

16) Study on Measures to Encourage Supply of Land for Landfill

It is recommended that KMS and the Central Government should study on measures to encourage supply of land for landfill because the land acquisition is always difficult for local governments. Possible measures worth studying include the following:

- a. A measure to encourage the supply of land for disposal sites is to provide land sellers with exemption of tax imposed on the land sales.
- b. Development of a system "Landfill Completion and Land Exchange" whereby local government will acquire land for new landfill sites through the exchange of land of the completed landfill sites with new land.
- c. Acquisition of land for landfill on lease base
- d. Development of alternate uses of land after completion of landfill (People would be more acceptable to the construction of landfill sites if they knew that the land will be converted into green parks or used for residential or commercial or industrial development purposes.

17) Improvement of Operation of the Incinerator and Effective Use of the Incinerator

KMS should do the following:

- a. Select more suitable waste, and take measures to keep waste drier in the pit.
- b. Install air-preheater to promote drying process of waste in the furnace
- c. Use incinerator for incineration of medical waste as already implemented recently.

**TABLES
AND
FIGURES**

Tables and Figures for Master Plan

Table 1 Waste Amount to be Generated, Recycled and Hauled (Average Throughout Year)

Year	Waste to be Generated	Waste That May not be Collected	To be Recycled before being hauled to LPA	To be Collected by RT/RW but Disposed at Unidentified Places	To be Collected and Hauled by Waste Generators	(ton/day)		
						To be Hauled under KMS' Responsibility	To be Hauled by KMS' Trucks	To be Hauled by KMS' Contractors
	(1)	(2)	(3)	(4)	(5)	(6)=(1)-(2)-(3)-(4)-(5)	(7)	(8)=(6)-(7)
1992	1,626	249	180	171	137	889	621	268
1993	1,707	246	188	146	202	925	621	304
1994	1,793	243	197	121	267	965	621	344
1995	1,882	240	207	96	332	1,007	621	386
1996	1,976	237	217	71	397	1,054	621	433
1997	2,075	234	228	46	462	1,105	621	484
1998	2,179	231	240	21	527	1,160	621	539
1999	2,288	228	252	0	572	1,236	621	615
2000	2,402	225	264	0	601	1,312	621	691
2001	2,522	222	277	0	631	1,392	621	771
2002	2,649	219	291	0	662	1,477	621	856
2003	2,781	216	306	0	695	1,564	621	943
2004	2,920	213	321	0	730	1,656	621	1,035
2005	3,066	210	337	0	767	1,752	621	1,131
2006	3,219	207	354	0	805	1,853	621	1,232
2007	3,380	204	372	0	845	1,959	621	1,338
2008	3,549	201	390	0	887	2,071	621	1,450
2009	3,727	198	410	0	932	2,187	621	1,566
2010	3,913	195	430	0	978	2,310	621	1,689

Note: Of the waste amount hauled by KMS and the generators (shown in columns (5) & (6) respectively), it is projected that 90 ton/day is hauled to unofficial LPA in Asemrowo till 1999.

Table 2. Projection of Household Waste Composition

(Unit: wt.%)

Classification	Rainy Season			Dry Season		
	1992	2000	2010	1992	2000	2010
Recyclable						
• Paper	12.6	13.3	14.1	12.5	13.1	13.9
• Plastics	7.9	9.0	10.6	7.7	8.8	10.2
• Metal	1.0	1.0	1.1	0.9	1.0	1.0
• Glass	0.9	1.0	1.2	1.1	1.2	1.4
Subtotal	22.4	24.3	26.9	22.2	24.1	26.6
Non-Recyclable						
• Textile	1.8	1.8	1.7	2.0	1.9	1.8
• Wood/Glass	19.6	19.0	18.2	18.0	17.4	16.7
• Garbage	52.3	50.8	48.7	52.0	50.4	48.3
• Other Combustible	0.8	0.8	0.9	0.6	0.6	0.7
• Other Non Combustible	3.2	3.4	3.6	5.3	5.6	5.9
Sub total	77.6	75.7	73.1	77.8	75.9	73.4
TOTAL	100	100	100	100	100	100
Moisture Content	66.1	65.5	64.8	54.7	53.4	52.8
Calorific Value (Kcal/kg)	1,020	1,050	1,090	1,290	1,360	1,410

