
Dumping Area	Vertical	5,496,540	-	1.9212	-
Zooplankton					
T-1 East of Pertamina Jetty	Horizontal	1,150	-	2.5219	△
	Vertical	1,035	○	2.1133	△
T-2 Front of Kojya Terminal	Horizontal	1,840	○	2.8750	△
	Vertical	1,035	○	1.7527	△
T-3 Front of Palm Oil Tank Yard	Horizontal	690	×	1.9283	△
	Vertical	805	×	1.8424	△
T-4 Front of PLTU Power Plant	Horizontal	805	-	2.1281	△
	Vertical	805	×	2.2357	△
T-5 Outside Port	Horizontal	1,035	-	1.6577	△
	Vertical	920	-	1.5488	△
Existing Dumping Area	Vertical	10,673	-	1.9852	-

Source: EIA documents prepared by GOI based on sea water quality monitoring, Jakarta bay, BPLHD, 2003

In the result of benthos survey, locations which indicated high (○), medium (△) and low (×) values in abundance and diversity parameter are shown in Table 10.2.4.

Table 10.2.4 Distribution of High Values in Benthos Survey

Survey Point	Abundance		Diversity	
T-1 East of Pertamina Jetty	225	-	1.3516	△
T-2 Front of Kojya Terminal	125	-	0.9932	×
T-3 Front of Palm Oil Tank Yard	100	×	1.5000	△
T-4 Front of PLTU Power Plant	275	○	1.9717	△
T-5 Outside Port	250	-	0.7219	×
Existing Dumping Area	2,125	-	2.1023	×

Source: EIA documents prepared by GOI based on sea water quality monitoring, Jakarta bay, BPLHD, 2003

Based on the result of interview survey, a list of nekton (fish), which are normally captured in Jakarta Bay, was made as shown in Table 10.2.5.

The interview was conducted to the local fishermen in Cilincing fishing area on 14 December 2003.

Table 10.2.5 List of Nekton (Fish) normally Captured in Jakarta Bay

No.	Local Name	Scientific Name
1	Alu-Alu, Senuk	*Sphyraena japonica*
2	Belanka	*Liza dussumieri*
3	Belanka Jumpul	*Liza vaigiensis*
4	Kembung Lelaki	*Rastreligger kanaguta*
5	Kembung Perempuan	*Rastrelogger brachysoma*
6	Pepetek Topang	*Equula equula*
7	Pepetek	*Equula fasciatus*
8	Gabus Laut	*Rachycentron canadus*
9	Tanda-Tanda	*L. decussates dan L. fulvifamma*
10	Betok Laut	*A. cyaneus dan A. sordidus*
11	Jehana	*L. gibbus*
12	Selar Ubur-Ubru	*Alepes djedaba*
13	Selar Batang	*Alepes kalla*
14	Selar Como	*Alepes mate*
15	Buntel	*Tetraodon stellatus*
16	Beronang Ladal	*Siganus oramin*
17	Beronang Tulis	*S. vermiculatus*
18	Beronang Kuning	*S. virgatus*

Source: EIA documents prepared by GOI based on interview survey and EIA report of Container Terminal III Development of Tanjung Priok Port in North Koja, 1995

f) Socio-economic condition

Two (2) administrative districts, which are closely related with the existing port area, are Kelurahan Tanjung Priok and Kelurahan Koja. These kelurahans adjoin the boundary of the port area.

Primary socio-economic data of the kelurahans are summarized in Tables below.

Table 10.2.6 Land Utilization of K. Tanjung Priok and Koja

Land Use	Area (ha)	Percentage (%)
Tanjung Priok	554	100
1. Port Facility		
General Warehouse	419	75.36
Office	20	3.61
2. Commercial Area		
Market	0.5	0.09
Government Facility	0.2	0.04
Industry	24.3	4.39
Office, Trading	10	1.80
3. Residential Area	80	14.44
Koja	328	100
1. Container Area	116	35.28
2. Commercial Area	34	10.45
3. Residential Area	115	35.08
4. Public Facility	31	9.32
5. Others	32	9.87

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

Table 10.2.7 Demographic Data of K. Tanjung Priok and Koja

Item	Unit	Male	Female	Total
Tanjung Priok				
Area (Residential Area)	ha	-	-	80
Area (Total)	ha	-	-	554
Population	person	12,811	13,920	26,731
Population Density (Residential Area)	person/ha	-	-	335
Population Density (Total Area)	person/ha	-	-	49
Household	no.	-	-	6,709
Koja				
Area	ha	-	-	327.8
Population	person	15,778	16,867	32,645
Population Density	person/ha	-	-	100
Household	no.	-	-	8,995
Total				
Area	ha	-	-	881.8
Population	person	28,589	30,787	59,376
Population Density	person/ha	-	-	67
Household	no.	-	-	15,704

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

Table 10.2.8 Livelihood Structure in K. Tanjung Priok and Koja

Item	Male (person)	Female (person)	Total (person)	Percentage (%)
Tanjung Priok				
Government, Private, Military Worker	3,913	4,523	8,436	59.03
Entrepreneur, Trader	1,624	1,405	3,029	21.20
Farmer	0	0	0	0
Skilled Worker	1,567	1,053	2,620	18.33
Pension	115	75	190	1.33
Fishery	15	0	15	0.11
Total	7,234	7,056	14,209	100
Koja				
Government Worker	-	-	3,900	17.62
Private Worker	-	-	4,791	21.65
Military Worker	-	-	50	0.23
Entrepreneur, Trader	-	-	1,327	6
Skilled Worker	-	-	380	1.72
Pension	-	-	840	3.8
Port, Industry Worker	-	-	10,822	48.91
Unskilled Worker	-	-	17	0.08
Total	-	-	22,127	100

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

According to Tanjung Priok Yearly Report, January 2002, 15 people lived in K. Tanjung Priok as fishery operator. However, today, the people have moved out to other locations.

Based on Koja Yearly Report and Koja Monographic Data, June 2002, no fishermen lives in K. Koja and no fishery area exists.

Fishermen live in Cilincing area, east side of Koja, and they catch fish outside the port area.

Table 10.2.9 Basic Economic Facilities in K. Tanjung Priok and Koja

Item	Tanjung Priok	Koja
Telecommunication Service Center	-	4
General Market	1	-
Fish Market	-	-
Store	-	-
Restaurant	-	
Hotel	-	5
Cinema	1	2
Billiard Bar, Discotheque	7	9
Traditional Massage	2	-
Bank	7	-
Factory, Industry	18	-
Train Station	1	-
Bus Terminal	1	-
Port, Ship Terminal	1	-

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

Table 10.2.10 Ethnic Structure in K. Tanjung Priok

Item	Population (person)	Percentage (%)
Java	9,585	35.86
Sunda	6,682	25.00
Betawai	4,861	18.18
Batak, Bima, Ambon, Madura, etc.	5,603	20.96
Total	26,731	100

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

Table 10.2.11 Religious Structure in K. Tanjung Priok

Item	Male (person)	Female (person)	Total (person)	Percentage (%)
Islam	9,304	10,011	19,315	72,26
Catholic	670	411	1,081	4.04
Protestant	2,635	3,251	5,886	22.02
Hindu	16	19	35	0.13
Buddhism	186	228	414	1.55
Total	12,811	13,920	26,731	100

Source: EIA documents prepared by GOI based on the statistic data in 2001 and 2002

Table 10.2.12 Income of Local People in K. Tanjung Priok and Koja

Type of Livelihood	Respondent Information	Monthly Income Assumption
Port Worker: Security warehouse supervisor, Loading and unloading worker	Their income depend on how long they have worked there.	800,000 Rp. – 1,500,000 Rp.
Steel Scrap Trader	1 truckload of 4 tons steel scrap divided by 10 persons. Each person buy 400kg by 900 Rp./kg and sell by 1,100 Rp./kg. 15-20 working days/month	12,000,000 Rp. – 16,00,000 Rp.
Movable Port Trader: Bicycle food and drink vendor	Daily profit 30,000 – 50,000 Rp.	900,000 Rp. – 1,500,000 Rp.
Photo Copy Service	Basic daily income 1,000,000 – 3,000,000 Rp. Profit 10 % 25 working days/month Income from 7 companies 7,000,000 – 10,000,000 Rp.	3,200,000 Rp.
Container Rental Service	50,000 Rp./container 1 container/day 25 working days/month	1,125,000 Rp.
Sea Freight Forwarder		500,000 Rp. – 1,000,000 Rp.
Loading and unloading service		500,000 Rp. – 1,000,000 Rp.
House/Room Rental Service	Generally they own 5 rooms for rent. Each room is occupied by 2 persons and pay 150,000/month.	1,500,000 Rp.
Government Worker	Kelurahan Board member earn 475,000 Rp./month. RT/RW workers are volunteers.	475,000 Rp. – 1,000,000 Rp.
Garment Trader		1,000,000 Rp. – 2,000,000 Rp.
Lecturer		1,000,000 Rp.
Food Stall	They sell 150 – 250 portion/day. Price/portion is 5,000 – 10,000 Rp. Profit/portion is 500 – 1,500 Rp.	1,500,000 Rp. – 3,000,000 Rp.

Source: EIA documents prepared by GOI based on the interview survey in July 2002

Sanitary conditions in the kelurahans were described as follows.
Fresh water supply system (tap water) has been supplied by PAM (water supply enterprise). Only small number of inhabitants uses shallow well for main or sub use purpose.

Solid wastes have been collected and disposed into final repositories by RT/RW Sanitation Crews in coordination with DKI Jakarta.

Drainage system is open gutter on both side of roads. This drainage system is in poor maintenance condition. Most of it is clogged with rubbish and sediment. As a result, many parts of the roads submerge during rainy season.

In order to grasp several vivid conditions in the kelurahans, an interview survey was conducted in July 2002. Number of respondents was 25 and 15 people in keialuhan Tanjung Priok and Koja, respectively.

Result of the interview survey says that:

- 80% and 100% of respondent expects that implementation of this project increase their job opportunity and income, respectively.
- 100% of respondent perceive present conditions of traffic jam, noise disturbance and air pollution as serious problems. 32.5% and 80% of respondent expect that implementation of this project accelerate existing noise disturbance and air pollution, and traffic jam, respectively.

(g) Potential Impacts of the Project

In order to realize type and intensity of the potential impacts of this project, several potential impacts were evaluated in two (2) stages, 1) Construction Stage and 2) Operation Stage as shown in Table 10.2.13.

In this Table, the factors of potential impacts which were realized as significant are as follows.

a) Construction stage

Negative Impact
- Sea transportation of construction equipment and materials.
- Land transportation of construction equipment and materials.
- Land operation of construction equipment. (road rehabilitation site)
- Transportation and dumping of dredged material.

b) Operation stage

Negative Impact
- Increase of sea traffic after widening of existing channel and basin.
- Increase of land traffic to handle increased cargo volume of the port.
- Maintenance dredging of channel and basin.
- Increase of water demand from ships.
- Increase of waste discharge from ships.

Positive Impact
- Increase of sea traffic after widening of existing channel and basin.
- Relocation of breakwater and widening of channel and basin.
- Maintenance dredging of channel and basin.
- Increase job and business opportunity

Table 10.2.13 Summary of Potential Impacts realized in ANDAL

Stage	Factor	Potential Impact	Type / Significance
Construction Stage	Sea transportation of construction equipment and materials.	Disturb existing local sea traffic. Increase traffic accident.	Negative / Significant
	Land transportation of construction equipment and materials.	Disturb existing local land traffic. Increase possibility of traffic accident. Adverse effect on human health by emission, noise and vibration from construction equipment.	Negative / Significant
	Maritime operation of construction equipment. (in and around the port and dumping site)	Adverse effect on human health by emission, noise and vibration from construction equipment.	Negative / Insignificant
	Land operation of construction equipment. (road rehabilitation site)	Adverse effect on human health by emission, noise and vibration from construction equipment.	Negative / Significant
	Dredging and breakwater relocation.	Disturb marine biota resulting from change of current pattern and increase of turbidity.	Negative / Insignificant
	Transportation and dumping of dredged material.	Degrade fishery condition and marine habitat due to dispersion of dumped material.	Negative / Significant
	Waste material disposal from road rehabilitation site.	Disturb local community by transportation of waste material.	Negative / Insignificant
	Waste material disposal by construction workers.	Degrade fishery conditions and water quality.	Negative / Insignificant
	Under ground water exploitation.	Decrease capacity of existing wells and encourage local land settlement.	Negative / Insignificant
	Run off from construction site of road rehabilitation.	Degrade water quality in the port.	Negative / Insignificant
	Disturbance on local community by worker's camp.	Degrade local water quality caused by discharge from worker's camp. Interference on existing social order.	Negative / Insignificant
	Increase job and business opportunity.	Increase of employment opportunity and income by construction activity.	Positive / Insignificant
Operation Stage	Increase of sea traffic after widening of existing channel and basin.	Decrease waiting time of ships. Stimulate regional economic activity.	Positive / Significant
	Increase of sea traffic after widening of existing channel and basin.	Increase of traffic accident. Hindrance on local traffic and fishing activity.	Negative / Significant
	Increase of land traffic to handle increased cargo volume of the port.	Increase of air born pollutants, noise and vibration in and around the port.	Negative / Significant
	Relocation of breakwater and widening of channel and basin.	Improvement of water quality inside the port by exchange of water column.	Positive / Significant
	Maintenance dredging of channel and basin.	Maintain water quality and operational functions inside the port.	Positive / Significant
	Maintenance dredging of channel and basin.	Degrade fishery conditions and disturb marine biota by turbid water.	Negative / Significant
	Increase of water demand from ships.	Insufficient supply of water for local demand.	Negative / Significant
	Increase of waste discharge from ships.	Degrade water quality inside the port.	Negative / Significant
	Increase job and business opportunity.	Increase of employment opportunity and income by port related activity.	Positive / Significant

Source: EIA documents prepared by GOI

2) Environmental Management Plan (RKL)

The RKL encompasses every efforts to prevent, control and minimise negative impacts, and maximise positive impacts, which were predicted in the ANDAL.

