JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF SETTLEMENT AND REGIONAL DEVELOPMENT
THE REPUBLIC OF INDONESIA

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

FINAL REPORT

COMPONENT C:
URBAN DRAINAGE SYSTEM IMPROVEMENT

VOLUME V COST ESTIMATE

AUGUST 2000

CTI ENGINEERING INTERNATIONAL CO., LTD.
IN ASSOCIATION WITH
PACIFIC CONSULTANTS INTERNATIONAL
AND
PASCO INTERNATIONAL INC.

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ESTIMATE OF PROJECT COST

Price Level	:	As of July 1999		
Currency Conversion Rate	:	US$1.00	=	Rp. 6,885
		1 Yen	=	Rp. 60.39

CONSTITUTION OF THE REPORT

1. SUMMARY
2. COMPONENT A : WEST FLOODWAY/GARANG RIVER IMPROVEMENT

VOLUME I	MAIN REPORT
VOLUME II	DESIGN CRITERIA
VOLUME III	DESIGN NOTES
VOLUME IV	WORK QUANTITY CALCULATION
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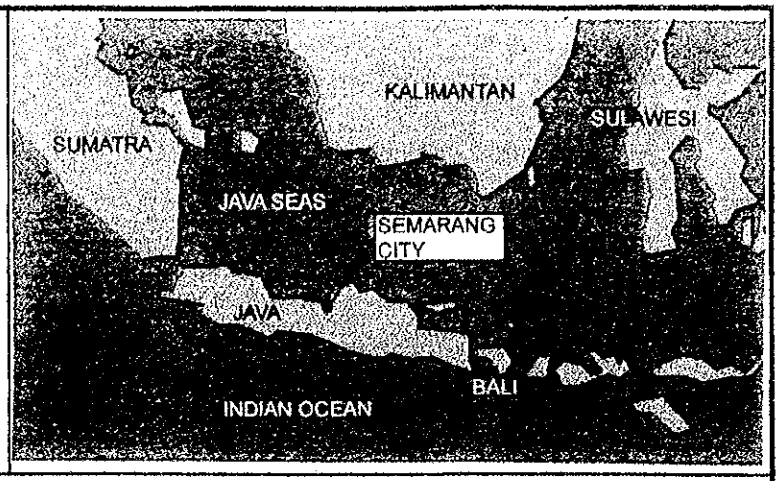
VOLUME III	WORK QUANTITY CALCULATION
VOLUME IV	CONSTRUCTION PLANNING
VOLUME V	COST ESTIMATE
VOLUME VI	DATA BOOK