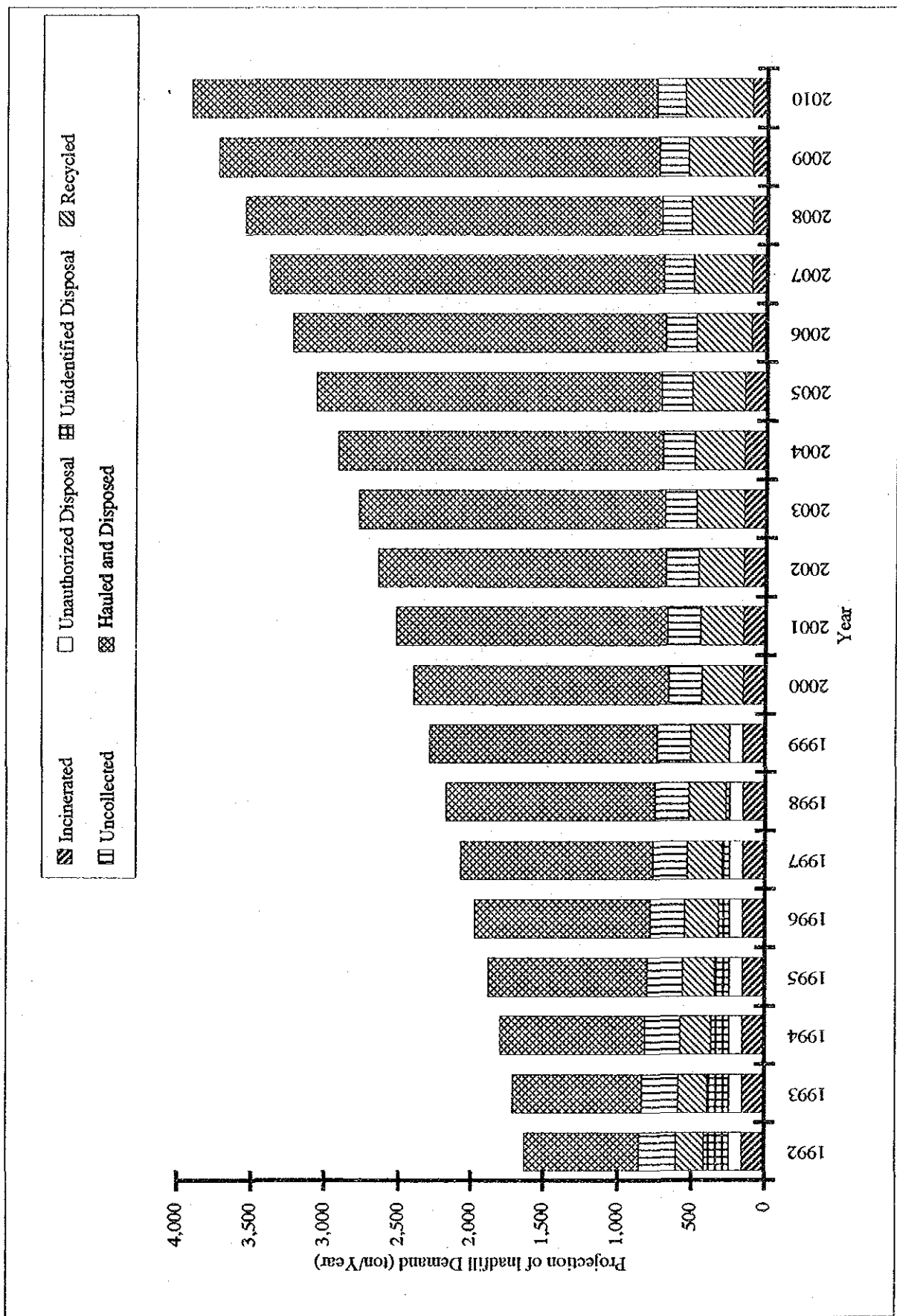


FIG. 1.