(a) Parties Involved

The following 9 (nine) parties are involved for implementation of the RKL

a) Department of Transportation
   - Directorate General of Marine Transportation
   - Directorate of Port and Dredging
   - Division of Tourniquet of IPC-II
   - Directorate Tequnique of IPC-II, Tanjung Priok Branch
   - Port Administrator (ADPEL)

b) Agency for Environmental Research of Jakarta Province (BPLHD)
c) Agency for Environmental Research of North Jakarta Regency
d) Local Agencies
e) KP3 of Tanjung Priok Port
f) Police Resort
g) DLLAJ
h) Agency of Clean City of Jakarta Province (Dinas Keberishan DKI)
i) Central for Public Health

(b) Management Item

Items to be managed under the RKL are shown by indication (○) in Table 10.2.14.

Table 10.2.14 Management Items in RKL

Item	Construction Stage	Operation Stage
Maritime Transportation Activities	○	○
Land Transportation Activities	○	○
Air Quality	○	○
Noise and Vibration	○	○
Water Quality	○	○
Dredging Activities	○	○
Marine Biota	○	○
Public Health	○	○
Water Supply	-	○
Liquid Waste	-	○
Solid Waste	-	○
Economic Indices (Job opportunity, Income, etc.)	-	○

Source: EIA documents prepared by GOI

(c) Content of Items

Following contents of each item are described in RKL.

- Source of impacts
- Indicator
- Purpose
- Site

- Period
- Fund
- Party responsible
- Executor
- Supervisor
- Reporting procedure

3) Environmental Monitoring Plan (RPL)

The RPL was formulated to ensure effective implementation of the RKL. In addition, effective implementation of the RKL will reduce the cost of monitoring woks then increase sustainability of the project.

(a) Parties Involved: Same as the RKL.

(b) Monitoring Item: Same as the RKL.

(c) Content of Items

Following contents are described in RPL.

- Source of impacts
- Component
- Purpose
- Method
- Site
- Schedule and frequency
- Party responsible
- Executor
- Supervisor
- Reporting procedure

10.2.3 Review of Previous Environmental Conditions Surveys

Value of environmental quality parameter, especially water and sediment qualities, changes largely depending on seasons, time of days, tidal currents, local characteristics, place, layer in the sea, and even by sample. Errors in analysis are also unavoidable. Data should be checked to determine if it is consistent with data of previous samples and nearby samples.

As a reference data of the environmental conditions survey in this study, the results of previous surveys, JICA F/S Study and IPC-II Monitoring, were reviewed in this section.

The sampling points in the previous surveys, together with the survey in this study, are shown in Figure 10.2.4.

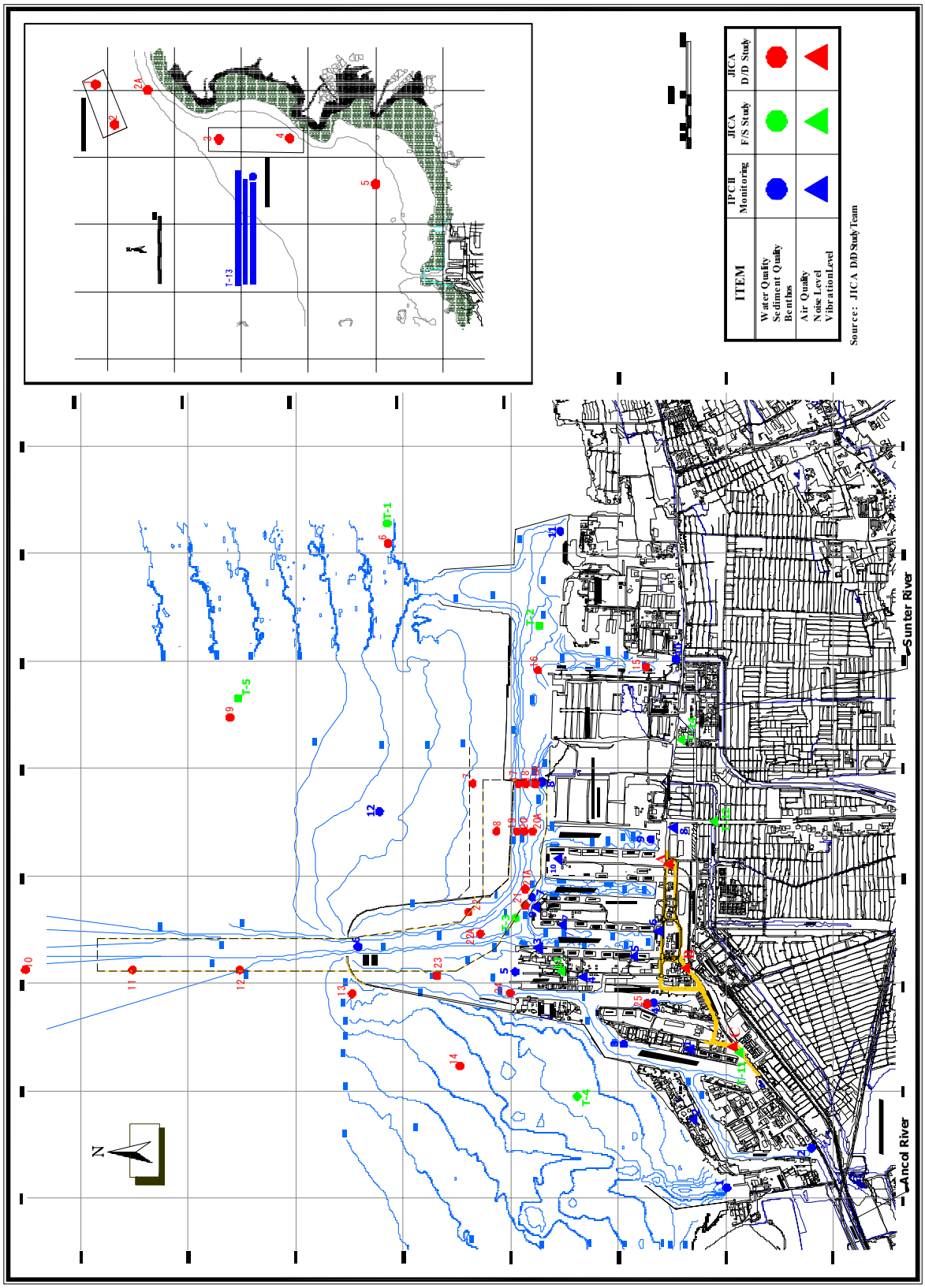


Figure 10.2.4 Sampling Locations of Surveys

(1) Survey Results in the Study for Development of the Greater Jakarta Metropolitan Ports in the Republic of Indonesia, December 2003, JICA (JICA F/S Study)

Table 10.2.15 shows item and period of the survey.

Table 10.2.15 Sampling Periods of JICA F/S Survey

Item	Period
Water Quality	26-27 June 2002
Sediment Quality	26-27 June 2002
Air Quality	9-16 June 2002
Noise and Vibration	9-16 June 2002

Source: JICA D/D Study Team

1) Water Quality

Water samples were taken from surface and bottom layers at five (5) points in both flood and ebb tides. (see Table 10.2.16)

Environmental indices on organic pollution and eutrophication, such as DO, COD, T-N and T-P were analyzed in ebb tide. They tended to be worse than those in flood tide due to the tide-induced discharge from the land area. As for a variation of concentration level by sampling depth, in general, the levels in the samples taken from surface layer were worse than those from bottom layer.

At T-1, T-2 and T-3, levels of nutrient salts (Ammonia, T-N, T-P) were much higher than those at other sampling points and exceeded both Indonesian and Japanese standards.

It is understood that water column in and around the port, especially inside the breakwaters, is seriously contaminated by human and industrial discharge from the Sunter River.

At all sampling points, concentration levels of heavy metal compounds met Indonesian standards.

Table 10.2.16 (1) Results of Water Quality Survey in JICA F/S Study (Flood Tide)

Data Category: Water Quality
Data Source: JICA F/S Study
Sampling Period: From 26 June 2002 to 27 June 2002
Sampling Condition: Sampled in flood tide

Parameter	Temp.	Salinity	SS	pH	DO	~~BOD~~	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	~~As~~	~~CN~~	~~Hg~~	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
T-1 (Surface)	28.9	30.9	3.0	8.1	5.5		16.5	<1.0	0.08	0.66	0.06	<0.0005	<0.005	<0.005				9
T-2 (Surface)	29.1	24.9	3.0	7.8	2.2		45.4	2.0	2.17	0.81	0.04	<0.0005	<0.005	<0.005				21
T-3 (Surface)	29.4	31.1	3.0	8.2	5.5		20.6	2.0	0.02	0.40	0.04	<0.0005	<0.005	<0.005				23
T-4 (Surface)	27.5	31.7	2.0	8.2	6.3		16.5	1.0	0.05	0.58	0.04	<0.0005	<0.005	<0.005				13
T-5 (Surface)	29.8	31.9	1.0	8.2	6.5		16.5	1.0	0.02	0.33	0.02	<0.0005	<0.005	<0.005				0
Minimum Value	27.5	24.9	1.0	7.8	2.2		16.5	1.0	0.02	0.33	0.02	-	-	-				0
Maximum Value	29.8	31.9	3.0	8.2	6.5		45.4	2.0	2.17	0.81	0.06	-	-	-				23

Parameter	Temp.	Salinity	SS	pH	DO	~~BOD~~	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	~~As~~	~~CN~~	~~Hg~~	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
T-1 (Bottom)	29.4	31.8	2.0	8.2	6.3		16.5	<1.0	0.05	0.45	0.03	<0.0005	<0.005	<0.005				11
T-2 (Bottom)	29.3	30.9	3.0	7.9	6.1		16.5	1.0	0.10	0.48	0.03	<0.0005	<0.005	<0.005				49
T-3 (Bottom)	29.4	31.3	3.0	8.1	6.1		16.5	1.0	0.02	0.69	0.03	<0.0005	<0.005	<0.005				49
T-4 (Bottom)	29.3	32.8	2.0	8.2	6.3		16.5	1.0	0.01	0.47	0.03	<0.0005	<0.005	<0.005				17
T-5 (Bottom)	29.8	32.2	2.0	8.1	6.5		16.5	1.0	0.02	0.28	0.02	<0.0005	<0.005	<0.005				7
Minimum Value	29.3	30.9	2.0	7.9	6.1		16.5	1.0	0.01	0.28	0.02	-	-	-				7
Maximum Value	29.8	32.8	3.0	8.2	6.5		16.5	1.0	0.10	0.69	0.03	-	-	-				49

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
2: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

Table 10.2.16 (2) Results of Water Quality Survey in JICA F/S Study (Ebb Tide)

Data Category: Water Quality
Data Source: JICA F/S Study
Sampling Period: From 26 June 2002 to 27 June 2002
Sampling Condition: Sampled in ebb tide

Parameter	Temp.	Salinity	SS	pH	DO	~~BOD~~	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	~~As~~	~~CN~~	~~Hg~~	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
T-1 (Surface)	28.9	30.6	20.0	7.8	4.9		20.6	1.0	0.32	2.25	0.46	<0.0005	<0.005	<0.005				12
T-2 (Surface)	28.8	22.3	7.0	7.9	2.0		57.8	2.0	3.77	5.35	0.10	<0.0005	<0.005	<0.005				26
T-3 (Surface)	29.3	31.6	3.0	8.1	4.9		16.5	2.0	0.34	2.27	0.07	<0.0005	<0.005	<0.005				27
T-4 (Surface)	29.3	31.8	2.0	8.2	6.1		16.5	< 1.0	0.07	1.08	0.07	<0.0005	<0.005	<0.005				17
T-5 (Surface)	29.8	31.1	2.0	8.2	6.3		16.5	1.0	0.02	0.78	0.04	<0.0005	<0.005	<0.005				0
Minimum Value	28.8	22.3	2.0	7.8	2.0		16.5	1.0	0.02	0.78	0.04	-	-	-				0
Maximum Value	29.8	31.8	20.0	8.2	6.3		57.8	2.0	3.77	5.35	0.46	-	-	-				27

Parameter	Temp.	Salinity	SS	pH	DO	~~BOD~~	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	~~As~~	~~CN~~	~~Hg~~	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
T-1 (Bottom)	29.0	31.6	3.0	7.7	5.8		16.5	1.0	0.01	1.01	0.05	<0.0005	<0.005	<0.005				12
T-2 (Bottom)	29.2	31.5	3.0	7.8	5.8		20.6	1.0	0.09	1.24	0.04	<0.0005	<0.005	<0.005				49
T-3 (Bottom)	29.4	31.5	4.0	8.1	6.0		12.4	2.0	0.16	0.57	0.04	<0.0005	<0.005	<0.005				63
T-4 (Bottom)	29.6	31.9	1.0	8.2	6.3		16.5	< 1.0	0.04	0.73	0.04	<0.0005	<0.005	<0.005				21
T-5 (Bottom)	29.3	32.1	3.0	8.2	6.3		12.4	1.0	0.05	0.57	0.04	<0.0005	<0.005	<0.005				11
Minimum Value	29.0	31.5	1.0	7.7	5.8		12.4	1.0	0.01	0.57	0.04	-	-	-				11
Maximum Value	29.6	32.1	4.0	8.2	6.3		20.6	2.0	0.16	1.24	0.05	-	-	-				63

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
2: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

2) Sediment Quality

Sediment samples were taken in ebb tide at the same time and points as those of water sampling. (see Table 10.2.17)

Concentration level of heavy metal compounds and distribution of grain size of sediments were analyzed.