GENERAL MAP



SCALE

0 10 20 30 40 50 km

JAVA SEA

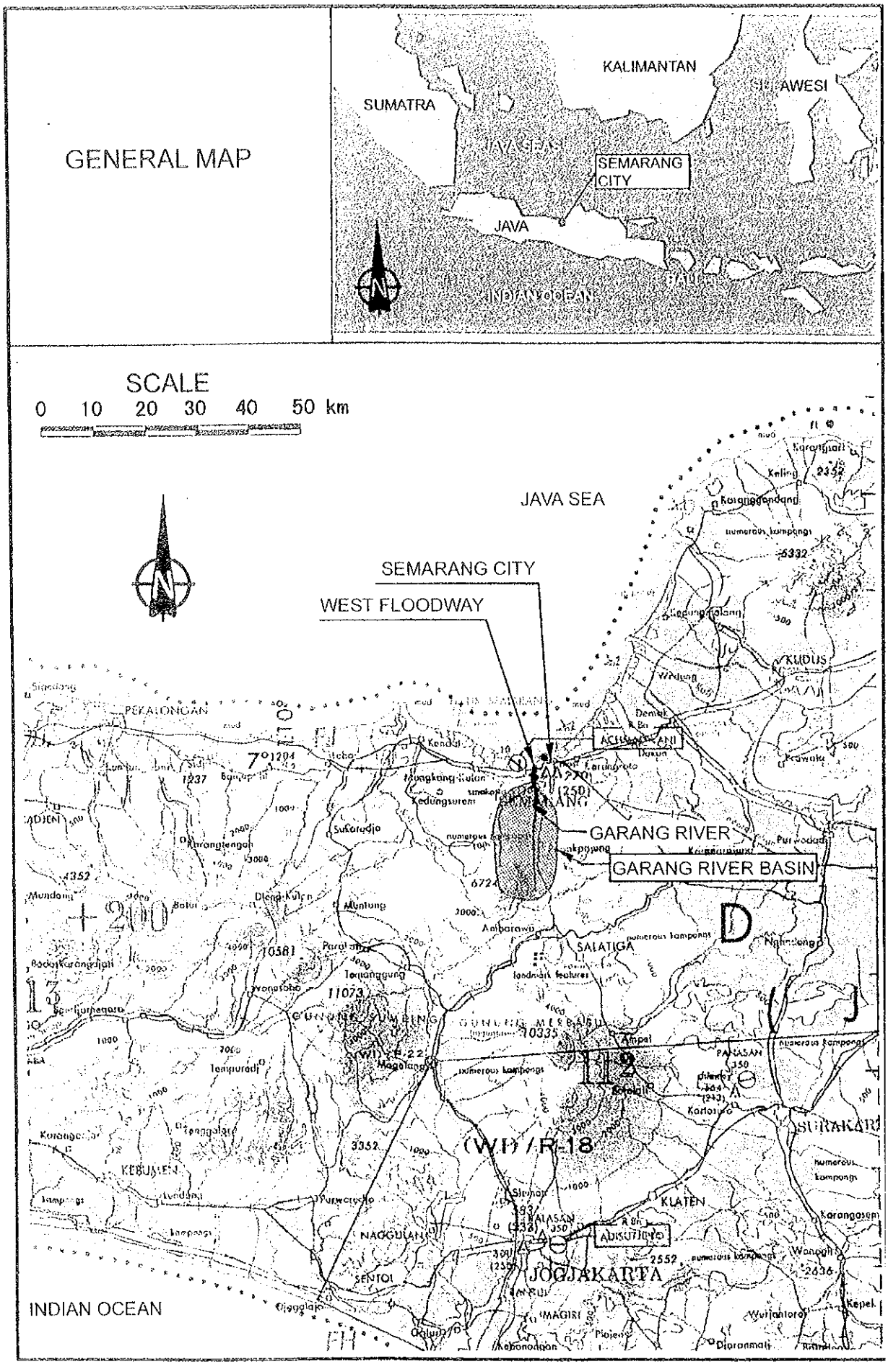
SEMARANG CITY

WEST FLOODWAY

GARANG RIVER

GARANG RIVER BASIN

INDIAN OCEAN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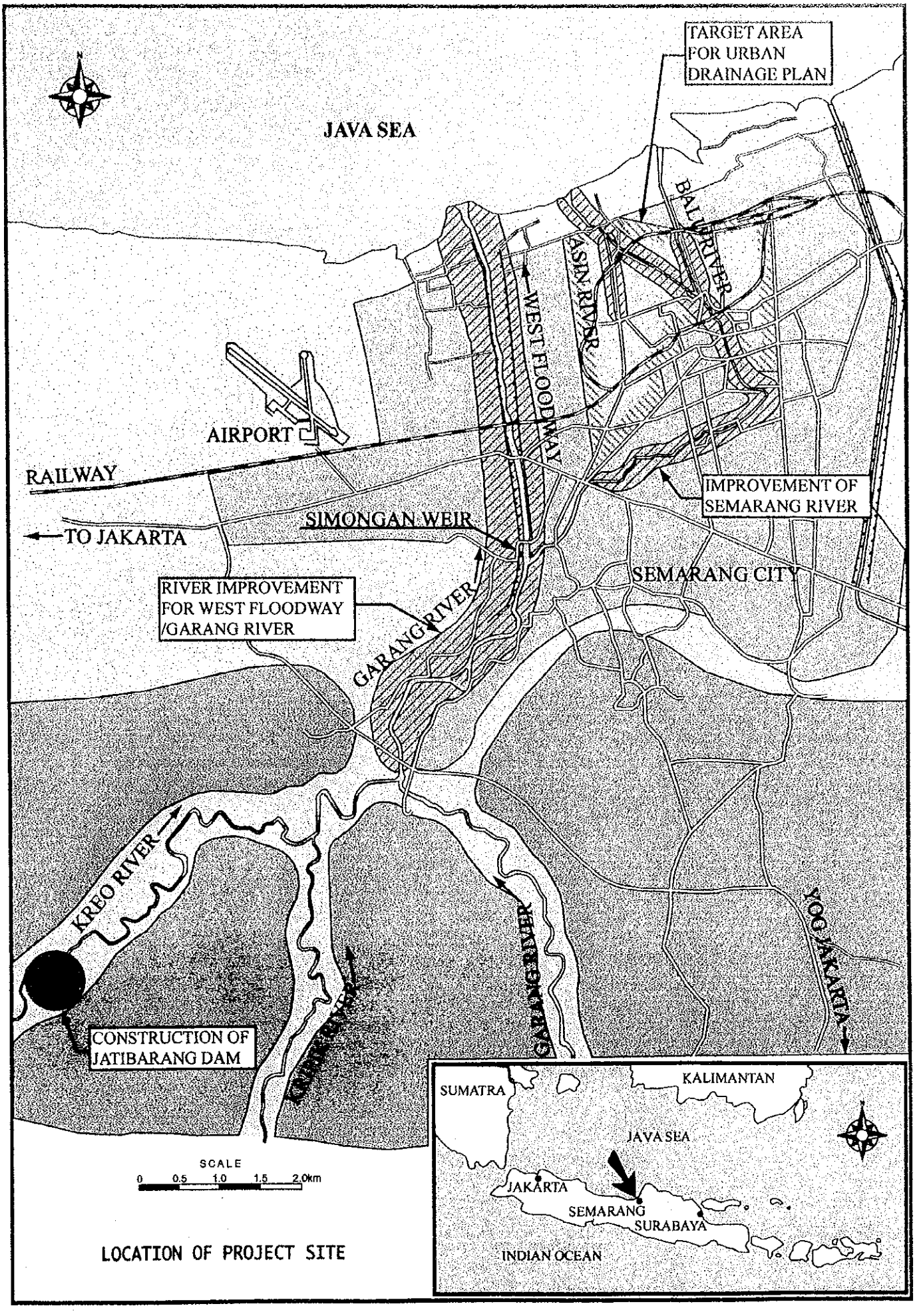
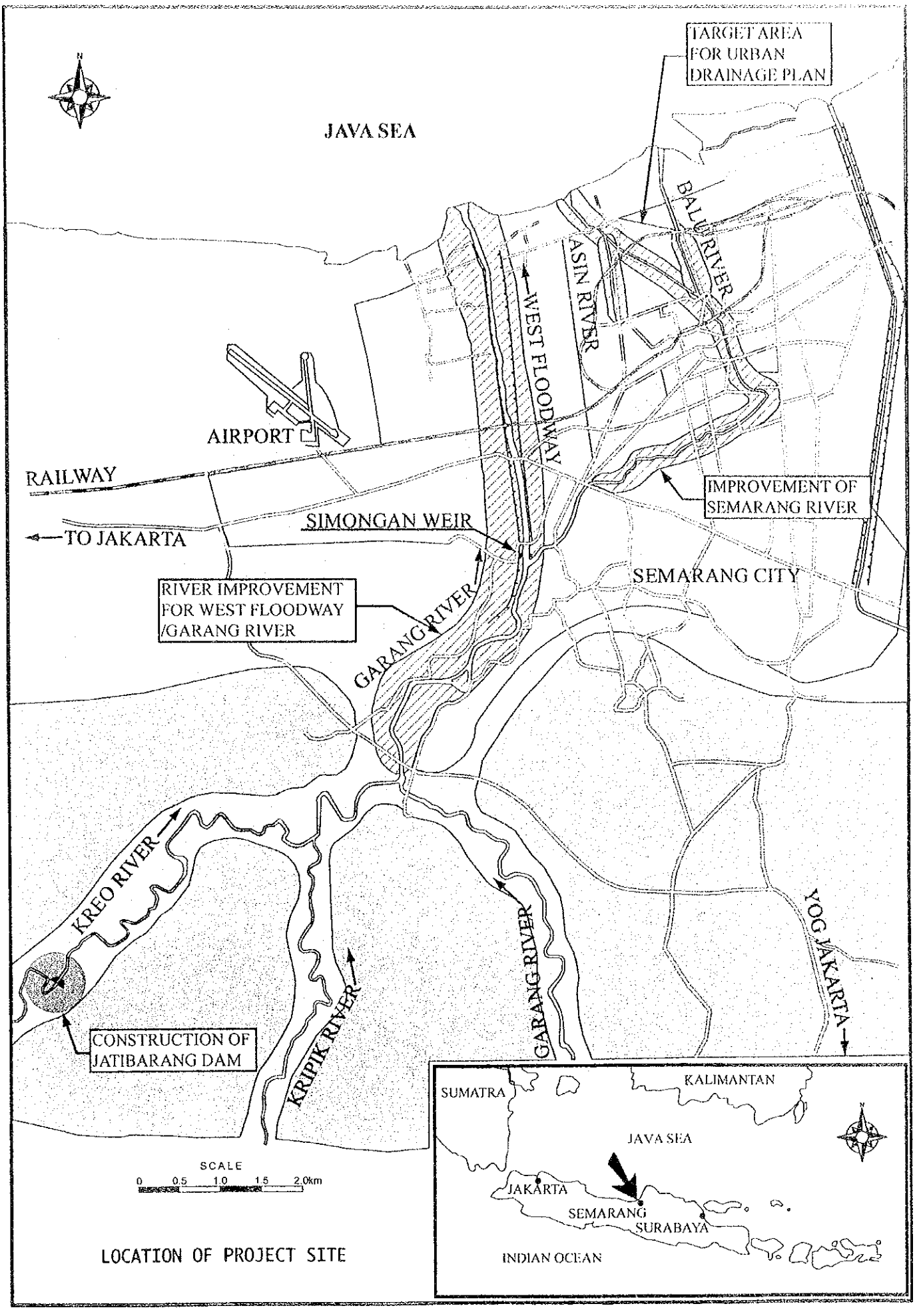