Projection of Waste Haulage and Disposal Amounts
(Average Throughout Year)

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

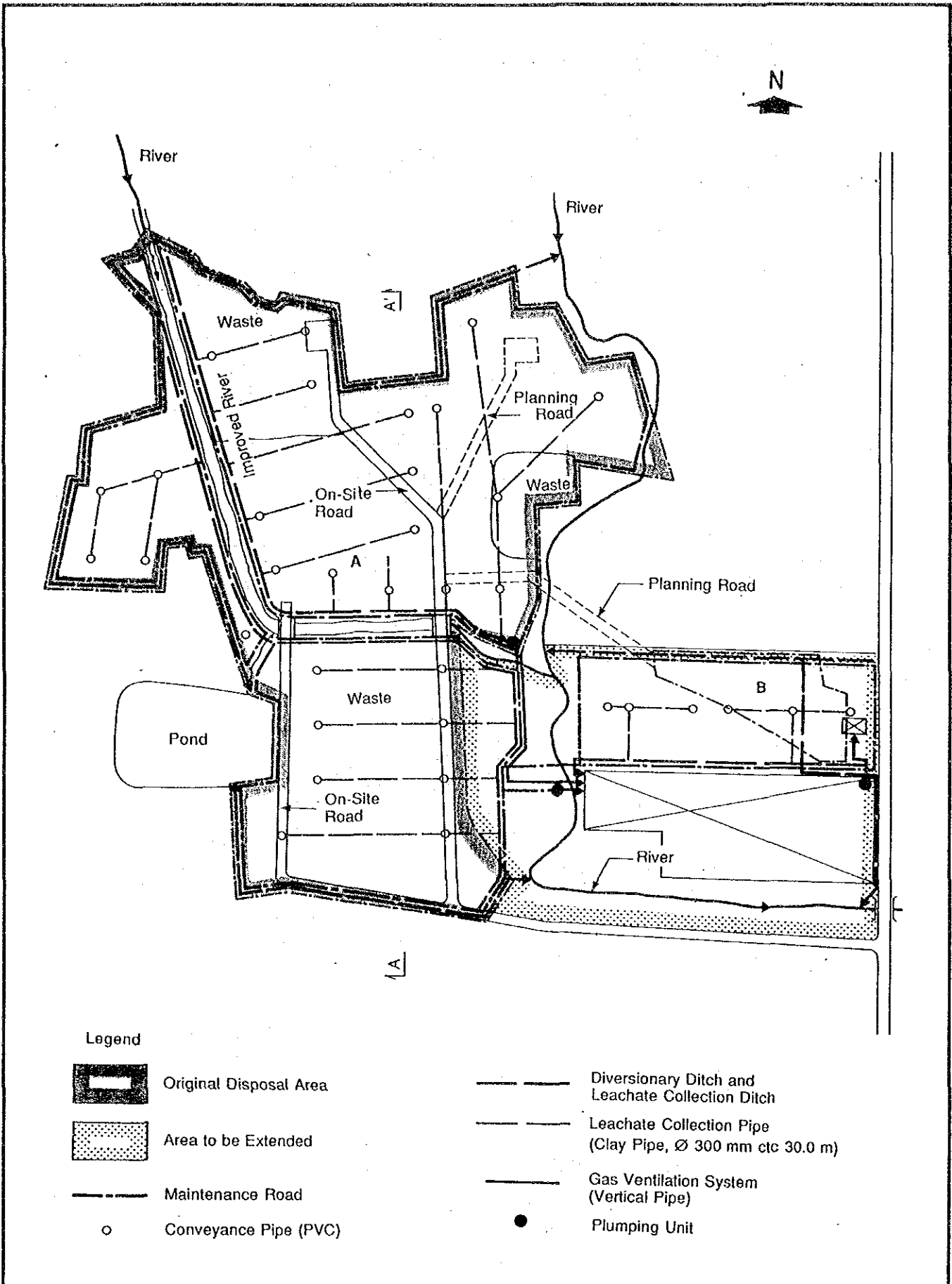


FIG. 2

General Layout Plan for Improvement of Lakarsantri Landfill Site

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

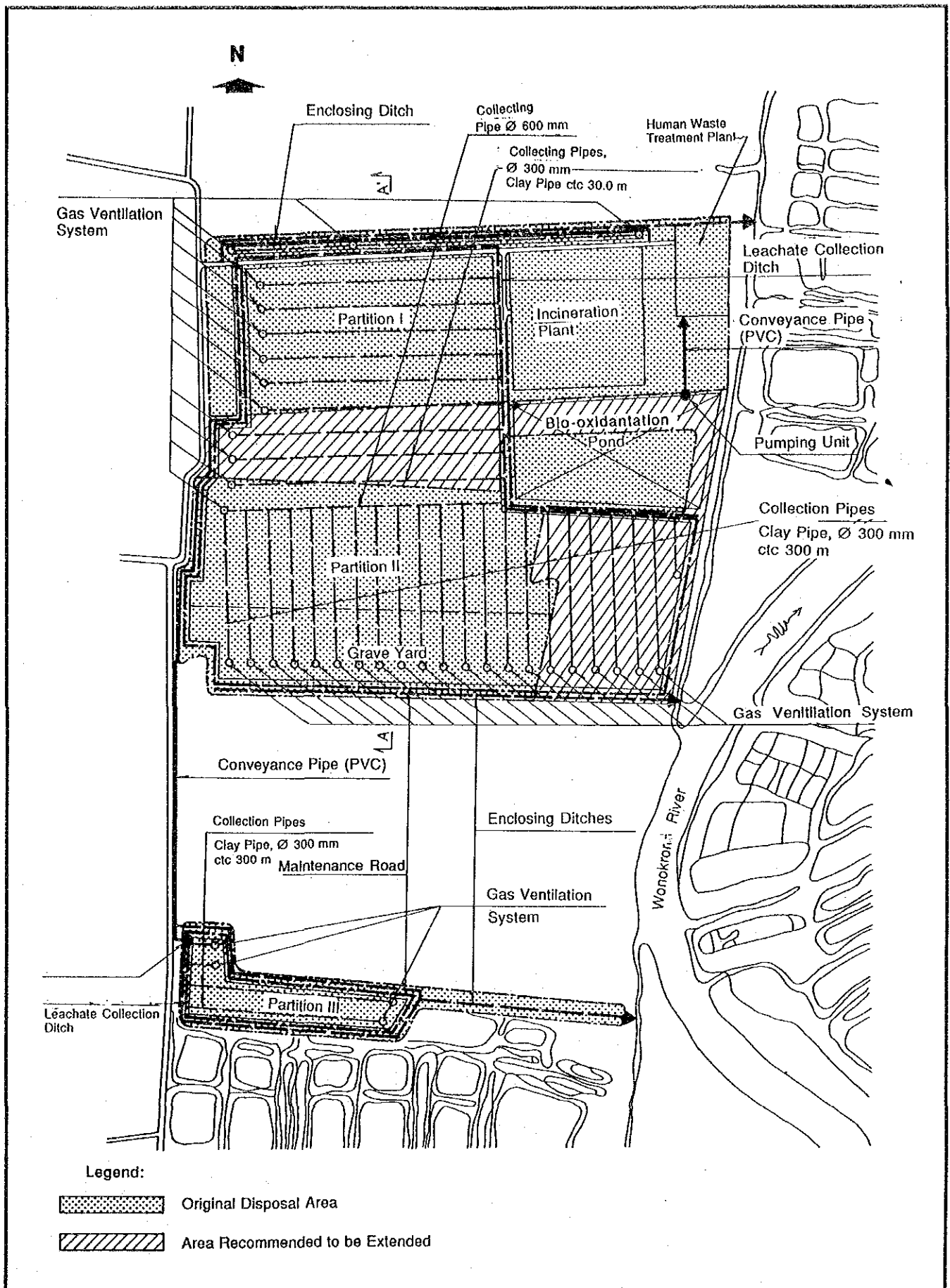


FIG. 3

General Layout Plan for Improvement of Keputih Landfill Site

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

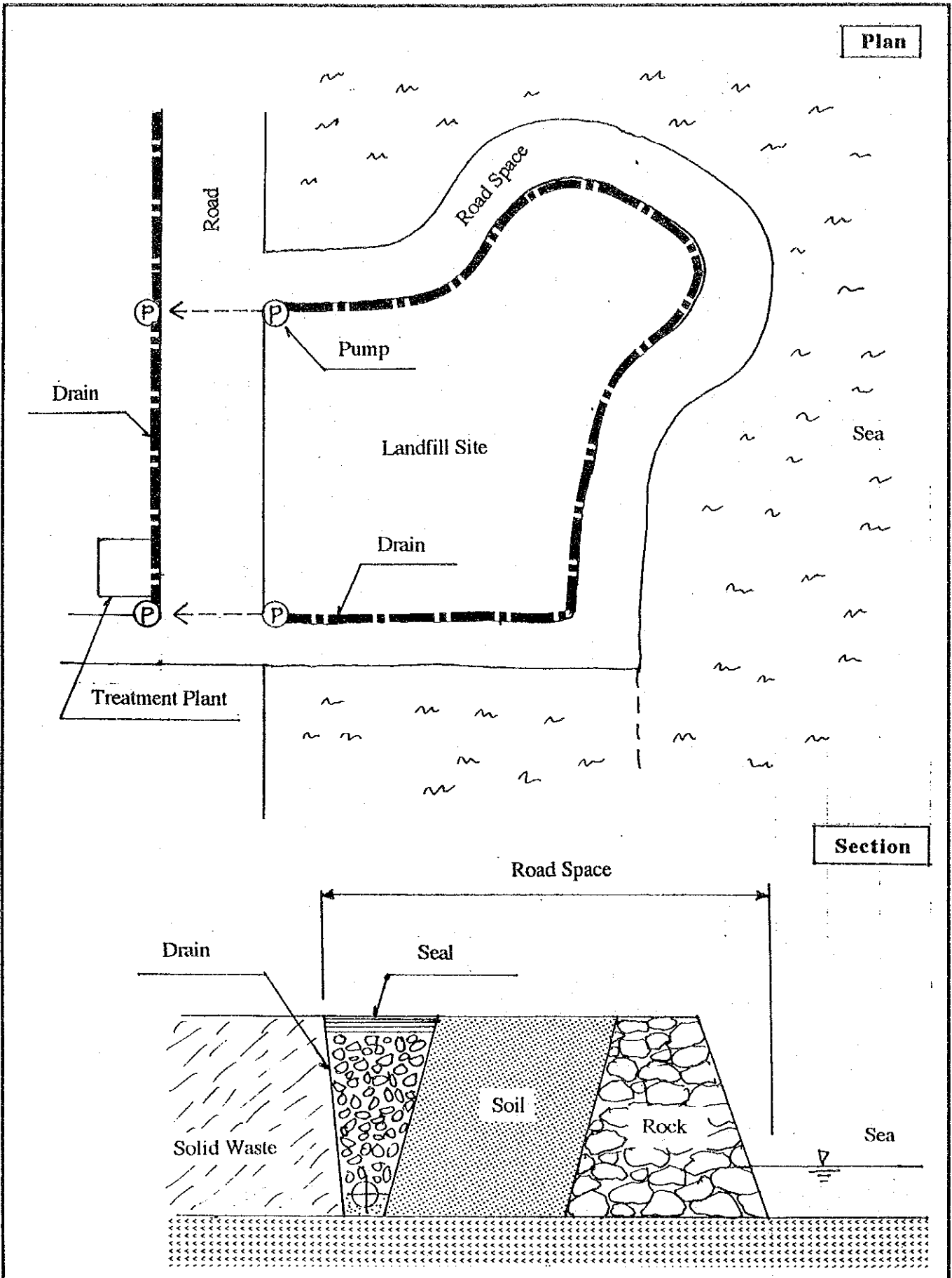


FIG. 4

General Layout Plan for Improvement of Kenjeran Landfill Site