Concentration levels of Mercury at T-2 and T-3, inside breakwaters apparently indicated high values than those outside. However, these high values still met a Testing Value, which are presented in the World Bank Technical Paper No. 126 as a permissible level of dredged material disposal in open water area.

According to the result of grain size analysis, the sediments inside and outside of the breakwaters were classified as muddy and sandy, respectively.

Table 10.2.17 Results of Sediment Quality Survey in JICA F/S Study (Ebb Tide)

Data Category: Sediment Quality
Data Source: JICA F/S Study
Sampling Period: From June 26 2002 to June 27 2002
Sampling Conditions Sampled in ebb tide

Parameter	Cd	~~CN~~	Pb	Cr^{6+}	As	Hg	~~I-Loss~~	Water Cont.	Soil Category
Unit	mg/kg	~~mg/kg~~	mg/kg	mg/kg	mg/kg	mg/kg	~~%~~	%	
Standard applied *	1	~~2~~	1	1	1	1	~~3~~	-	
Permissible Level	7.5	~~50~~	530	480	85	1.6	~~12~~	-	
Sampling Locations									
T-1	<0.5		18	6	<0.5	0.20		43.26	Sand
T-2	<0.5		47	13	<0.5	0.73		81.51	Mud
T-3	<0.5		69	13	<0.5	0.68		72.48	Mud
T-4	<0.5		22	8	<0.5	0.01		26.58	Sand
T-5	<0.5		16	17	<0.5	0.46		71.43	Mud
Minimum Value	-		16	6	-	0.01		26.58	-
Maximum Value	-		69	17	-	0.73		81.51	-

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team
* 1: World Bank Technical Paper No. 126, Testing Values
2 and 3: Japanese Reference

3) Air Quality

In the dry season, basic item of air quality were analysed in and around the port area. (see Table 10.2.18)

It is clearly understood that air quality in the survey area was seriously degraded by dust pollution. Concentration levels of TSP exceeded Indonesian standard at all sampling points.

4) Noise and Vibration

The levels of noise and vibration were measured at four (4) points in and around the port area. (see Table 10.2.18)

At T-11 and 12, maximum noise levels exceeded 70 dBA, upper limit of industrial area in Indonesian standard. Maximum noise level measured at Kojya Hospital, locating outside of the port area, were higher than those in the port area. Since the hospital faces to a road congested by the port related heavy traffic, even minimum noise level likely exceeded the upper limit level at hospital (55 dBA) in Indonesian standard.

Level of vibration met Indonesian standard at all locations.

Table 10.2.18 Results of Air Quality, Noise and Vibration Survey in JICA F/S Study

Data Category: Air Quality
Data Source: JICA F/S Study
Sampling Period: From July 9 2002 to July 16 202
Sampling Conditions See column

Parameter	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise		Vibration		Sampling Conditions			
Unit	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	g/m³	µg/m³	dBA	dBA	m/sec	m/sec	Air Temp.	Wind D	Wind S	Weather
Standard applied *	1	1	1	1	1	1	1	2	2	3	3	℃		m/s	
Permissible Level	230		150	365	2	10	160	70	55	40	8.5				
Sampling Locations															
Gate - 1 (T-11)															
- Day 1 (July 9 to July 10)	150-1,241		15.34-52.67	6.75-22.77		0.1-2.5		53.0-73.0	-	0.6-3.6	-	26-34	West	0.3-6.1	Bright
- Day 2 (July 10 to July 11)	15-1,386		11.62-66.92	4.84-35.3		0.1-2.6		54.5-73.4	-	0.3-1.8	-	26-33	West	03-3.6	Bright
- Day 3 (July 11 to July 12)	239-1,345		32.73-58.43	13.46-22.68		0.6-3.8		58.0-74.2	-	0.5-2.0	-	26-34	West	0.2-3.5	Bright
- Day 4 (July 12 to July 13)	258-1,208		29.69-49.79	12.54-21.56		0.6-4.5		58.0-71.7	-	0.5-1.4	-	27-35	South	0.1-3.9	Bright
- Day 5 (July 13 to July 14)	138-1,532		18.54-50.89	8.36-31.61		0.4-3.1		50.0-69.2	-	0.4-1.6	-	27-36	South	0.8-6.3	Bright
- Day 6 (July 14 to July 15)	103-592		14.19-48.12	4.38-29.68		0.2-1.6		50.0-70.0	-	0.7-1.2	-	26-35	South-West	0.6-4.4	Bright
- Day 7 (July 15 to July 16)	211-1,429		24.14-50.16	15.08-29.69		0.5-3.5		50.0-72.3	-	0.6-2.1	-	28-34	South	0.9-4.3	Bright
Crossroad of Jl. Enggano-and Jl. Sulawesi (T-12) :															
- Day 1 (July 9 to July 10)	151-463		16.63-73.02	6.8-29.86		0.3-5.1		60.0-73.8	-	0.7-7.1	-	21-33	West	0.4-0.8	Cloudy
- Day 2 (July 10 to July 11)	99-844		12.39-80.72	6.78-24.53		0.2-5.6		63.2-73.2	-	0.7-6.5	-	22-33	West	0.5-0.7	Cloudy
- Day 3 (July 11 to July 12)	326-548		37.18-60.27	8.65-36.81		0.5-4.1		64.0-71.8	-	0.5-1.4	-	24-34	West	0.6-4.8	Bright
- Day 4 (July 12 to July 13)	256-745		50.72-128.7	15.33-58.1		0.7-3.8		63.4-71.5	-	0.5-1.2	-	23-34	South	0.4-4.6	Cloudy
- Day 5 (July 13 to July 14)	226-774		35.28-70.27	10.95-20.67		0.7-4.3		62.0-72.0	-	0.4-1.9	-	25-35	West	0.6-3.8	Bright
- Day 6 (July 14 to July 15)	128-404		10.45-47.83	6.14-20.17		0.5-4.3		64.6-74.3	-	0.9-1.6	-	23-32	West	0.5-2.5	Cloudy
- Day 7 (July 15 to July 16)	212-628		28.28-92.37	8.4-34.7		1.2-4.3		66.2-74.3	-	0.6-2.7	-	24-35	West	0.6-9.4	Bright
MultipurposeBerth III (T-13)															
- Day 1 (July 9 to July 10)	147-765		9.19-28.4	6.07-17.43		0.2-1.6		47.0-57.0	-	0.4-2.7	-	24-34	North	0.8-2.9	Bright
- Day 2 (July 10 to July 11)	120-1,115		9.7-23.86	6.01-14.23		0.1-1.4		44.5-64.0	-	0.5-2.3	-	24-34	West	0.3-4.4	Cloudy
- Day 3 (July 11 to July 12)	516-1,343		15.43-25.94	8.41-16.34		0.8-1.8		50.1-60.0	-	0.6-3.6	-	25-33	East	0.3-2.7	Bright
- Day 4 (July 12 to July 13)	258-784		13.56-21.47	8.22-15.86		0.4-1.2		52.1-65.3	-	0.4-2.9	-	25-36	North	0.2-3.2	Bright
- Day 5 (July 13 to July 14)	243-956		16.71-28.89	10.82-15.91		0.3-1.5		47.9-64.2	-	0.5-5.1	-	25-35	West	0.6-1.0	Bright
- Day 6 (July 14 to July 15)	103-403		8.73-25.92	6.37-14.13		0.1-1.0		50.3-63.5	-	0.8-4.4	-	24-37	West	0.4-4.5	Cloudy
- Day 7 (July 15 to July 16)	177-407		15.74-28.19	7.07-19.18		1.4-1.2		53.1-63.2	-	0.8-8.1	-	24-36	West	0.4-2.1	Bright-Cloudy
Koja Hospital (T-14)															
- Day 1 (July 9 to July 10)	-		-	-		-		-	57.8-76.0	-	1.3-3.7	-	-	-	-
- Day 2 (July 10 to July 11)	-		-	-		-		-	58.1-73.5	-	0.8-7.8	-	-	-	-
- Day 3 (July 11 to July 12)	-		-	-		-		-	59.3-75.6	-	1.3-5.8	-	-	-	-
- Day 4 (July 12 to July 13)	-		-	-		-		-	61.1-72.4	-	1.1-4.4	-	-	-	-
- Day 5 (July 13 to July 14)	-		-	-		-		-	57.8-71.9	-	0.8-3.0	-	-	-	-
- Day 6 (July 14 to July 15)	-		-	-		-		-	55.9-85.4	-	0.9-4.7	-	-	-	-
- Day 7 (July 15 to July 16)	-		-	-		-		-	54.5-72.5	-	1.0-4.7	-	-	-	-
Minimum Value	15		8.73	4.38		0.1		44.5	54.5	0.3	0.8	21	-	0.1	-
Maximum Value	1,532		128.70	58.10		5.6		74.3	85.4	8.1	7.8	37	-	9.4	-

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team

* 1: Indonesian Ambient Air Quality Standard: No. 41 1999
2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996
3: Indonesian Vibration Level Standard: KEP-49/MENLH/11/1996

(2) Survey Results in Environmental Monitoring Report, 2004 (IPC-II Monitoring)

Table 10.2.19 shows item and period of the survey.

Table 10.2.19 Sampling Periods of IPC-II Monitoring Survey

Item	Period
Water Quality	26-27 July 2004
Sediment Quality	26-27 July 2004
Air Quality	29 July 2004
Noise	29 July 2004

Source: JICA D/D Study Team

1) Water Quality

Water samples were taken from surface layer at 13 points in flood tide and 7 points in ebb tide. (see Table 10.2.20)

In the results of this survey, there was no significant difference in the concentration levels between the samples taken in flood tide and ebb tide.

At the sampling points 2 and 10, river mouth of the Ancol River and the Sunter River, levels of salinity were low but SS were high. These results indicated the possibility of certain volume of water discharge with soil particles (sediment) from the rivers.

At all sampling points inside the breakwaters, levels of ammonia exceeded Indonesian standard.

At all sampling points, concentration levels of heavy metal substances met Indonesian standards.

Table 10.2.20 (1) Results of Water Quality Survey in IPC-II Monitoring Survey (Flood Tide)

Data Category: Water Quality
Data Source: IPC II Monitoring
Sampling Period: July 26, 2004
Sampling Conditio Sampled in flood tide

Parameter	Temp.	Salinity	SS	pH	DO	BOD	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	As	CN	Hg	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
1 (Surface)	25.9	33.0	10.0	8.1	6.4	6.8	27.4	<0.2	0.9			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
2 (Surface)	24.8	5.0	81.0	7.9	0.0	34.2	109.8	3.3	19.8			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
3 (Surface)	24.2	31.0	14.0	8.2	6.2	6.2	27.4	<0.2	1.2			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
4 (Surface)	24.7	29.0	5.0	8.2	6.0	8.6	38.4	<0.2	2.5			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
5 (Surface)	29.8	12.0	31.0	8.3	6.0	6.0	23.5	<0.2	0.5			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
6 (Surface)	24.9	33.0	10.0	8.3	6.4	5.6	23.5	<0.2	0.6			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
7 (Surface)	25.4	33.0	10.0	8.2	5.7	7.6	31.4	<0.2	0.4			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
8 (Surface)	25.5	29.0	10.0	8.0	6.4	5.6	23.5	<0.2	1.9			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
9 (Surface)	25.5	32.0	13.0	8.0	6.4	6.6	27.4	<0.2	0.5			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
10 (Surface)	26.3	6.0	25.0	7.7	0.0	16.2	61.4	2.1	18.2			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
11 (Surface)	27.5	30.0	12.0	7.9	4.2	6.0	23.5	<0.2	2.4			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
12 (Surface)	24.9	32.0	11.0	8.2	6.2	5.4	23.5	<0.2	0.1			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
13 (Surface)	26.1	33.0	10.0	8.3	6.0	6.0	27.4	<0.2	0.3			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
Minimum Value	29.8	5.0	5.0	7.7	0.0	5.4	23.5	<0.2	0.1			-	-	-	-	-	-	
Maximum Value	29.8	33.0	81.0	8.3	6.4	34.2	109.8	3.3	19.8			-	-	-	-	-	-	

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
2: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

Table 10.2.20 (2) Results of Water Quality Survey in IPC-II Monitoring Survey (Ebb Tide)

Data Category: Water Quality
Data Source: IPC II Monitoring
Sampling Period: July 26, 2004
Sampling Conditio Sampled in ebb tide

Parameter	Temp.	Salinity	SS	pH	DO	BOD	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	As	CN	Hg	Coliform
Unit	℃	‰	mg/l	–	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *	1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level	Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																		
1 (Surface)	26.6	32.0	12.0	7.9	6.0	7.3	28.8	<0.2	0.7			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
2 (Surface)	26.8	4.0	39.0	7.5	0.0	28.4	88.6	4.6	18.8			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
3 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
4 (Surface)	27.0	26.3	20.0	8.0	4.4	7.2	31.4	<0.2	5.1			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
5 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
6 (Surface)	25.0	32.0	10.0	8.1	6.6	6.2	27.4	<0.2	0.2			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
7 (Surface)	-	32.0	11.0	8.0	5.2	6.2	27.4	<0.2	0.4			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
8 (Surface)	24.3	25.0	13.0	7.7	6.0	7.0	28.5	<0.2	4.0			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
9 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
10 (Surface)	28.6	5.0	38.0	7.4	2.0	4.6	55.3	3.7	18.9			<0.0005	<0.005	<0.005	<0.002	<0.005	<0.0005	
11 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
12 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
13 (Surface)	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	
Minimum Value	24.3	4.0	10.0	7.4	0.0	4.6	27.4	<0.2	0.2			-	-	-	-	-	-	
Maximum Value	30.4	32.0	39.0	8.2	6.6	28.4	88.6	4.6	18.9			-	-	-	-	-	-	

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
2: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

2) Sediment Quality

At the sampling points 4, 7, 11 and 12, concentration levels of cadmium exceeded the Testing Value. Especially at points 4 and 7, western area inside the breakwaters, were remarkably high. The points 4, 7 and 11 are inside of the breakwaters but point 12 is outside. (see Table 10.2.21)

Concentration levels of mercury, which indicated high values in JICA F/S Study, 2002, became lower at all sampling points in this monitoring survey.