LOCATION OF PROJECT SITE



LOCATION OF PROJECT SITE

VOLUME V COST ESTIMATE

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TERMS AND ABBREVIATIONS

1. INDONESIAN GOVERNMENT AGENCIES AND ORGANIZATIONS

GOI	:	Government of Indonesia
BAPPENAS	:	Badan Perencanaan Pembangunan National (National Development Planning Board)
BAPPEDA	:	Badan Perencanaan Pembangunan Daerah (Provincial Development Planning Board)
BINAMARGA	:	Directorate General of Road and Bridge, Ministry of Public Works
BAPEDAL	:	Badan Pengendalian Dampak Lingkungan (Environmental Impact Assessement Board)
BPN	:	Badan Pertanahan Nasional (National Land Agency)
BPP	:	Balai Penyuluhan Pertanian (Agricultural Extension Center)
DPU	:	Departemen Pekerjaan Umum (Ministry of Public Works)
DGWRD	:	Directorate General of Water Resources Development, Ministry of Public Works
DGCK	:	Directorate General of Cipta Karya (Housing, Building and Urban Development, Ministry of Public Works)
DGRD	:	Directorate General of Research and Development, Ministry of Public Works)
DOR	:	Directorate of Rivers
DPUP	:	Dinas Pekerjaan Umum Propinsi (Provincial Public Works Services)
IHE	:	Institute of Hydraulic Engineering (Bandung)
PJKA	:	Perusahaan Jawatan Kereta Api (Railway Company, Old Name)
PERUMKA	:	Perusahaan Umum Kereta Api (Indonesian Railway Public Corporation, New Name)
PDAM	:	Perusahaan Daerah Air Minum (Water Works Company)
PMG	:	Pusat Meteorologi dan Geofisika (Center of Meteorology and Geographysics)
PLN	:	Perusahaan Listrik Negara (State Electricity Corporation)
P3SA	:	Proyek Pengembangan dan Penyelidikan Sumber-Sumber Air (Water Resources Development and Investigation Project)

2. JAPANESE GOVERNMENT / INTERNATIONAL ORGANIZATIONS

GOJ	:	Government of Japan
JICA	:	Japan International Cooperation Agency
MOC	:	Ministry of Construction, Japan
JEM	:	Japan Electric Machine Industry