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

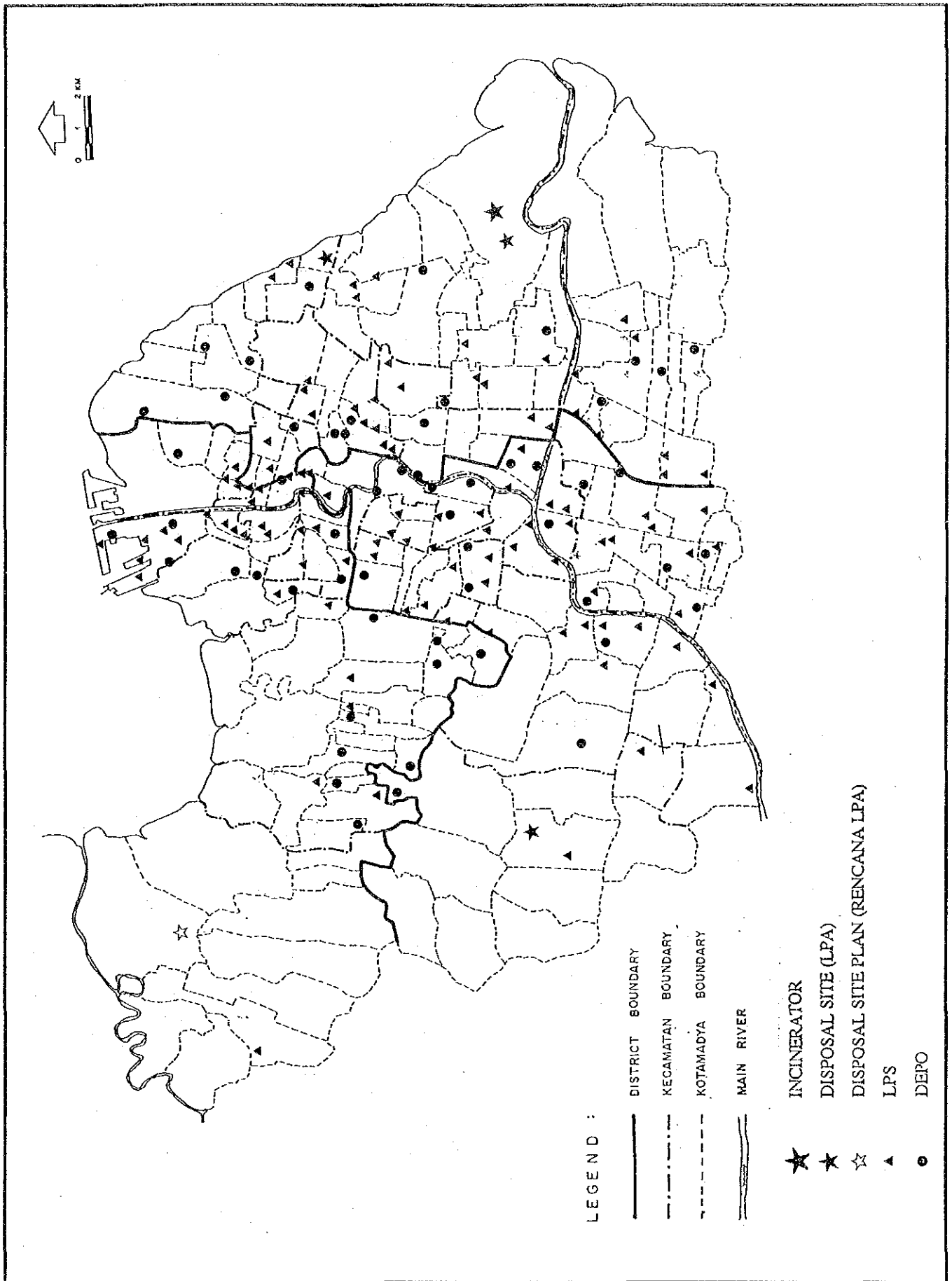


FIG. 5

Location of Depo, LPS and Incinerator

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

Tables and Figures of the Feasibility Study

Table 3 Annual Implementation Program

Projects	Total Quantity	93/94	94/95	95/96	96/97	97/98	98/99
1. Procurement of waste haulage vehicles, containers, & handcart							
1.1 7 GVW Arm-roll trucks serving for 8 m ³ containers	26	7	4	6	0	9	0
1.2 14 GVW Arm-roll trucks serving for 14 m ³ containers	39	18	0	6	0	15	0