Table 10.2.21 Results of Sediment Quality Survey in IPC-II Monitoring Survey (Ebb Tide)

Data Category: Sediment Quality
Data Source: IPC II Monitoring
Sampling Period: July 26, 2004
Sampling Conditions Sampled in ebb tide

Parameter	Cd	~~CN~~	Pb	Cr6+	As	Hg	~~I.Loss~~	~~Water Cont.~~	
Unit	mg/kg	~~mg/kg~~	mg/kg	mg/kg	mg/kg	mg/kg	~~%~~	~~%~~	~~Soil~~
Standard applied *	1	~~2~~	1	1	1	1	~~3~~	~~-~~	~~Category~~
Permissible Level	7.5	~~50~~	530	480	85	1.6	~~12~~	~~-~~	
Sampling Locations									
1	<0.5		5.0	22.0	<0.5	0.28			
2	<0.5		50.0	25.0	<0.5	0.12			
3	<0.5		39.0	7.0	<0.5	<0.01			
4	88		51.0	9.0	<0.5	0.05			
5	-		-	-	-	-			
6	<0.5		43.0	13.0	<0.5	0.05			
7	175		201.0	12.0	<0.5	<0.01			
8	-		-	-	-	-			
9	<0.5		166.0	21.0	<0.5	<0.01			
10	<0.5		63.0	19.0	<0.5	0.11			
11	11		29.0	7.0	<0.5	0.12			
12	31		142.0	9.0	<0.5	<0.01			
13	-		-	-	-	-			
Minimum Value	11		5.0	7.0	-	0.05			
Maximum Value	175		201.0	25.0	-	0.28			

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team
* 1: World Bank Technical Paper No. 126, Testing Values
2 and 3: Japanese Reference

3) Air Quality

During the dry season, basic item of air quality were analysed in and around the port area. (see Table 10.2.22).

It is clearly understood that air quality in the survey area was seriously degraded by dust pollution. Levels of hydro carbon at seven (7) points out of ten (10) points exceeded Indonesian standard.

4) Noise

At the same time and points as those of air quality survey, noise level was measured in the site. In general, noise level exceeded Indonesian standard at the sampling points set nearby harbour trunk road. (see Table 10.2.22)

Table 10.2.22 Results of Air Quality and Noise Survey in IPC-II Monitoring Survey

Data Category: Air Quality
Data Source: IPC II Monitoring
Sampling Period: From July 28 2004 to July 29 2004
Sampling Conditions See coloumn

Parameter	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise	~~Vibration~~	Sampling Conditions			
Unit	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	dBA	~~m/sec~~	Air Temp.	Wind D	Wind S	Weather
Standard applied	1	1	1	1	1	1	1	2	~~3~~	℃		m/s	
Permissible Level	230	-	150	365	2	10,000	160	70	~~40~~				
Sampling Locations													
1	793	<1	17.61	13.04	0.31	2,971	183	73		30-32	North	2	Bright
2	270	<1	21.57	16.36	0.12	1,600	144	63		33-34	North	1	Bright
3	93	<1	14.54	11.38	0.12	1,143	131	66		-	-	-	-
4	830	<1	30.47	22.40	0.05	2,857	170	62		-	-	-	-
5	240	<1	25.42	19.54	0.07	2,857	170	63		31-32	North	2	Bright
6	610	<1	27.90	21.63	0.14	2,971	176	75		31-32	North	1	Bright
7	1,803	<1	23.64	17.11	0.17	3,086	183	75		30-32	South	1	Bright
8	386	<1	25.92	19.69	0.20	3,200	261	71		31-33	East	2	Bright
9	367	<1	18.04	13.95	0.05	2,629	196	66		32-34	North	1	Bright
10	522	<1	8.51	6.25	1.10	914	131	61		32-34	North	0	Bright
Minimum Value	93	-	8.51	6.25	0.05	914	131	61		30	-	0	-
Maximum Value	1,803	-	30.47	22.40	1.10	3,200	261	75		34	-	2	-

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team
* 1: Indonesian Ambient Air Quality Standard: No. 41 1999
2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996
3: Indonesian Noise Level Standard: KEP-49/MENLH/11/1996

10.3 Additional Information collected in this Study

10.3.1 Environmental Conditions Survey

In order to verify physical environmental conditions described in the EIA documents and obtain base line data for Environmental Management in this project, a series of environmental conditions survey was carried out in this study.

The survey was scheduled in dry and rainy seasons, i.e. June and October 2005.

Summary of the survey results is described in the following sections.

(1) Area of Survey

The survey area was decided, including not only the project area but its vicnity, considering topographic and hydraulic conditions, location of several local activities.

In this study, sampling locations of each survey item were selected as shown in Figure 10.2.4, based on the following conditions.

- Sampling locations of water and sediment were selected, considering the locations of previous and future monitoring surveys and some possible discharge points of pollutants. Sediment and water samples were taken from the same points since effect on the bottom sediment usually comes through the water pollution.
- Sampling locations of benthos were set in the areas to be dredged and disposed in order to assess a similarity of existing benthos communities between the areas.
- Sampling locations of air, noise and vibration were selected in order to assess possible impacts caused by the road and flyover construction activities to the existing local communities, including a mosque and street stalls.

(2) Item of Survey

Item and sampling location of survey are shown in Table 10.3.1.

Table 10.3.1 Item and Sampling Location of Survey

Item	Sampling Location (see Figure 10.2.4)
(1) Water quality survey: Temperature, pH, Salinity, SS, Oil, DO, BOD, COD, T-N, T-P, Ammonium, T-Coliform, Cd, CN, Pb, Cr^{6+}, As, Hg	No. 1～No. 25
(2) Sediment quality survey: Cd, CN, Pb, Cr^{6+}, As, Hg, Ignition Loss, Grain Size	No. 1～No. 25
(3) Benthos survey: Inventory	No. 1～No. 23
(4) Air quality survey: TSP, H_2S, NO_2, SO_2, Pb, CO, HC	No. A～No. C
(5) Noise survey	No. A～No. C
(6) Vibration survey	No. A～No. C

Source: JICA D/D Study Team

(3) Timing of Sampling

In general, affected by several discharges from land area through the rivers, level of contaminants in sea water tends to increase during ebb tide. Therefore, all samples from sea and river mouth were taken in ebb tide as much as possible.

As for the sampling of air, noise and vibration, based on the results of Traffic Condition Survey carried out by the Study Team, the survey period was set covering the highest and lowest traffic conditions, Friday and Sunday.

(4) Survey Results

1) Water Quality

Water samples were taken from three (3) depths, surface, middle and bottom. At the sampling points where the depth was shallower than 10m, the samples were taken from two (2) layers, surface and bottom. Temperature, salinity, pH and DO were measured on the survey boat. Other parameters were analysed in a laboratory. All survey results in the surface layer measured during both dry and rainy seasons are presented in Table 10.3.2, and briefly described as follow.


Water Sampling

DO levels were lower than a permissible level stated in the Indonesian Standard at the sampling points not only inside the breakwaters but also outside. In and around the dumping sites, DO levels met the standard value. At all points, affected by oxidation of seabed materials, DO levels in bottom layer tend to lower than those in surface layer. The lowest value of DO was zero (0) at the sampling point 15, mouth of the Sunter River. In general, 3.0 mg/l is a target value in terms of continuous habitation of aquatic lives.

T-P and Ammonia, major parameters of eutrophication process, exceeded the permissible levels both inside and outside the breakwaters. Significantly high values were measured at the sampling points 15 and 25, river mouth of Sunter and Ancol. This implies that these rivers can be a source of human and industrial discharges which cause anthropogenic eutrophication in and around the port.

Besides the above nutrient salts, COD values, a parameter of organic matter content in the water column, exceeded in both dry and rainy seasons at the sampling points 9,10,11 and 12, along and east-side of the existing access channel. In this area, numbers of large-size ships drop their anchors waiting for an entering clearance into the port. There are also many abandoned ships in this area to reproduce scrap steel. These vessels are potential sources of organic waste and cause of high COD concentration in this area.

SS consentration level in the survey area, except for a sampling point 15, at the Sunter River mouth, met the permissible levels. The consentration levels can be averged througout the dry and rainy seasons at 11mg/l, 22mg/l and 34mg/l in the dumping area, outside port area and inside port area respectively.

Cr^{6+} and As concentrations measured mainly in and around the dumping sites in October 2005 were higher than the permissible levels. This may be caused by some industrial discharges from land area in the event of heavy rain condition.

Table 10.3.2 (1) Results of Water Quality Survey in JICA D/D Study (June 2005)

Data Category: Water Quality
Data Source: JICA D/D Study
Sampling Period: From 15 June 2005 to 17 June 2005
Sampling Conditior Sampled in ebb tide

Parameter		Temp.	Salinity	SS	pH	DO	BOD	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	As	CN	Hg	Coliform
Unit		℃	‰	mg/l	−	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *		1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level		Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																			
1 (Surface)	Ptoposed	28	34	14	8.22	6.70	1.10	48.91	<0.01	<0.001	0.0233	0.0362	<0.0001	<0.001	<0.001	0.0005	<0.002	<0.0005	500
2 (Surface)	Dumping Site	29	34	13	8.19	6.40	2.67	65.21	<0.01	<0.001	0.0111	<0.001	<0.0001	<0.001	<0.001	0.0006	0.020	<0.0005	500
2A (Surface)		No Sample																	
3 (Surface)	Existing	29	34	16	8.23	6.60	3.10	61.13	0.15	<0.001	0.2205	0.0293	<0.0001	<0.001	<0.001	0.0008	0.020	<0.0005	220
4 (Surface)	Dumping Site	29	34	6	8.22	6.80	2.26	69.28	0.16	<0.001	1.0433	<0.001	<0.0001	<0.001	<0.001	0.0008	0.020	<0.0005	>1,600
5 (Surface)		30	34	27	8.23	6.40	1.20	40.76	0.15	0.0237	0.9500	0.0764	<0.0001	<0.001	<0.001	<0.0005	0.010	<0.0005	>1,600
6 (Surface)		29	36	12	7.88	0.64	11.50	48.91	<0.01	0.3243	0.3755	1.4305	<0.0001	<0.001	<0.001	0.0009	<0.002	<0.0005	>1,600
7 (Surface)		29	36	15	7.97	0.77	13.10	48.91	0.18	0.0728	0.2462	0.5759	<0.0001	<0.001	<0.001	0.0009	0.020	<0.0005	>1,600
8 (Surface)	Outside Port	30	34	27	8.04	1.04	9.80	61.13	0.12	0.1084	0.2300	0.2280	<0.0001	<0.001	<0.001	0.0005	0.020	<0.0005	>1,600
9 (Surface)	Area	30	35	52	8.14	1.05	8.60	391.25	<0.01	0.0642	0.3715	1.1189	<0.0001	<0.001	<0.001	0.0010	0.010	<0.0005	>1,600
10 (Surface)		29	35	16	8.28	1.72	6.80	432.00	<0.01	0.0155	0.3232	1.2459	<0.0001	<0.001	<0.001	0.0008	0.010	<0.0005	1600
11 (Surface)		30	34	33	8.31	1.77	9.20	346.42	0.16	0.0347	0.1853	1.5952	<0.0001	<0.001	<0.001	0.0011	0.010	<0.0005	1600
12 (Surface)		30	35	16	8.15	1.42	2.50	388.10	<0.01	0.8020	0.3028	0.4049	<0.0001	<0.001	<0.001	0.0008	<0.002	0.0006	>1,600
13 (Surface)		30	35	20	8.11	1.36	11.90	61.13	0.17	0.1833	0.2474	1.6830	<0.0001	<0.001	<0.001	0.0012	0.010	<0.0005	>1,600
14 (Surface)		30	35	31	8.23	1.59	4.50	48.91	0.17	0.0222	0.1737	1.6892	<0.0001	<0.001	<0.001	0.0012	0.020	<0.0005	>1,600
15 (Surface)		28	31	89	7.09	0.00	20.50	44.83	0.19	0.4007	0.4725	0.0535	<0.0001	<0.001	<0.001	0.0006	0.020	<0.0005	>1,600
16 (Surface)		29	30	24	7.80	0.70	6.15	48.91	0.18	0.3555	0.4423	0.0212	<0.0001	<0.001	<0.001	0.0008	0.010	<0.0005	>1,600
17 (Surface)		No Sample																	
18 (Surface)		29	30	75	7.84	0.64	11.70	48.91	0.15	0.3539	0.3275	0.0389	<0.0001	<0.001	<0.001	<0.0005	0.020	<0.0005	>1,600
18A (Surface)		No Sample																	
19 (Surface)	Inside Port	No Sample																	
20 (Surface)	Area	30	30	29	7.83	0.70	12.90	48.91	0.19	0.0347	0.2922	0.0329	<0.0001	<0.001	<0.001	<0.0005	0.020	<0.0005	>1,600
20A (Surface)		No Sample																	
21 (Surface)		30	31	72	7.95	1.20	11.10	40.76	<0.01	0.2455	0.2781	0.2281	<0.0001	<0.001	<0.001	<0.0005	0.010	<0.0005	>1,600
21A (Surface)		No Sample																	
22 (Surface)		30	30	20	7.81	1.40	9.80	57.06	<0.01	0.3098	0.4496	<0.001	<0.0001	<0.001	<0.001	0.0012	<0.002	<0.0005	>1,600
22A (Surface)		No Sample																	
23 (Surface)		30	30	35	7.22	0.46	9.80	57.06	0.16	0.5549	0.7977	0.0784	<0.0001	<0.001	<0.001	0.0010	0.010	<0.0005	>1,600
24 (Surface)		30	30	31	7.80	0.94	9.80	52.98	0.15	0.4544	0.5781	1.3604	<0.0001	<0.001	<0.001	0.0005	0.020	<0.0005	>1,600
25 (Surface)		30	26	62	7.84	0.30	8.60	57.06	0.17	0.4847	1.2462	0.0496	0.0001	<0.001	<0.001	0.0012	0.010	<0.0005	>1,600
Minimum Value		28	26	6	7.09	0.00	1.10	40.76	0.12	0.0155	0.0111	0.0212	0.0001	-	-	0.0005	0.010	0.0006	220
Maximum Value		30	36	89	8.31	6.80	20.50	432.00	0.19	0.8020	1.2462	1.6892	0.0001	-	-	0.0012	0.020	0.0006	1600