ADB	:	Asian Development Bank
IBRD	:	International Bank for Reconstruction and Development (World Bank)
UNDP	:	United Nations Development Program
WMO	:	World Meteorological Organization
ASTM	:	American Society for Testing and Materials
ASME	:	American Society of Mechanical Engineer
USASI	:	United States of America Standards
IEC	:	International Electrotechnical Committee
NEMA	:	National Electrical Manufacturers Association

3. MEASUREMENT UNITS

(Length)			**(Weight)**		
mm	:	millimeter(s)	g, gr	:	gram(s)
cm	:	centimeter(s)	kg	:	kilogram(s)
m	:	meter(s)	t, ton	:	tonnage (s)
km	:	kilometer(s)			
(Area)			**(Time)**		
mm^2	:	square millimeter(s)	sec., s	:	second(s)
cm^2	:	square centimeter(s)	min	:	minute(s)
m^2	:	square meter(s)	h (hrs)	:	hour(s)
km^2	:	square kilometer(s)	d (dys)	:	day(s)
ha(has)	:	hectare(s)	y, yr(yrs)	:	year(s)
(Volume)			**(Discharge)**		
cm^3	:	cubic centimeter(s)	l, ltr	:	liter(s)
m^3	:	cubic meter(s)	EL., El.	:	Elevation

(Combined Units)

Speed/Velocity

cm/sec, cm/s	:	centimeter per second
m/sec, m/s	:	meter per second
km/hr, km/h	:	kilometer per hour

Stress

kgf/cm^2	:	kilogram per square centimeter
tf/m^2	:	ton per square meter
N/mm^2	:	newton per square millimeter
Mpa	:	mega pascal

Discharge

ltr/sec, l/s	:	liter per second
m^3/sec, m^3/s	:	cubic meter per second
m^3/yr, m^3/y	:	cubic meter per year

(Note : Other combined units may be constructed similarly as above)

Electricity

MW	:	megawatt	GW	:	gegawatt
MWh	:	megawatt hour	GWh	:	gegawatt hour
kV	:	kilovolt			

4. MONETARY TERMS

¥	:	Japanese Yen
US$	:	United States Dollar
Rp.	:	Indonesian Rupiah

5. INDONESIAN TERMS

JKT	:	Jakarta
Jawa	:	Java
Propinsi	:	Province
Kabupaten, Kab.	:	District (Regency)
Kotamadya, Kodya	:	Municipality
Kecamatan, Kec.	:	Sub-District
Desa	:	Village (Rural Area)
Kampung, Kp.	:	Village (Rural Area)
Kelurahan	:	Village (Urban Area)
Kali, Sungai	:	River
Gunung	:	Mountain
Rawa	:	Swamp
Danau	:	Lake
Laut	:	Sea
PT.	:	Incorporated or Limited
PPT	:	Panitia Pembebasan Tanah (Land Acquisition Committee)
KOMPUS	:	Komisi Pusat (Central Committee for Environmental Impact Assessment)
KA-ANDAL	:	Terms of Reference of Environmental Impact Statement
ANDAL	:	Environmental Impact Statement
RKL	:	Environmental Management Plan

RPL	:	Environmental Monitoring Plan
AMDAL	:	Environmental Impact Assessment
BPPM2	:	Semarang Port Bench Mark
SPB	:	Semarang Peil Baru (New Semarang Level)
TTG	:	Tanda Tinggi Geodesi (National Bench Mark)

6. OTHERS

JRATUNSELUNA PROJECT : Water Resources Development Projects for Jragung, Tuntang, Serang, Lusi and Juwana Rivers

SSUDP	:	Semarang and Surakarta Urban Development Program
IUIDP	:	Integrated Urban Infrastructures Development Program
SWL	:	Surcharge Water Level
DFWL	:	Design Flood Water Level
PMP	:	Probable Maximum Precipitation
PMF	:	Probable Maximum Flood
EIRR	:	Economic Internal Rate of Return
JIS	:	Japanese Industrial Standard
USASI	:	United States of America Standards
SWR	:	Shadow Wage Rate
CIF	:	Cost, Insurance and Freight
VAT	:	Value Added Tax.

CHAPTER 1 INTRODUCTION

This sector report is prepared for the estimate of the project cost for the component of Urban Drainage System Improvement, which consist of Semarang River Drainage System Improvement (hereinafter referred to as the Package-1), Asin River Drainage System Improvement (the Package-2) and Bandarharjo Drainage System Improvement (the Package-3).

CHAPTER 2 CONSTITUTION OF PROJECT COST AND CONDITIONS OF COST ESTIMATE

2.1 Constitution of Project Cost

Project cost is composed of such costs as construction base cost, engineering service cost, compensation cost, administration cost, physical contingency, price contingency and tax. In addition, construction base cost is divided into many cost items as illustrated in Fig. 2.1.1.

The explanation of each project cost item is described below. Administration cost, physical contingency, price contingency and tax are calculated by ratios which are expressed in percentage to other cost items (refer to Table 2.1.1):

Construction Base Cost : Construction base cost is composed of direct cost estimated based on the work quantities and indirect cost which is estimated in percentage (refer to Sub-Section 2.2 "Composition of Construction Base Cost").

Engineering Service Cost :Engineering service cost is mainly expended for the construction supervision services of consultants. It is estimated based on the number of consultant engineers and other expenses, necessary for the supervision service. The engineering service cost is estimated based on the data collected from the previous and current similar projects.