1.3 Open dump trucks	5	3	1	0	1	0	0
Sub-total of trucks (1.1+1.2+1.3)	70	28	5	12	1	24	0
1.4 8 m ³ containers	89	39	44	6	0	0	0
1.5 14 m ³ containers	130	122	0	2	1	3	2
Sub-total of containers (1.4+1.5)	219	161	44	8	1	3	2
1.6 1 m ³ Handcarts	256	85	86	0	0	0	0
1.7 1.5 m ³ Handcarts	94	31	32	0	0	0	0
Sub-total (1.6+1.7)	350	116	118	0	0	0	0
2. Construction of sanitary landfill site in Benowo (94/95 - 96/97)							
2.1 LPA (Lump-sum)	1			0.8	0.2		
3. Construction and rehabilitation of Depo/LPS & Improvement of Asemrowo Workshop							
3.1 Construction of Depo	24	0	6	6	6	6	0
3.2 Construction of LPS	12	0	3	3	3	3	0
3.3 Rehabilitation of Depo *	30						
3.4 Rehabilitation of LPS *	34						
3.5 Improvement of Asemrowo Workshop							
3.5.1 Remodeling of Asemrowo Workshop	Lump-sum		1				
3.5.2 Procurement of tools & equipment	Lump-sum		1				
4. Procurement of heavy Equipment							
4.1 Bulldozers	4	0	1	1	2	0	0
4.2 Rotary screen	1	1	0	0	0	0	0
4.3 Excavator	1	0	0	0	1	0	0
4.4 Overhaul of Bulldozer	4	2	2	0	0	0	0
4.5 Overhaul of Landfill compactor	2	1	1	0	0	0	0
4.6 Overhaul of Wheeled loader	1	0	0	0	1	0	0
Sub-total	13	4	4	1	4	0	0