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
2: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

Table 10.3.2 (2) Results of Water Quality Survey in JICA D/D Study (October 2005)

Data Category: Water Quality
Data Source: JICA D/D Study
Sampling Period: From 12 October 2005 to 14 October 2005
Sampling Conditior Sampled in ebb tide

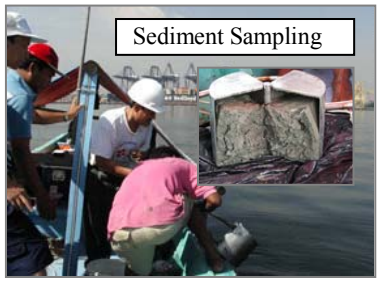
Parameter		Temp.	Salinity	SS	pH	DO	BOD	COD	Oil-Grease	Ammonia	T-N	T-P	Cd	Cr6+	Pb	As	CN	Hg	Coliform
Unit		℃	‰	mg/l	−	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Standard applied *		1	1	1	1	2	3	2	1	1	4	4	1	2	2	3	3	3	1
Permissible Level		Natural	Natural	80	6.5-8.5	5	20	80	5	0.3	1	0.09	0.01	0.01	0.01	0.012	0.5	0.001	1,000
Sampling Locations																			
1 (Surface)	Ptoposed	29.1	33	4	7.49	6.80	2.80	20.38	0.02	0.120	4.335	<0,001	<0.0001	0.020	< 0.001	0.004	0.001	<0,0005	300
2 (Surface)	Dumping Site	29.8	33	4	7.51	5.20	2.40	40.75	<0,001	0.080	0.225	0.001	<0.0001	0.040	< 0.001	0.022	0.001	<0,0005	80
2A (Surface)		30.7	32	11	7.54	5.20	2.00	40.75	<0,001	0.079	0.494	0.004	<0.0001	0.040	< 0.001	0.029	0.001	<0,0005	30
3 (Surface)	Existing	30.0	33	13	7.44	5.60	3.60	77.43	<0,001	0.102	0.610	0.078	<0.0001	0.030	< 0.001	0.011	0.006	<0,0005	>1,600
4 (Surface)	Dumping Site	30.2	33	15	7.33	4.80	4.80	48.90	<0,001	0.069	0.622	0.018	<0.0001	0.030	< 0.001	0.013	<0,001	<0,0005	130
5 (Surface)		30.0	32	22	7.42	5.40	4.96	32.60	<0,001	0.065	0.689	0.035	<0.0001	0.040	< 0.001	<0,0005	0.001	<0,0005	130
6 (Surface)		29.9	32	26	8.00	4.00	5.19	73.35	<0,001	0.701	0.341	0.057	<0.0001	0.020	< 0.001	0.013	0.001	<0,0005	900
7 (Surface)		30.9	32	10	7.43	4.00	4.96	142.63	<0,001	0.440	0.512	0.094	<0.0001	0.020	< 0.001	0.013	0.002	<0,0005	>1,600
8 (Surface)	Outside Port	30.6	32	8	7.25	1.60	8.10	93.73	<0,001	0.442	0.347	0.053	<0.0001	0.030	< 0.001	0.031	0.002	<0,0005	240
9 (Surface)	Area	30.4	32	30	7.83	6.80	2.18	146.71	0.019	0.189	0.170	0.026	<0.0001	0.020	< 0.001	<0,0005	0.003	<0,0005	1600
10 (Surface)		No Sample																	
11 (Surface)		34.4	32	33	7.78	6.00	4.21	273.04	<0,001	0.395	0.592	0.014	<0.0001	0.040	< 0.001	<0,0005	0.004	<0,0005	80
12 (Surface)		30.4	31	12	7.75	6.00	4.50	228.21	0.017	0.302	0.390	0.080	<0.0001	0.010	< 0.001	<0,0005	<0,001	<0,0005	80
13 (Surface)		29.8	32	11	7.45	4.00	1.95	228.21	0.017	0.606	0.396	0.064	<0.0001	<0,001	< 0.001	0.004	0.001	<0,0005	140
14 (Surface)		29.9	32	9	7.35	2.80	7.76	142.36	<0,001	0.255	0.536	0.052	<0.0001	<0,001	< 0.001	0.022	0.002	<0,0005	23
15 (Surface)		29.6	32	12	7.81	2.00	19.38	93.73	<0,001	0.869	0.494	0.041	<0.0001	<0,001	< 0.001	<0,0005	0.001	<0,0005	>1,600
16 (Surface)		29.3	32	16	7.97	2.80	13.92	24.45	<0,001	1.277	0.738	0.083	<0.0001	<0,001	< 0.001	0.015	0.003	<0,0005	>1,600
17 (Surface)		Only Hg sediment parameter																	
18 (Surface)		Only Hg sediment parameter																	
18A (Surface)		29.6	35	39	8.13	2.40	10.59	32.60	0.013	0.534	0.867	0.090		<0,001	< 0.001	0.009	0.001	<0,0005	>1,600
19 (Surface)	Inside Port	Only Hg sediment parameter																	
20 (Surface)	Area	Only Hg sediment parameter																	
20A (Surface)		29.2	33	18	8.10	4.00	10.02	36.68	<0,001	0.924	2.053	0.133	<0.0001	<0,001	< 0.001	0.007	0.002	<0,0005	>1,600
21 (Surface)		29.6	35	15	8.19	4.40	11.19	93.73	0.017	0.451	0.726	0.053	<0.0001	<0,001	< 0.001	<0,0005	0.002	<0,0005	>1,600
21A (Surface)		Only Hg sediment parameter																	
22 (Surface)		30.0	35	17	8.20	5.20	11.76	13.00	<0,001	0.608	1.050	0.107	<0.0001	<0,001	< 0.001	0.018	0.003	<0,0005	>1,600
22A (Surface)		Only Hg sediment parameter																	
23 (Surface)		29.7	32	30	7.47	3.20	14.22	142.63	<0,001	0.549	0.818	0.069	<0.0001	<0,001	< 0.001	<0,0005	0.004	<0,0005	>1,600
24 (Surface)		30.1	32	15	7.49	4.40	2.83	122.26	0.017	0.500	0.995	0.098	<0.0001	<0,001	< 0.001	0.020	0.001	<0,0005	500
25 (Surface)		29.9	31	8	7.22	2.00	6.30	44.83	<0,001	1.180	2.181	0.719	<0.0001	0.010	< 0.001	0.002	0.003	<0,0005	>1,600
Minimum Value		29.1	31	4	7.22	1.60	1.95	13.00	0.01	0.065	0.170	0.001	0.0000	0.010	-	0.002	0.001	0.0000	23
Maximum Value		34.4	35	39	8.20	6.80	19.38	273.04	0.02	1.277	4.335	0.719	0.0000	0.040	-	0.031	0.006	0.0000	1600

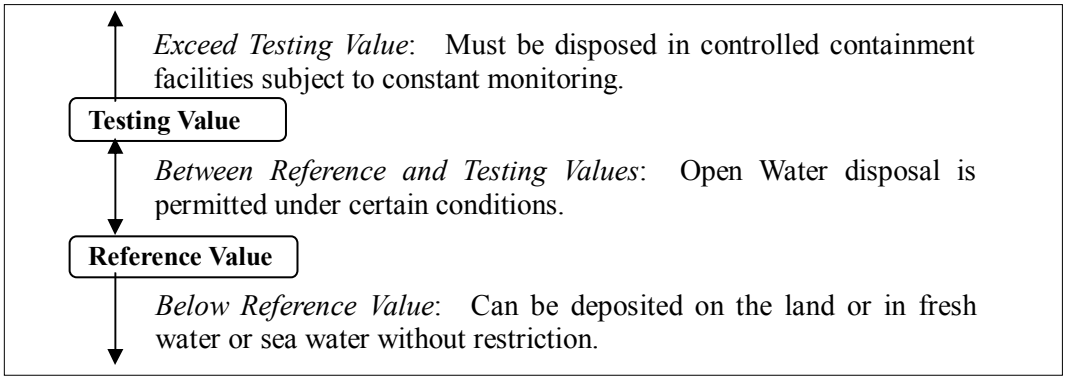
Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team

* 1: Indonesian Sea Water Quality Standard for Port Area: Decree of Environment Ministry No. 51/2004
2: Indonesian Sea Water Quality Standard for Fishery: Kep-02/MENLH/1/1988
3: Indonesian Sea Water Quality Standard for Marine Biota: Decree of Environment Ministry No. 51/2004
4: Japanese Environmental Standard: Certain aquatic creature, which is tolerant of high turbidity, is caught mainly and / or□ limit level for inhabitation of bottom fishes and shellfishes throughout the year□

2) Sediment Quality

25 samples were taken from the seabed by a Grab-type Sampler and they were analysed in a laboratory. Since there is no sediment quality standard in Indonesia, the result of analysis was evaluated comparing with the permissible levels on heavy metal concentration in dredged sediment material, which was presented as the Testing Value in the World Bank Technical Paper No. 126 (Refer to Table 10.2.1). Definition of the values is explained in Figure 10.3.1.





Source: JICA D/D Study Team

Figure 10.3.1 Definition of Testing and Reference Values

All results of laboratory analysis are presented in Table 10.3.3. Comparing the analysis results with the Testing Values, six (6) samples taken in June 2005 from sampling points 3, 4, 5, 6 (in and around the existing dumping site) and 16, 18 (east-side of harbour basin) exceeded the Testing Value of T-Hg (1.6mg/kg). However, these high values became lower than the Testing Value in October 2005.

This change in four (4) months, based on the information obtained from IPC-II Tanjung Priok branch office, can be explained as follow.

In and around the existing dumping site, concentration level of T-Hg in seabed material was increased rapidly due to the dumping of dredged materials from the east-side of harbour basin and in front of oil basin (sampling point 15). IPC-II carried out the maintenance dredging half month before the sampling of seabed material in June 2005. After four (4) months, the dumped material was dispersed by local current system, and then T-Hg concentration level was decreased to the background condition. The changes of soil characteristics (Clay→Silt) shown in Table 10.3.3 imply the dispersion of seabed materials in the dumping site.

The change of T-Hg concentration level in the east-side of harbour basin may be caused by strong bottom current produced by screws of large-size container ships because there was no maintenance dredging activity during the four (4) months. Physical characteristics of the seabed material at and around the sampling point 18 were completely changed in four (4) months as shown in Figure 10.3.2.

Concentration levels of Cd, CN, Cr^{6+} and As were below the Testing Values.

Table 10.3.3 (1) Results of Sediment Quality Survey in JICA D/D Study (June 2005)

Data Category: Sediment Quality
Data Source: JICA D/D Study
Sampling Period: From 15 June 2005 to 17 June 2005
Sampling Condition Sampled in ebb tide

Parameter		Cd	CN	Pb	Cr^{6+}	As	T-Hg	I-Loss	Water Cont.	Soil	Remarks
Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	Category	
Standard applied *		1	2	1	1	1	1	-	-		
Permissible Level		7.5	50	530	480	85	1.6	-	-		
Sampling Locations	Area										
1	Dumping Area	ND	0.010	70.89	ND	0.012	1.148	11.95	58.07	Clay	Proposed Dumping Site
2		ND	0.013	68.17	ND	0.015	1.061	8.20	53.58	Clay	〃
2A		No Sample									〃
3		ND	0.019	52.93	ND	0.013	1.807	14.03	57.64	Clay	Existing Dumping Site
4		0.056	<0.002	89.27	ND	0.017	1.919	32.70	64.02	Clay	〃
5	Outside Port Area	ND	0.050	82.17	ND	0.021	1.751	9.87	73.74	Clay	East Outside Port
6		ND	<0.002	48.76	ND	0.068	1.746	33.74	56.90	Clay	North Outside Port
7		0.126	<0.002	61.47	ND	0.079	0.034	11.55	54.97	Silt	〃
8		ND	<0.002	119.40	ND	0.039	0.127	16.03	78.18	Clay	〃
9		ND	<0.002	98.54	ND	0.057	0.005	15.90	71.27	Clay	〃
10		0.132	0.013	31.80	ND	0.044	0.316	12.12	69.70	Clay	Channel
11		0.216	<0.002	24.55	ND	0.066	0.181	15.22	72.23	Clay	〃
12		0.066	<0.002	69.26	ND	0.027	0.109	12.90	69.90	Clay	〃
13		0.132	<0.002	40.37	0.003	0.014	0.067	8.46	32.03	Fine Sand	West Outside Port
14		0.058	<0.002	99.47	ND	0.035	0.127	13.24	65.35	Clay	〃
15	Inside Port Area	0.048	<0.002	108.91	ND	0.082	0.878	16.92	79.16	Clay	Sunter River Mouth
16		ND	<0.002	39.52	ND	0.012	2.342	15.84	53.32	Clay	East Outside Basin
17		ND	<0.002	78.48	ND	0.043	ND	8.99	57.39	Silt	Inside Basin
18		ND	0.055	90.50	ND	0.074	1.614	11.13	68.90	Clay	〃
18A		No Sample									〃
19		0.094	<0.002	41.83	ND	0.011	0.105	7.94	36.38	Fine Sand	〃
20		ND	0.006	124.18	ND	0.053	1.219	14.11	67.78	Clay	〃
20A		No Sample									〃
21		ND	<0.002	69.78	ND	0.036	0.085	15.81	66.59	Clay	〃
21A		No Sample									〃
22		ND	0.007	51.65	ND	0.052	0.005	17.57	72.97	Clay	〃
22A		No Sample									〃
23		ND	0.035	88.25	ND	0.069	0.163	13.24	65.98	Clay	〃
24		No Sample									〃
25		ND	0.025	97.09	ND	0.042	1.366	18.87	67.72	Clay	Ancol River Mouth
Minimum Value		0.048	0.006	24.55	0.003	0.011	0.005	7.94	32.03		
Maximum Value		0.216	0.055	124.18	0.003	0.082	2.342	33.74	79.16		