Compensation Cost :Compensation cost consists of the land acquisition and house evacuation costs.

Administration Cost :This cost is Project Owner's expenditures for the proper project management to execute the project implementation smoothly. **Seven (7) %** of the sum of the construction base cost and the compensation cost is adopted.

Physical Contingency :**Six (6) %** of the sum of the construction base cost, the engineering service cost and the compensation cost is considered for contingent expenses for the incidental construction tasks.

Price Contingency :This contingency is the cost for the price escalation. From the economical point of view, it is assumed and adopted that **three**

(3) % of all costs, in which construction base cost, enginnering service cost, compensation service cost, administration service cost and physical contingency are included, in foreign currency portion and **eight (8)** % of all costs in local currency portion is the ratios of price escalation for one (1) year. (Refer to Tables 2.1.2 and 2.1.3)

Value Added Tax : **Ten (10)** % of the construction base cost, the engineering service cost and contingencies shall be considered.

2.2 Composition of Construction Base Cost

The construction base cost is calculated in the following manner.

Construction Base Cost = Σ (Unit Cost for a Payment Item x Work Quantity for a Payment Item).

The unit costs for payment items are estimated as the sum of the direct cost and the indirect cost.

2.2.1 Direct cost

The estimate for direct costs is performed based on the quantities of all construction tasks shown on drawing and described in project requirements. The direct cost includes all of countable element due to the type, size, design, construction procedures and quality of the intended structure, which are taken into account when deriving the cost for each work item. Direct costs are broken down into the following costs and rates.

(1) Basic Cost

Basic costs are determined at first for the estimate of the project cost. Basic costs consist of labor wage, prices of materials and operation costs of equipment. Details of each basic cost are explained in Chapter 3.

(2) Unit Rate

Using the basic costs, unit rates are estimated for basic work items such as unit rate of excavation by backhoe, rate of concrete works per 1.0 m^3, etc. Basic costs and unit rates were used directly to compute unit costs of payment items, which correspond to items of bill of quantities. Unit rates are explained in Chapter 4.

2.2.2 Indirect Cost

The indirect cost on the project is an integral part for estimate. "Site expense", "Overhead and profit" and parts of "Preparatory and Temporary works" ("General" in items of bill of quantities and payment) are considered as the indirect cost.

"Site expense" includes the cost items such as staffing, site office expenses, consumables, small tools and insurance for laborers at a site. **Fifteen (15) %** of direct costs of each payment item are adopted.

"Overhead and Profit" includes the cost items such as home office support, profit and insurance at head office. **Ten (10) %** of the sum of the direct costs of each payment item and site expense is adopted.

"Site expense" and "Overhead and Profit" are added in unit costs of payment items.

"Preparatory and Temporary works" includes countable and uncountable items, direct cost and indirect cost, such as temporary buildings, electrical facilities, water supply system, construction and maintenance for access road, investigation and temporary utilities. These costs for each payment item are added up as countable cost or appropriated as percentage. Lump sum for each facilities, system and maintenance is adopted referring to similar and recent projects or quotation by private firms through formal inquiry letters.

2.3 Conditions of Project Cost Estimate

2.3.1 Price Level and Foreign Exchange Rate

The cost estimate is made on the price level as of **the end of July 1999**, since the cost data of materials, laborers, equipment and other necessary items for the cost estimate are collected in this period. The foreign exchange rate applied to the cost estimate is **US$ 1.0 = Rp. 6,885** and **¥1.0 = Rp. 60.39** of the International Banking Rate at that time.

2.3.2 Currency Component

The project cost is divided into the foreign currency components representing the and indirect foreign currencies and local currency component. The local currency for cost estimate is expressed in Rupiah currency. Moreover, the pure foreign and the indirect foreign currencies and total cost are expressed in Rupiah after exchanging from Yen, US$ or Other Currencies to Rupiah. The pure foreign currency, indirect foreign currency and local currency comprise the following items respectively:

Pure Foreign Currency (Rp.) : Cost of wage for foreign engineer and foreman,

(1) Base cost of all components for construction plants and heavy equipment except local mechanic, maintenance, repairing, fuel and laborer costs,

(2) Cost of imported materials and
Cost of materials that are produced in Indonesia by Foreign-Indonesian joint enterprise with the capital of the foreign firm which occupy more then 10% of the share.

Indirect Foreign Currency (Rp.) : Cost of foreign portion of local materials and
Cost of foreign portion of equipment produced in Indonesia.

Local Currency (Rp.) : Cost of per diem portion for foreign personnel,
Cost of local laborers,
Cost of local portion of local materials,
Cost of local portion of equipment produced in Indonesia, and
Inland transportation cost exclusive of foreign portions

Refer to Chapter 3 for further details.

CHAPTER 3 BASIC COST

The basic costs are estimated as unit rates for laborer, material and equipment costs.

3.1 Constitution of Currency Component

The basic costs are estimated in terms of pure and indirect foreign currencies and local currency. The constitution of currency component is explained below.

3.1.1 Laborer Cost

The laborer cost is computed as local currency portion in the cost estimate. The foreign laborer wage is computed as pure foreign and local currencies taking into account the annual income, airfare and living allowance, etc.

3.1.2 Material Cost

Materials are counted as local currency portion and indirect or pure foreign currency portion taking account into their usage of imported raw or processed materials, costs of production facilities and amount imported as a pure or indirect foreign currency. The price ratios of some material groups divided into every portion are listed in Table 3.1.1.

3.1.3 Equipment Cost

The currency component of the operation cost of the equipment is taking account into the following currency portion.