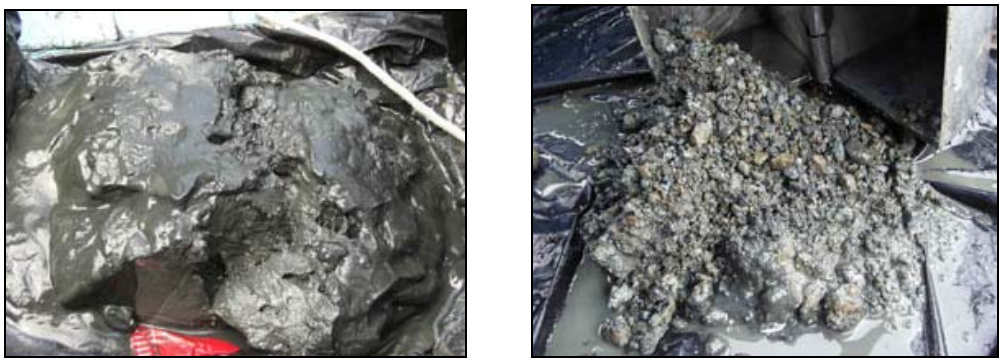
Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team
* 1: World Bank Technical Paper No. 126, Testing Values
2 and 3: Japanese Reference

Table 10.3.3 (2) Results of Sediment Quality Survey in JICA D/D Study (October 2005)

Data Category: Sediment Quality
Data Source: JICA D/D Study
Sampling Period: From 12 October 2005 to 14 October 2005
Sampling Condition Sampled in ebb tide

Parameter		Cd	CN	Pb	Cr^{6+}	As	T-Hg	I-Loss	Water Cont.	Soil	Remarks
Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	Category	
Standard applied *		1	2	1	1	1	1	-	-		
Permissible Level		7.5	50	530	480	85	1.6	-	-		
Sampling Locations	Area										
1	Dumping Area	0.77	0.014	21.94	1.740	1.603	0.033	1.23	53.20	Silt	Proposed Dumping Site
2		0.79	0.010	23.53	0.290	1.771	0.029	0.07	52.35	Silt	〃
2 A		0.40	0.023	11.64	1.560	0.603	ND	2.30	69.32	Silt	〃
3		0.45	0.015	13.35	0.091	3.724	0.107	1.57	57.50	Silt	Existing Dumping Site
4		0.40	0.013	14.93	0.180	1.938	0.091	2.59	67.26	Silt	〃
5	Outside Port Area	0.37	0.013	16.71	0.110	0.940	0.083	3.49	73.11	Sand	East Outside Port
6		0.61	0.014	16.55	1.470	1.157	0.066	0.89	65.65	Silt	North Outside Port
7		0.73	0.014	41.67	0.027	1.715	0.271	0.54	49.55	Sand	〃
8		0.54	0.018	29.97	1.210	2.440	0.193	2.55	65.98	Silt	〃
9		0.73	0.009	25.54	0.150	1.659	0.242	1.82	64.48	Silt	〃
10		No Sample									Channel
11		0.49	0.012	16.38	0.180	1.157	0.097	2.32	68.45	Silt	〃
12		0.63	0.014	28.08	0.298	1.157	0.201	0.59	66.52	Silt	〃
13		0.99	0.029	45.65	0.250	1.548	0.180	2.31	30.66	Sand	West Outside Port
14		0.64	0.013	32.02	0.310	1.603	0.209	3.55	63.76	Silt	〃
15	Inside Port Area	0.66	0.015	25.81	0.460	2.831	0.124	2.48	68.97	Silt	Sunter River Mouth
16		0.53	0.016	21.44	0.360	2.831	0.010	2.19	62.80	Silt	East Outside Basin
17							0.086				Inside Basin
18							0.113				〃
18 A		0.43	0.020	20.63	1.470	2.887	0.075	-	69.68	-	〃
19							0.275				〃
20							ND				〃
20 A		0.42	0.015	14.69	0.270	2.998	ND	3.45	37.14	Silt	〃
21		0.49	0.020	17.50	1.070	2.831	0.080	1.88	78.03	Silt	〃
21 A							0.073				〃
22		0.51	0.018	22.29	1.530	2.943	0.779	2.47	76.25	Silt	〃
22 A							0.017				〃
23		0.70	0.011	51.13	2.190	2.496	0.288	3.87	69.98	Silt	〃
24		1.04	0.018	39.19	0.910	3.115	0.082	0.92	45.67	Sand	〃
25		1.20	0.010	38.81	0.470	3.501	0.083	0.84	71.71	Silt	Ancol River Mouth
Minimum Value		0.37	0.009	11.64	0.027	0.603	0.010	0.07	30.66		
Maximum Value		1.20	0.029	51.13	2.190	3.724	0.779	3.87	78.03		

Note : Values in bold line boxes exceed permissible level in standards Source : JICA D/D Study Team
* 1: World Bank Technical Paper No. 126, Testing Values
2 and 3: Japanese Reference



Source: JICA D/D Study Team

Sample taken in June 2005 Sample taken in October 2005

Figure 10.3.2 Seabed Materials at and around Sampling Point 18

3) Air Quality, Noise and Vibration Levels

Field sampling was carried out in two (2) conditions; high and low traffic conditions at the following three (3) points as indicated in Figure 10.2.4.

- A: East end of inner port road rehabilitation
- B: Middle of flyover and in front of mosque
- C: West end of inner port road rehabilitation

Samples were taken in every three (3) hours during the survey period (24 hours). Thus, eight (8) samples were collected at each point. Air samples were dissolved into appropriate solvents in the site and analyzed in a laboratory. Noise and vibration levels were directly measured by level meters in the sites.

All results of field measurements and laboratory tests are presented in Table 10.3.4.

Comparing the results with the Indonesian standards, primary parameters of emission gases concentration, such as H_2S, NO_2, SO_2, Pb, CO, HC met the standards.

Only a few samples taken during the high traffic condition in October 2005, TSP (dust concentration in air) slightly exceeded the standard.

No results of vibration measurement exceeded the standard but most of the results of noise measurement in both low and high traffic conditions failed to meet the standard even during the nighttime.

Table 10.3.4 (1) Results of Air Quality, Noise and Vibration Levels Survey in JICA D/D Study (Low Traffic Condition in June 2005)

Data Category: Air Quality, Noise and Vibration Levels

Data Source: JICA D/D Study

Sampling Period: From 26 June 2005 and 27 June 2005 (Low Traffic Condition)

Sampling Conditions See column

Parameter	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise		Vibration		Sampling Conditions		
Unit	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	g/m^3	µg/m^3	dBA	dBA	m/sec	m/sec	Air Temp.	Wind S	Weather
Standard applied *	1	1	1	1	1	1	1	2	2	3	3	℃	m/s	
Permissible Level	90	-	400	900	1	30	160	70	55	40	8.5			
Sampling Locations														
A (6:00 - 9:00, 26 June)	68	ND	ND	ND	0.58	ND	ND	75.6	-	0.3	-	32	1.3	clear
A (9:00 - 12:00, 26 June)	69	ND	ND	ND	0.68	ND	ND	67.4	-	0.2	-	34	2.7	clear
A (12:00 - 15:00, 26 June)	72	ND	ND	ND	0.45	ND	ND	71.8	-	0.3	-	35	7.8	clear
A (15:00 - 18:00, 26 June)	70	ND	ND	ND	0.57	ND	ND	75.3	-	0.2	-	30	6.5	clear
A (18:00 - 21:00, 26 June)	69	ND	ND	ND	0.56	ND	ND	83.0	-	0.6	-	28	7.0	clear
A (21:00 - 24:00, 26 June)	69	ND	ND	ND	0.52	ND	ND	80.6	-	0.4	-	27	4.2	clear
A (24:00 - 3:00, 27 June)	65	ND	ND	ND	0.52	ND	ND	81.5	-	0.2	-	26	3.2	clear
A (3:00 - 6:00, 27 June)	65	ND	ND	ND	0.58	ND	ND	81.5	-	0.1	-	28	3.5	clear
B (6:00 - 9:00, 26 June)	58	ND	ND	ND	0.22	ND	ND	-	73.2	-	<0.1	33	0.4	clear
B (9:00 - 12:00, 26 June)	60	ND	ND	ND	0.25	ND	ND	-	75.8	-	<0.1	30	0.5	clear
B (12:00 - 15:00, 26 June)	60	ND	ND	ND	0.26	ND	ND	-	75.2	-	<0.1	32	1.7	clear
B (15:00 - 18:00, 26 June)	61	ND	ND	ND	0.23	ND	ND	-	74.8	-	<0.1	30	0.7	clear
B (18:00 - 21:00, 26 June)	62	ND	ND	ND	0.23	ND	ND	-	73.2	-	<0.1	29	0.8	clear
B (21:00 - 24:00, 26 June)	60	ND	ND	ND	0.24	ND	ND	-	70.2	-	<0.1	29	1.0	clear
B (24:00 - 3:00, 27 June)	61	ND	ND	ND	0.25	ND	ND	-	65.5	-	<0.1	25	0.9	clear
B (3:00 - 6:00, 27 June)	60	ND	ND	ND	0.22	ND	ND	-	65.3	-	<0.1	24	1.0	clear
C (6:00 - 9:00, 26 June)	65	ND	ND	ND	0.58	ND	ND	70.5	-	0.2	-	32	1.3	clear
C (9:00 - 12:00, 26 June)	66	ND	ND	ND	0.55	ND	ND	67.4	-	0.8	-	34	2.7	clear
C (12:00 - 15:00, 26 June)	66	ND	ND	ND	0.54	ND	ND	74.5	-	0.5	-	35	7.8	clear
C (15:00 - 18:00, 26 June)	65	ND	ND	ND	0.52	ND	ND	70.7	-	0.3	-	30	6.5	clear
C (18:00 - 21:00, 26 June)	68	ND	ND	ND	0.58	ND	ND	67.4	-	0.3	-	28	7.0	clear
C (21:00 - 24:00, 26 June)	58	ND	ND	ND	0.60	ND	ND	68.9	-	0.1	-	27	4.2	clear
C (24:00 - 3:00, 27 June)	58	ND	ND	ND	0.55	ND	ND	72.5	-	0.1	-	26	3.2	clear
C (3:00 - 6:00, 27 June)	60	ND	ND	ND	0.54	ND	ND	68.4	-	0.1	-	28	5.2	clear
Minimum Value	58	-	-	-	0.22	-	-	67.4	65.3	0.1	-	24	0.4	-
Maximum Value	72	-	-	-	0.68	-	-	83.0	75.8	0.8	-	35	7.8	-

Note : Values in bold line boxes exceed permissible level in standards

Source : JICA D/D Study Team

* 1: Indonesian Ambient Air Quality Standard: No. 41 1999

2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996

3: Indonesian Vibration Level Standard: KEP-49/MENLH/11/1996

Table 10.3.4 (2) Results of Air Quality, Noise and Vibration Levels Survey in JICA D/D Study (High Traffic Condition in June 2005)

Data Category: Air Quality, Noise and Vibration Levels
Data Source: JICA D/D Study
Sampling Period: From 24 June 2005 and 25 June 2005 (High Traffic Condition)
Sampling Conditions See column