Pure Foreign Currency (Rp.) : Hourly depreciation costs,
Spare parts and foreign mechanic costs for repairing, and
Parts of annual management costs

Indirect Foreign Currency (Rp.) : Foreign portion of local material such as tire, fuel, etc.

Pure Local Currency (Rp.) : Local mechanic cost for repairing,
Local laborer for repairing, and
Parts of annual management costs.

3.2 Basic Cost of Laborer

The List of Construction Material Unit Cost in Semarang by DPU, April-May 1999/2000 (hereinafter referred to as "DPU Cost Table") ("Daftar Harga Satuan Bahan Bangunan), as well as survey in the Semarang City, are referred for the basic costs of laborer. The costs of laborer wages are shown in Table 3.2.1 including the laborer's all fringe benefits, such as vacation and sick leave, charge of insurance, living allowance and others according to the Labor Law in Indonesia.

3.3 Basic Cost of Material

Prices of materials required for the construction works are canvassed from DPU Cost Table, some cost reports published periodically and domestic market price survey as well as Japanese market price (refer to Chapter 6 Reference Material).

Table 3.3.1 shows basic costs of materials divided into each currency portion.

3.4 Basic Cost of Equipment

The costs of equipment are reached by the calculation measure of Japanese Construction Equipment Society as well as the measure of Technical Guide of Cost Analysis & Unit Price of Work in Semarang, Bina Marga 1995. The equipment cost for the work consists of the hourly depreciation cost, repairing cost, annual management cost and operator wage for operating, which are calculated by using a rate of delivered cost, proper economical life and repairing rate in Indonesia.

Hourly driving equipment cost calculated is shown in Table 3.4.1. In addition, Table 3.4.2 shows calculation sheet of equipment operation cost.

3.5 Reference Book

The following reference books are referred for the estimate of the basic costs:

No.	Data in Indonesia		Data in Japan
	Indonesian Word	English Word	
1	Daftar Harga Satuan Bahan Bangunan, DPU	The list of Construction Material Unit Price, DPU	
2	Jurnal Bahan Bangunan, Konstruksi dan Interior	Journal of Building & Iterior	
3	Petunjuk Teknik Analisa Biaya dan Harga Stuan Pekerjaan Kabupaten, Bina Marga 1995	Technical Guide of Cost Analysis & Unit Price of Work in Semarang, Bina Marga 1995	
4			Construction Equipment/Machine Catalogue in Japan
5			Depreciation Calculation Table by Japanese Construction Equipment Society
6			Journal of Cost Estimate, July 1999

CHAPTER 4 UNIT RATES FOR WORK ITEMS AND UNIT COSTS FOR PAYMENT ITEMS

Based on the basic costs mentioned in the preceding chapter, unit rates for work items and unit costs for payment items will be calculated in the manner mentioned hereinafter.

4.1 Unit Rate

It is important for estimate of unit rates, such as excavation by an excavator, or concreting works by m^3, etc. to decide production rates. The most of production rates are quoted from Japanese and Indonesian Standard. Japanese standard rates are utilized in case of construction works by using equipment for weir, bridge, dredging, earth works and so on. On the other hand, Indonesian Standard rates are utilized in case of construction by manpower mainly, such as building, masonry works and etc. The summary of unit rates is enumerated in Table 4.1.1.

4.1.1 Unit Rate of Common Works Using Equipment

Unit rates of common works such as earth works and concrete works mainly using equipment are calculated in Table 4.1.2. Working coefficients due to kind of equipment, amount of capacity, quantity of working volume and laborer rate are indicated in Table 4.1.3.

4.1.2 Unit Rate of Common Works by Manpower

Based on "DPU Cost Table", unit rates of common works by manpower are calculated in Table 4.1.4.

4.1.3 Unit Rate of Foundation Work

Based on the Japanese standard rates, driving piles and appurtenant works are calculated in Table 4.1.5. Working coefficients due to kind of equipment, amount of capacity, quantity of working volume and laborer rate are indicated in Tables 4.1.6 and 4.1.7.

4.1.4 Other Unit Rates

Unit rates for other works such as bridge works and temporary works etc. are computed in Tables 4.1.8 and 4.1.9.

4.2 Unit Cost for Payment Item

4.2.1 General

As described in Fig. 2.1.1, an unit cost for a payment item consists of basic costs, unit rates and their production rates.

The other conditions for the estimates of unit costs are as follows:

(1) Quotation

Quotations of electrical and mechanical facilities for pumping facilities and gates are asked to private firms for certainty.

(2) Mobilization and Demobilization

Based on the construction schedule established in "Volume VI Construction Planning", numbers of mobilization and demobilization of equipment for cost estimates are counted. Tables 4.2.1 and 4.2.2 show the number of mobilization and demobilization of equipment. The results, which are adopted to the unit costs for payment items, of the number of trailer, track and vessel for mobilization and demobilization are summarized in Tables 4.2.3 and 4.2.4.

4.2.2 Amount of Unit Costs for Payment Items

(1) Unit Costs for Payment Items

The unit costs for payment items, which are tabulated in the Volume IV, Work Quantity Calculation, in three (3) packages are broken down into basic costs and unit rates in Table 4.2.5.

(2) Unit Costs for Buildings/Complexes

Besides civil works, appurtenant buildings such as the Pump Control Buildings and Management Offices etc. are constructed in Package-2 and 3. Unit costs for buildings and calculation sheets are indicated in Tables 4.2.6 to 4.2.9.

4.3 Reference Book

In addition to the reference book enumerated in Sub-section 3.5, the following books/materials are referred to for computation of unit rates and costs.