Item	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise		Vibration		Sampling Conditions		
Unit	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	g/m^3	$\mu g/m^3$	dBA	dBA	m/sec	m/sec	Air Temp.	Wind S	Weather
Standard applied *	1	1	1	1	1	1	1	2	2	3	3	℃	m/s	
Permissible Level	90	-	400	900	1	30	160	70	55	40	8.5			
Sampling Locations														
A (6:00 - 9:00, 24 June)	70	ND	ND	ND	0.65	ND	ND	74.8	-	0.5	-	32	1.2	clear
A (9:00 - 12:00, 24 June)	75	ND	ND	ND	0.71	ND	ND	74.1	-	1.1	-	34	2.3	clear
A (12:00 - 15:00, 24 June)	78	ND	ND	ND	0.68	ND	ND	74.5	-	0.9	-	35	7.3	clear
A (15:00 - 18:00, 24 June)	85	ND	ND	ND	0.65	ND	ND	75.3	-	1.2	-	31	6.2	clear
A (18:00 - 21:00, 24 June)	75	ND	ND	ND	0.58	ND	ND	78.2	-	0.5	-	27	6.9	rainy
A (21:00 - 24:00, 24 June)	71	ND	ND	ND	0.64	ND	ND	76.5	-	0.2	-	25	4.5	clear
A (24:00 - 3:00, 25 June)	70	ND	ND	ND	0.58	ND	ND	68.9	-	0.3	-	26	3.5	clear
A (3:00 - 6:00, 25 June)	71	ND	ND	ND	0.61	ND	ND	68.9	-	0.3	-	29	4.9	clear
B (6:00 - 9:00, 24 June)	60	ND	ND	ND	0.23	ND	ND	-	80.6	-	<0.1	32	1.0	clear
B (9:00 - 12:00, 24 June)	61	ND	ND	ND	0.53	ND	ND	-	82.1	-	<0.1	33	1.0	clear
B (12:00 - 15:00, 24 June)	65	ND	ND	ND	0.52	ND	ND	-	84.1	-	<0.1	32	1.0	clear
B (15:00 - 18:00, 24 June)	62	ND	ND	ND	0.45	ND	ND	-	82.1	-	<0.1	29	0.8	clear
B (18:00 - 21:00, 24 June)	60	ND	ND	ND	0.35	ND	ND	-	75.1	-	<0.1	25	0.7	rainy
B (21:00 - 24:00, 24 June)	61	ND	ND	ND	0.56	ND	ND	-	70.1	-	<0.1	24	0.7	clear
B (24:00 - 3:00, 25 June)	58	ND	ND	ND	0.18	ND	ND	-	65.5	-	<0.1	25	0.9	clear
B (3:00 - 6:00, 25 June)	65	ND	ND	ND	0.25	ND	ND	-	65.3	-	<0.1	25	0.5	clear
C (6:00 - 9:00, 24 June)	68	ND	ND	ND	0.65	ND	ND	78.7	-	0.2	-	32	1.2	clear
C (9:00 - 12:00, 24 June)	70	ND	ND	ND	0.68	ND	ND	74.7	-	0.1	-	34	2.3	clear
C (12:00 - 15:00, 24 June)	75	ND	ND	ND	0.69	ND	ND	71.9	-	0.2	-	35	7.3	clear
C (15:00 - 18:00, 24 June)	74	ND	ND	ND	0.65	ND	ND	70.0	-	0.5	-	31	6.2	clear
C (18:00 - 21:00, 24 June)	65	ND	ND	ND	0.58	ND	ND	68.4	-	0.6	-	27	6.9	rainy
C (21:00 - 24:00, 24 June)	62	ND	ND	ND	0.58	ND	ND	67.9	-	0.2	-	25	4.5	clear
C (24:00 - 3:00, 25 June)	60	ND	ND	ND	0.60	ND	ND	65.2	-	0.1	-	26	3.5	clear
C (3:00 - 6:00, 25 June)	61	ND	ND	ND	0.65	ND	ND	76.8	-	0.1	-	29	4.9	clear
Minimum Value	85	-	-	-	0.71	-	-	78.7	84.1	1.2	-	35	7.3	-
Maximum Value	58	-	-	-	0.18	-	-	65.2	65.3	0.1	-	24	0.5	-

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team

* 1: Indonesian Ambient Air Quality Standard: No. 41 1999
2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996
3: Indonesian Vibration Level Standard: KEP-49/MENLH/11/1996

Table 10.3.4 (3) Results of Air Quality, Noise and Vibration Levels Survey in JICA D/D Study (Low Traffic Condition in October 2005)

Data Category: Air Quality, Noise and Vibration Levels
Data Source: JICA D/D Study
Sampling Period: From 16 October 2005 and 17 October 2005 (Low Traffic Condition)
Sampling Conditions See column

Parameter	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise		Vibration		Sampling Conditions		
Unit	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	g/m^3	$\mu g/m^3$	dBA	dBA	m/sec	m/sec	Air Temp.	Wind S	Weather
Standard applied *	1	1	1	1	1	1	1	2	2	3	3	℃	m/s	
Permissible Level	90	-	400	900	1	30	160	70	55	40	8.5			
Sampling Locations														
A (07:00 - 10:00, 16 October)	82	<100	<50	<5	0.76	<5	<50	80.1	-	0.2	-	33	2.75	clear
A (10:00 - 13:00, 16 October)	78	<100	<50	<5	0.86	<5	<50	84.1	-	0.1	-	35	3.25	clear
A (13:00 - 16:00, 16 October)	65	<100	<50	<5	0.81	<5	<50	80.1	-	0.2	-	35	4.56	clear
A (16:00 - 19:00, 16 October)	61	<100	<50	<5	0.76	<5	<50	86.1	-	0.1	-	35	3.21	clear
A (19:00 - 22:00, 16 October)	68	<100	<50	<5	0.56	<5	<50	80.3	-	71.7	-	32	3.11	clear
A (22:00 - 01:00, 16 October)	56	<100	<50	<5	0.45	<5	<50	81.3	-	72.1	-	28	1.25	clear
A (01:00 - 04:00, 17 October)	54	<100	<50	<5	0.65	<5	<50	84.1	-	70.3	-	27	1.12	clear
A (04:00 - 07:00, 17 October)	65	<100	<50	<5	0.25	<5	<50	88.2	-	78.1	-	28	1.23	clear
B (07:00 - 10:00, 16 October)	53	<100	<50	<5	0.11	<5	<50	-	74.2	-	<0,1	28	1.32	clear
B (10:00 - 13:00, 16 October)	56	<100	<50	<5	0.16	<5	<50	-	75.0	-	<0,1	32	2.51	clear
B (13:00 - 16:00, 16 October)	57	<100	<50	<5	0.12	<5	<50	-	76.1	-	<0,1	31	3.15	clear
B (16:00 - 19:00, 16 October)	58	<100	<50	<5	0.15	<5	<50	-	75.8	-	<0,1	31	3.56	clear
B (19:00 - 22:00, 16 October)	54	<100	<50	<5	0.18	<5	<50	-	77.1	-	<0,1	29	1.25	clear
B (22:00 - 01:00, 16 October)	56	<100	<50	<5	0.12	<5	<50	-	77.1	-	<0,1	27	1.35	clear
B (01:00 - 04:00, 17 October)	51	<100	<50	<5	0.1	<5	<50	-	67.3	-	<0,1	27	0.85	clear
B (04:00 - 07:00, 17 October)	48	<100	<50	<5	0.25	<5	<50	-	74.8	-	<0,1	28	0.96	clear
C (07:00 - 10:00, 16 October)	62	<100	<50	<5	0.45	<5	<50	81.3	-	0.2	-	33	3.25	clear
C (10:00 - 13:00, 16 October)	45	<100	<50	<5	0.21	<5	<50	77.9	-	0.1	-	35	5.21	clear
C (13:00 - 16:00, 16 October)	68	<100	<50	<5	0.22	<5	<50	70.9	-	0.2	-	32	3.56	clear
C (16:00 - 19:00, 16 October)	85	<100	<50	<5	0.35	<5	<50	70.9	-	0.2	-	32	1.58	clear
C (19:00 - 22:00, 16 October)	65	<100	<50	<5	0.21	<5	<50	80.3	-	0.1	-	28	1.25	clear
C (22:00 - 01:00, 16 October)	58	<100	<50	<5	0.25	<5	<50	75.5	-	0.1	-	28	3.25	clear
C (01:00 - 04:00, 17 October)	57	<100	<50	<5	0.18	<5	<50	74.4	-	0.1	-	27	2.15	clear
C (04:00 - 07:00, 17 October)	62	<100	<50	<5	0.23	<5	<50	70.4	-	0.1	-	27	1.12	clear
Minimum Value	45	-	-	-	0.10	-	-	70.4	67.3	0.1	-	27	0.85	-
Maximum Value	85	-	-	-	0.86	-	-	88.2	77.1	78.1	-	35	5.21	-

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team

* 1: Indonesian Ambient Air Quality Standard: No. 41 1999
2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996
3: Indonesian Vibration Level Standard: KEP-49/MENLH/11/1996

Table 10.3.4 (4) Results of Air Quality, Noise and Vibration Levels Survey in JICA D/D Study (High Traffic Condition in October 2005)

Data Category: Air Quality, Noise and Vibration Levels
Data Source: JICA D/D Study
Sampling Period: From 14 October 2005 and 15 October 2005 (High Traffic Condition)
Sampling Conditions See column

Item	TSP	H_2S	NO_2	SO_2	Pb	CO	HC	Noise		Vibration		Sampling Conditions		
Unit	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	g/m^3	$\mu g/m^3$	dBA	dBA	m/sec	m/sec	Air Temp.	Wind S	Weather
Standard applied *	1	1	1	1	1	1	1	2	2	3	3	℃	m/s	
Permissible Level	90	-	400	900	1	30	160	70	55	40	8.5			
Sampling Locations														
A (07:00 - 10:00, 14 October)	85	<100	<50	<5	0.58	<5	<50	91.1	-	0.1	-	32	1.12	clear
A (10:00 - 13:00, 14 October)	76	<100	<50	<5	0.76	<5	<50	90.1	-	0.1	-	35	1.21	clear
A (13:00 - 16:00, 14 October)	85	<100	<50	<5	0.81	<5	<50	97.0	-	0.1	-	38	3.23	clear
A (16:00 - 19:00, 14 October)	65	<100	<50	<5	0.56	<5	<50	94.5	-	0.2	-	32	3.11	cloudy
A (19:00 - 22:00, 14 October)	85	<100	<50	<5	0.81	<5	<50	91.5	-	0.4	-	28	1.23	clear
A (22:00 - 01:00, 14 October)	48	<100	<50	<5	0.78	<5	<50	91.1	-	0.3	-	27	1.56	clear
A (01:00 - 04:00, 15 October)	82	<100	<50	<5	0.71	<5	<50	93.2	-	0.1	-	27	2.65	clear
A (04:00 - 07:00, 15 October)	91	<100	<50	<5	0.96	<5	<50	85.1	-	0.1	-	25	1.25	clear
B (07:00 - 10:00, 14 October)	68	<100	<50	<5	0.21	<5	<50	-	79.5	-	<0,1	29	1.23	clear
B (10:00 - 13:00, 14 October)	71	<100	<50	<5	0.25	<5	<50	-	78.4	-	<0,1	30	1.25	clear
B (13:00 - 16:00, 14 October)	68	<100	<50	<5	0.41	<5	<50	-	77.7	-	<0,1	32	1.45	clear
B (16:00 - 19:00, 14 October)	62	<100	<50	<5	0.41	<5	<50	-	79.4	-	<0,1	30	1.37	cloudy
B (19:00 - 22:00, 14 October)	63	<100	<50	<5	0.32	<5	<50	-	77.1	-	<0,1	28	1.03	clear
B (22:00 - 01:00, 14 October)	68	<100	<50	<5	0.46	<5	<50	-	76.3	-	<0,1	28	0.85	clear
B (01:00 - 04:00, 15 October)	51	<100	<50	<5	0.21	<5	<50	-	65.8	-	<0,1	28	1.15	clear
B (04:00 - 07:00, 15 October)	62	<100	<50	<5	0.31	<5	<50	-	73.2	-	<0,1	27	1.25	clear
C (07:00 - 10:00, 14 October)	85	<100	<50	<5	0.85	<5	<50	89.6	-	0.5	-	30	1.15	clear
C (10:00 - 13:00, 14 October)	96	<100	<50	<5	0.78	<5	<50	95.0	-	1.1	-	32	1.35	clear
C (13:00 - 16:00, 14 October)	78	<100	<50	<5	0.85	<5	<50	93.5	-	0.9	-	35	3.25	clear
C (16:00 - 19:00, 14 October)	65	<100	<50	<5	0.78	<5	<50	95.0	-	1.2	-	32	2.75	cloudy
C (19:00 - 22:00, 14 October)	75	<100	<50	<5	0.65	<5	<50	83.2	-	0.5	-	29	3.65	clear
C (22:00 - 01:00, 14 October)	56	<100	<50	<5	0.54	<5	<50	86.4	-	0.2	-	28	2.15	clear
C (01:00 - 04:00, 15 October)	65	<100	<50	<5	0.25	<5	<50	75.2	-	0.2	-	27	0.27	clear
C (04:00 - 07:00, 15 October)	58	<100	<50	<5	0.32	<5	<50	74.2	-	0.1	-	28	2.81	clear
Minimum Value	48	-	-	-	0.96	-	-	97.0	79.5	1.2	-	38	3.65	-
Maximum Value	96	-	-	-	0.21	-	-	74.2	65.8	0.1	-	25	0.27	-

Note : Values in bold line boxes exceed permissible level in standards
Source : JICA D/D Study Team
* 1: Indonesian Ambient Air Quality Standard: No. 41 1999
2: Indonesian Noise Level Standard: KEP-48/MENLH/11/1996
3: Indonesian Vibration Level Standard: KEP-49/MENLH/11/1996

4) Benthos

At the same time and point with those of the sediment quality survey, 19 samples were collected from seabed by a Grab-type Sampler.

In the seven (7) samples, benthos shown in Table 10.3.5 was identified. In other sampling locations, no benthos was identified. Maximum number of taxon and value of total abundance were recorded at the sampling point No. 13, west side of the port entrance.

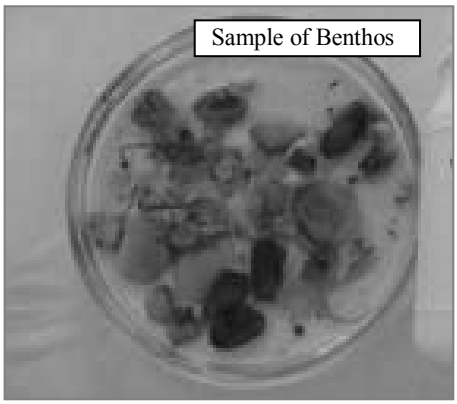


Table 10.3.5 Inventory of Benthos

Sampling Location No.	Classes	Species
3	Polychaeta	*Diopatra*
4	Polychaeta Crustacea	*Diopatra* *Pinnotheres*
12	Asteroidea	
13	Polychaeta Pelecypoda	*Diopatra* *Terrebellides* *Barbatia* *Chione* *Mactra* *Modiolus*
17	Pelecypoda	*Chione*
18	Polychaeta	*Diopatra*
19	Peneidae	

Source: JICA D/D Study Team

In the proposed dumping site (No. 1 and 2), no benthos was identified, while some benthos were identified in the existing dumping site (No. 3 and 4). This may be caused by different hydraulic condition in the sites. Due to the disturbance on the seabed materials by coastal current and wave energy, benthos may hardly exist on the seabed in the proposed dumping site.

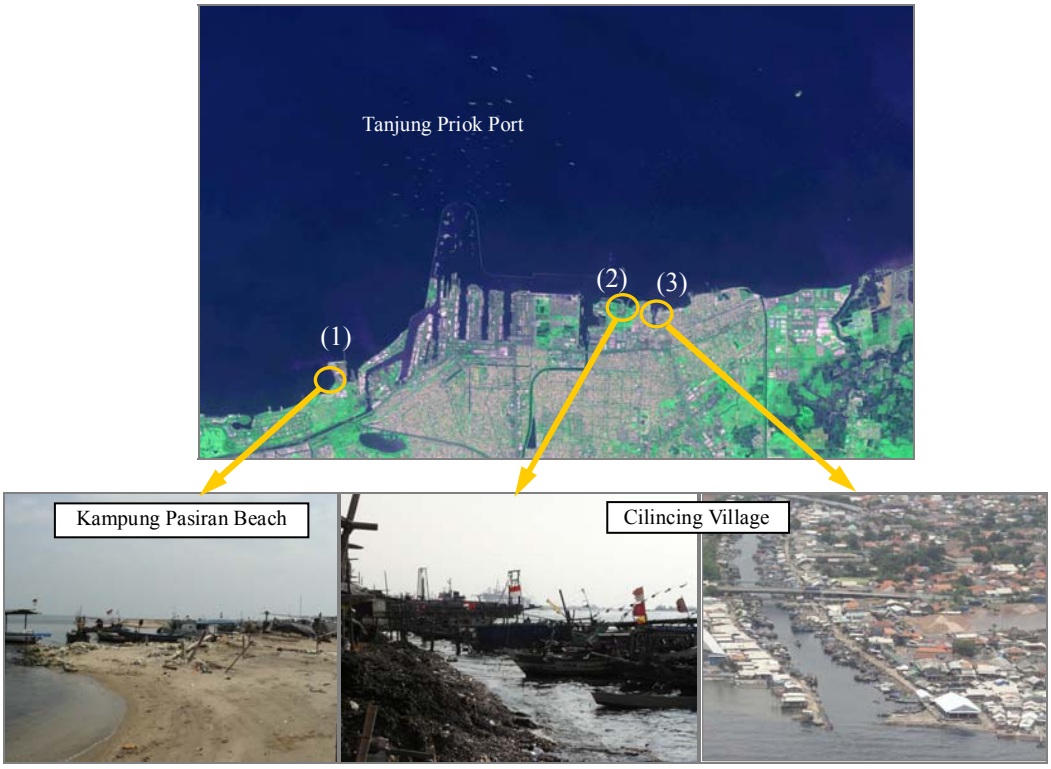
In and around the port area, as shown in Table 10.3.2, levels of dissolved oxygen were very low especially in the bottom layer of the water column. In this condition, benthos can not be alive except for some sandworm species. However, at sampling locations, No. 12, 13, 17, 18 and 19, some benthos were identified.

According to the result of physical sediment analysis, seabed materials in these locations contain more sand fraction and less organic matters than those in other locations. This condition may not reduce DO level in water column and help benthos to be alive in these locations.

There was no significant difference between the survey results in dry and rainy seasons.

10.3.2 Fishery Activity

In order to supplement the information regarding fishery activities in the study area described in the EIA documents, the study team conducted a field interview survey at three (3) locations as shown in Figure 10.3.3.



Source: JICA D/D Study Team

Figure 10.3.3 Locations of Field Interview Survey on Fishing Activities

(1) Kampung Pasiran Beach, 10 May 2005

The study team noticed about 20 fishing boats and 10 huts along the beach. This area, separated by a concrete wall, adjoins a machinery plant.

Interview was made to a fisherman who has lived there since 1961. He said that usually, about 100 boats anchor this natural beach. At this time, most of them went fishing to several water areas not only Jakarta Bay, but even sail to Damar Island and Seribu Island, about 15 km and 50 km north of Tanjung Priok Port, respectively. The remaining small ships mainly catch small shrimps in near shore area every day and sell them in a local market.

The fisherman explained present condition of the beach that water quality has been degraded due to several discharges from the land. Front beach has disappeared (about 100m in width) during past 10 years affected by the wave and current in rainy season.

(2) Cilincing Village, 28 June 2005

The study team visited a green shell cultivation area in Cilincing Village. The shells are grown in the shallow area fixed on numerous bamboo piles. The piles are spread out within two (2) km distance from the shoreline.

A supervisor of washing and sorting the shells said that annual monitoring of Hg concentration in the shells has been conducted by Fishery Office of DKI Jakarta Province. In case significant level of Hg concentration is found, the cultivation activity in and around Cilincing water area will be prohibited by the government.

Harvested Shells

(3) Cilincing Village, 28 June 2005

As shown in Figure 10.3.3, many boats were moored along the river bank on both sides. The study team made first interview to a fisherman, who owns and rents out 13 boats to the local fishermen.

Middle Type Boat

The boats moored along the river bank can be categorized into three (3) types, small type (about 4 persons on board), middle type (5-10 persons on board) and large type (15-20 persons on board). The small type boats are mainly used for recreational purpose in Jakarta Bay, such as fishing, shuttle service for tourists between the islands. The middle ones are used for commercial fishing mainly inside Jakarta Bay, including the study area. The large ones operate around Damar Island and Seribu Island, some time sail to Sumatra Island for offshore fishing.
Major fishing methods are set and gill net in near shore, and gill and encircling net in offshore area. Trawl fishing is not popular in Jakarta Bay.

Fishing Stand

There are numerous fishing stands (a kind of set net) in the east and north-east area from the port. The interviewee also owned some fishing stands some years ago. However, considering profitability and legal aspect of it, building the stand is illegal he said, he decided to abandon the fishing stands and invested to the boat fishing in offshore area.

Facility of TPI Stand

High season of the fishing activities in Jakarta Bay is from March to November, dry season.

The second interviewee was an officer in Fishery Public Sale (TPI), which is operated by Fishery and Oceanography Office of DKI Jakarta Province in North Jakarta district, locating in the river mouth.

Every day, this office handles two (2) types of catchments. In the morning time, the one caught around Damar Island and Seribu Island. In the afternoon time, the other caught inside Jakarta Bay.

In general, the catchments caught around Damar Island and Seribu Island, as shown in Figure 10.3.4, are large size and have high value in the market. On the other, caught inside Jakarta Bay, especially in Cilincing water area, are small size and low value. Some very small fishes are consumed as feeding stuff for turtle aqua farming in West Java province.

The study team realized that Jakarta Bay, except for the limited area near the port, is a productive fishing field in the region.

Large Size Fishes

Middle Size Fishes

Small Size Fishes

Otters

Source: JICA D/D Study Team

Figure 10.3.4 Fishery Products in and around Jakarta Bay

10.3.3 Water Traffic Accident

Since no information on the water traffic accidents in the study area was available in the previous reports, the study team collected a record of water traffic accident between large vessels (mainly cargo carriers, detailed type are not specified in the record) occurred in and around Tanjung Priok Port.

The record was provided by Port Administration of Tanjung Priok (ADPEL) and includes 34 cases in 2000, 2002, 2003, 2004 and 2005, as of July 2005. Table 10.3.6 shows dates and

types of the accidents. Locations and types of the accidents are shown in Figure 10.3.5**.** The locations of Nos. 2, 9, 14, 15 and 34 are not indicated in this figure since they occurred outside the area covered by the figure.

According to the Table 10.3.6, in the past three (3) years, 2002, 2003 and 2004, about 6.4 cases of accidents occurred per year.

As Shown in Figure 10.3.5, most case of ship collision occurred in front of berthing facilities and entrance of the port.

Table 10.3.6 Records of Water Traffic Accident between Large Ships in and around Tanjung Priok Port

As of July 2005

No	Month	Type	No	Month	Type
1	January 2000	Collision Ship	21	September 2003	Collision Ship
2	February 2000	Ship Sink	22	September 2003	Fire
3	February 2000	Collision Ship	23	December 2003	Collision Ship
4	February 2000	Ship Sink	24	April 2004	Ship Collapse
5	February 2000	Machine Damage	25	June 2004	Ship Crash Jetty
6	February 2000	Machine Damage	26	June 2004	Fire
7	February 2000	Fire	27	November 2004	Collision Ship
8	April 2000	Machine Damage	28	December 2004	Collision Ship
9	July 2000	Ship Sink	29	January 2005	Seaman Fall into Sea
10	January 2002	Strong Collision	30	January 2005	Ship Adrift
11	January 2002	Cargo Fall into Sea	31	April 2005	Aground Ship
12	May 2002	Ship Sink	32	June 2005	Fire
13	July 2002	Collision Ship	33	June 2005	Collision Ship
14	July 2002	Collision Ship	34	June 2005	Collision Ship
15	August 2002	Ship Sink			
16	February 2003	Collision Ship			
17	May 2003	Collision Ship			
18	May 2003	Touch			
19	July 2003	Collision Ship			
20	July 2003	Touch			

Source: JICA D/D Study Team

Besides, the study team obtained information from a fisherman in Cilincing village, approximately 2.5 km east of Tanjung Priok Port. He said that near the port area, 2 or 3 cases of accidents between fishing boats and large vessels happened per month in the passed. In some cases, fishermen lost their lives.

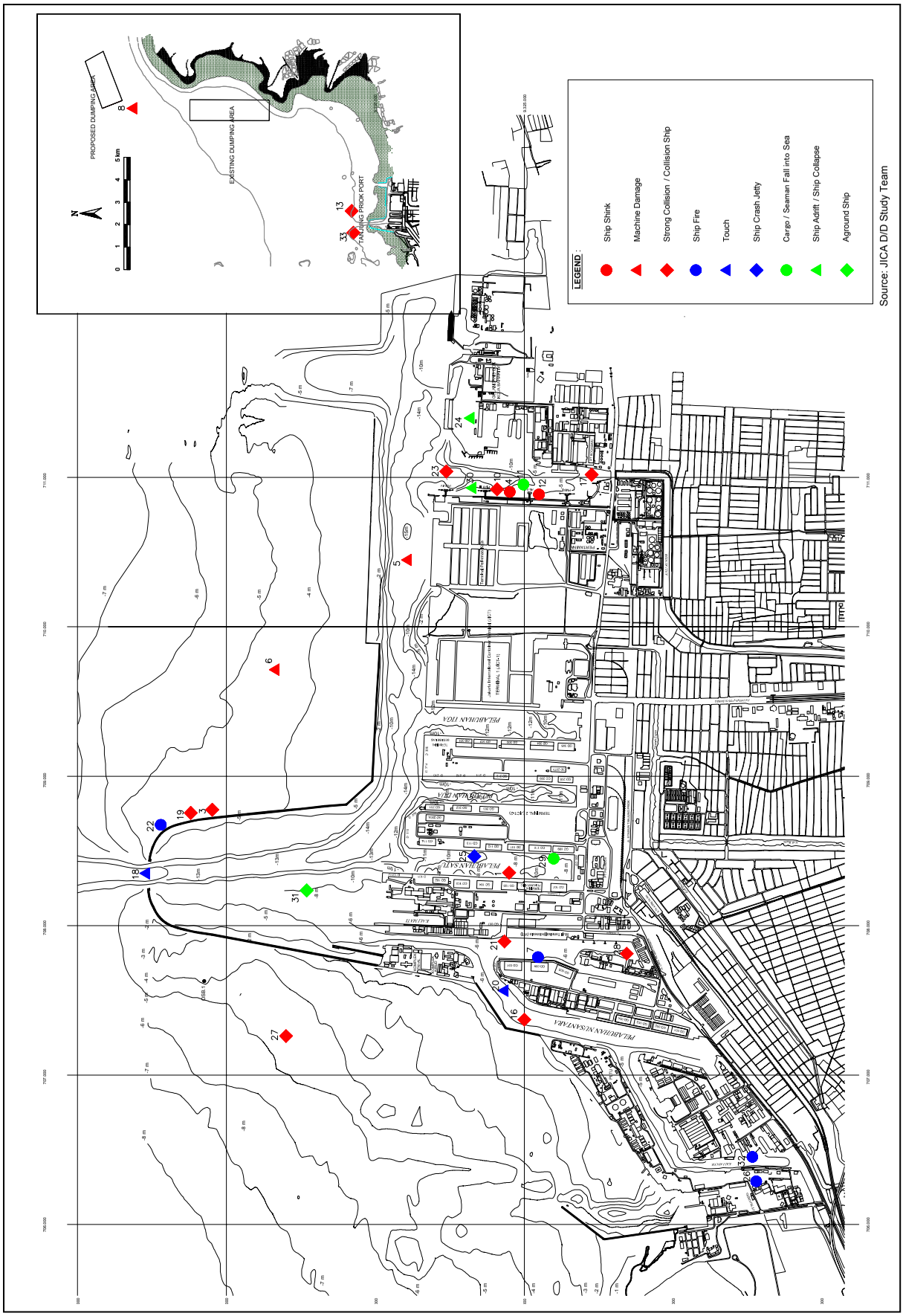


Figure 10.3.5 Locations of Water Traffic Accidents in 2000, 2002, 2003, 2004 and 2005 (between large vessels, as of July2005)