No.	Data in Indonesia		Data in Japan
	Indonesian Word	English Word	
1	Dasar Penyusunan Anggaran Biaya Bangunan	Standard of Building Cost Estimate	
2			Standards Outline of Production Rate for Construction (1998)
3			Manual for Cost Estimate Standard for Civil Work by Ministry of Construction (1999)
4			Construction Equipment/Machine Catalogue in Japan
5			Standard of Cost Estimate for Civil Work by Ministry of Construction (1999)

CHAPTER 5. PROJECT COST

5.1 Construction Schedule

To estimate the project cost, construction schedule is most important factor in terms of price escalation, depreciation cost of equipment and/or temporary facilities, running cost of site office and so on. Therefore the construction schedules of three (3) packages which were established in Volume VI Construction Planning, are confirmed hereafter. The schedule are prepared under the assumption that the project implementation starts at the beginning of 2001 with arrangement such as tendering, contract and etc. in 2000. The project is completed until the end of 2003. Tables 5.1.1 to 5.1.3 indicate annual progress rate of the construction works based on the Construction Schedule. The schedules of main items are assumed as follows (refer to Volume VI Construction Planning);

Package-1 (Semarang River Drainage System Improvement)

1. Preparatory Works	:	Jan. 2002 – Mar. 2002
2. Dredging and Excavation	:	Apr. 2002 – Oct. 2003
3. Dike Raising	:	Apr. 2002 – Nov. 2002
4. Closure of Drainage Outlets	:	Apr.2003 – Oct. 2003
5. Inspection Road	:	Apr. 2003 – Sep. 2003

Package-2 (Asin Drainage System Improvement)

1. Preparatory Works	:	Jan. 2001 – Mar. 2001
2. Asin River Improvement	:	Apr. 2001 – Nov. 2003
3. Semarang River Improvement	:	Apr. 2001 – Nov. 2001
4. Asin Pumping Station	:	May 2002 – Mat 2003
5. Retarding Pond	:	May 2002 – Nov. 2002
6. Inspection Road	:	May 2003 – Nov. 2003

Package-3 (Bandarharjo Drainage System Improvement)

1. Preparatory Works	:	Jan. 2001 – Apr. 2002
2. Baru River Improvement	:	May 2001 – Oct. 2002
3. Baru Pumping Station	:	May 2002 – May 2003
4. Retarding Pond	:	May 2001 – Nov. 2002
5. Secondary Channel Works	:	Apr. 2002 – Nov. 2003

5.2 Project Cost

5.2.1 Construction Base Cost

Based on the unit costs for each payment item, construction base costs of three (3) packages are computed respectively and summarized as follows:

(1) Package-1: Semarang River Drainage System Improvement

The payment items, the work quantities, the unit costs and the construction base cost for Package-1 are indicated in Table 5.2.1. Dredging, excavation, pavement and masonry works account for main items in this package. Dredging and excavation works include treatment of soil to prevent leaching of heavy metals from excavated material not to contaminate ground water at a spoil bank.

(2) Package-2: Asin Drainage System Improvement

The payment items, the work quantities, the unit costs and the construction base cost for Package-2 are indicated in Table 5.2.2. The main structure in this package is Asin Pumping Station. The works for construction of the pumping station includes excavation, pile driving, concrete, furnishing and installation of mechanical and electrical equipment, steel and masonry works and so on. In addition, three (3) bridges are reconstructed due to Asin River Improvement. Moreover, a retarding pond is constructed with secondary channel.

(3) Package-3: Bandarharjo Drainage System Improvement

The payment items, the work quantities, the unit costs and the construction base cost

for Package-3 are indicated in Table 5.2.3. There is also construction of a new pumping station called Baru Pumping Station. In addition, a retarding pond is constructed with conveyance and secondary channels as well as Package-2. As another particular works, closing structure is constructed for isolation of Baru River from Asin River at diversion point.

(4) Total Construction Base Cost

The results of calculation of the construction base cost are summarized in the following table.

Name of Package	Currency	Construction Base Cost			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Package-1 (Semarang River Drainage System Improvement)	Rp x 10^6	6,915	1,151	11,243	19,308
Package-2 (Asin River Drainage System Improvement)	Rp x 10^6	46,135	3,286	32,189	81,610
Package-3 (Bandarharjo Drainage System Improvement)	Rp x 10^6	27,001	2,584	20,028	49,613
Total	Rp x 10^6	80,052	7,020	63,459	150,531
	Yen x 10^6	1,326	116	1,051	2,493
	US$ x 10^3	11,627	1,020	9,217	21,864

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.2 Engineering Service Cost

The total man-month of foreign engineer has been assumed at 53 man-months for 1 year of preliminary term and 3 years for construction works in which package-1, 2 and 3 are undertaken. In addition, local engineer remuneration, international and local transportation fee, salary for office staff and establishment and etc. are summed up. The summary of the engineering service cost are tabulated below (refer to Tables 5.2.4 and 5.2.5) :

Name of Package	Currency	Engineering Service Cost			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	8,230	0	3,789	12,019
	Yen x 10^6	136	0	63	199
	US$ x 10^3	1,195	0	550	1,746

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.3 Compensation Cost

Some hectare of land areas and three (3) houses/buildings should be expropriated for construction. Unit compensation costs were decided as below under the results of consultation between the Jratunseluna and the Study Team;

Land : 25,000 Rp/m^2

Building : 30,000,000 Rp/house

5.0 ha of land acquisition and 3 units of house evacuation are necessary to be compensated in the three (3) packages.

The total compensation cost is shown in the following table (refer to Table 5.2.6);

Name of Package	Currency	Compensation Service Cost (million rupiah/yen)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	0	0	4,793	4,793
	Yen x 10^6	0	0	79	79
	US$ x 10^3	0	0	696	696

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.4 Administration Cost

As described in "sub-section 2.1 Basic Composition of Project Cost", the administration cost for owner's expenditures is estimated as local portion at seven (7) % of the sum of construction base cost and the compensation cost. The amount of administration cost is as follows;

Name of Package	Currency	Administration Cost (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	0	0	10,873	10,873
	Yen x 10^6	0	0	180	180
	US$ x 10^3	0	0	1,579	1,579

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.5 Physical Contingency

Physical contingency is considered as local portion at six (6) % of the sum of the construction base cost, engineering service cost and the compensation cost.

Name of Package	Currency	Physical Contingency (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	5,297	421	4,322	10,041
	Yen x 10^6	88	7	72	166
	US$ x 10^3	769	61	628	1,458

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.6 Price Contingency

Based on the construction period and construction schedule descrived in Section 5.1 Construction Schedule, price contingency are computed at three (3) % of the foreign currecy portion and eight (8) % of the local portion respectively. Table 5.2.7 shows summary of price contingency between years 2000 and 2003.

Name of Package	Currency	Price Contingency (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	8,562	743	21,997	31,302
	Yen x 10^6	142	12	364	518
	US$ x 10^3	1,244	108	3,195	4,546

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.2.7 Value Added Tax

Value added tax is considered as local portion at ten (10) % of the sum of the construction base cost and engineering service cost including physical and price contingencies. The amount of value added tax is shown in the following table.

Name of Package	Currency	Value Added Tax (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Three (3) packages in Total	Rp x 10^6	0	0	20,083	20,083
	Yen x 10^6	0	0	333	333
	US$ x 10^3	0	0	2,917	2,917

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.3 Total Project Cost

Total project cost, which is summed up aforementioned items, is as follows;

Project Cost of Package-1

Name of Package	Currency	Project Cost (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Construction Base Cost	Rp x 10^6	6,915	1,151	11,243	19,308
Engineering Service Cost	Rp x 10^6	1,070	0	493	1,562
Compensation Cost	Rp x 10^6	0	0	0	0
Administration Cost	Rp x 10^6	0	0	1,352	1,352
Physical Contingency	Rp x 10^6	479	69	704	1,252
Price Contingency	Rp x 10^6	845	138	4,193	5,175
Value Added Tax	Rp x 10^6	0	0	2,697	2,697
Total	Rp x 10^6	9,309	1,358	20,680	31,347
	Yen x 10^6	154	22	342	519
	USx10^3$	1,352	197	3,004	4,553

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

Project Cost of Package-2

Name of Package	Currency	Project Cost (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Construction Base Cost	Rp x 10^6	46,135	3,286	32,189	81,610
Engineering Service Cost	Rp x 10^6	4,526	0	2,084	6,610
Compensation Cost	Rp x 10^6	0	0	2,540	2,540
Administration Cost	Rp x 10^6	0	0	5,891	5,891
Physical Contingency	Rp x 10^6	3,040	197	2,209	5,446
Price Contingency	Rp x 10^6	5,020	353	11,208	16,580
Value Added Tax	Rp x 10^6	0	0	10,863	10,863
Total	Rp x 10^6	58,721	3,837	66,982	129,540
	Yen x 10^6	972	64	1,109	2,145
	USx10^3$	8,529	557	9,729	18,815

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

Project Cost of Package-3

Name of Package	Currency	Project Cost (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Construction Base Cost	Rp x 10^6	27,001	2,584	20,028	49,613
Engineering Service Cost	Rp x 10^6	2,634	0	1,212	3,846
Compensation Cost	Rp x 10^6	0	0	2,253	2,253
Administration Cost	Rp x 10^6	0	0	3,631	3,631
Physical Contingency	Rp x 10^6	1,778	155	1,410	3,343
Price Contingency	Rp x 10^6	2,698	252	6,597	9,547
Value Added Tax	Rp x 10^6	0	0	6,524	6,524
Total	Rp x 10^6	34,111	2,991	41,654	78,755
	Yen x 10^6	565	50	690	1,304
	USx10^3$	4,954	434	6,050	11,439

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

Total Project Cost of Three Packages

Name of Package	Currency	Project Cost (million rupiah)			
		Pure Foreign Portion	Indirect Foreign Portion	Local Portion	Total
Construction Base Cost	Rp x 10^6	80,052	7,020	63,459	150,531
Engineering Service Cost	Rp x 10^6	8,230	0	3,789	12,019
Compensation Cost	Rp x 10^6	0	0	4,793	4,793
Administration Cost	Rp x 10^6	0	0	10,873	10,873
Physical Contingency	Rp x 10^6	5,297	421	4,322	10,041
Price Contingency	Rp x 10^6	8,562	743	21,997	31,302
Value Added Tax	Rp x 10^6	0	0	20,083	20,083
Total	Rp x 10^6	102,141	8,185	129,316	239,642
	Yen x 10^6	1,691	136	2,141	3,968
	USx10^3$	14,835	1,189	18,782	34,806

Note ; Conversion Rate : US$ 1.0 = Rp. 6,885, ¥ 1.0 = Rp. 60.39

5.4 Disbursement Schedule

Table 5.4.1 shows summary of disbursement schedule and Table 5.4.2 shows detail disbursement schedule of construction base cost including price contingency.