* See Main Report Table 3.4-5

Table 4 Annual Investments of the F/S Project

Unit: Million Rupiah in 1992 price

Projects	92/93	93/94	94/95	95/96	96/97	97/98	98/99	Total
1. Vehicles, Containers & Handcarts								
1.1 Vehicles (3 types)	0	2,041.7 (28)	253.1 (5)	815.4 (12)	50.7 (1)	1,734.9 (24)	0	4,895.8 (70)
1.2 Containers (2 Type : 8 & 14 m ³)	0	1,210.0 (161)	264.0 (44)	52.0 (8)	8.0 (1)	24.0 (3)	16.0 (2)	1,574.0 (219)
1.3 Handcarts (2 types: 1 & 1.5 m ³)	0	57.9	57.8	58.9	0	0	0	174.6
Sub-total of Item 1 (1.1 + 1.2 + 1.3)	0	3,309.6	574.9	926.3	58.7	1,758.9	16.0	6,644.4
2. Construction of Sanitary Landfill in Benowo	0	0	0	18,335.0	3,693.0	1.0	1,405.0	23,434.0
3. Depo/LPS construction & rehabilitation & Asemrowo Workshop Improvement								
3.1 Construction of Depo/LPS	0	0	309.5 [81.0] {228.5}	228.5 [0] {228.5}	363.6 [135] {228.5}	255.5 [27] {228.5}	0	1,157.1 [243] {914.1}
3.2 Rehabilitation of Depo/LPS	0	0	52.7	44.4	39.0	47.6	0	183.7
3.3 Asemrowo Workshop Improvement	0	0	267.0	0	0	0	0	267.0
Sub-total of Item 3 (3.1 + 3.2 + 3.3)	0	0	629.2 [81] {548.2}	272.9 [0] {272.9}	402.6 [135] {267.6}	303.1 [27] {276.1}	0	1,607.8 [243] {1,364.8}
4. Procurement of Heavy Equipment	0	215.0	500.0	300.0	880.0	0	0	1,895.0
Grand Total (1 + 2 + 3 + 4)	0	3,524.6 [0] {3,524.6}	1,704.1 [81] {1,623.1}	19,834.2 [0] {19,834.2}	5,034.3 [135] {4,899.3}	2,063.0 [27] {2,036.0}	1,421.0 [0] {1,421.0}	33,581.2 [243] {33,338.2}

Notes:

1. The above-shown investment amounts include the value added tax (10% of original prices).
2. Figures in brackets [] indicate cost (million Rupiah) needed for purchase of land.
3. Figures in { } indicate cost (million Rupiah) excluding cost of land purchase.
4. It is assumed that cash expenditures will be not be required for land acquisition of the planned sanitary landfill in Benowo.

Table 5 Annual Operation and Maintenance Costs of the F/S Project

Unit: Million Rupiah in 1992 price

Projects	92/93	93/94	94/95	95/96	96/97	97/98	98/99	Total
1. Vehicles, Containers & Handcarts								
1.1 Vehicles & Containers	0	451.7	632.2	685.2	987.4	987.3	1,531.9	5,275.7
1.2 Handcarts (2 types: 1 & 1.5 m ³)	0	0	0	0	0	0	0	0
Sub-total of Item 1 (1.1 + 1.2)	0	451.7	632.2	685.2	987.4	987.3	1,531.9	5,275.7
2. Construction of Sanitary Landfill in Benowo	0	0	0	0	683.0	683.0	683.0	2,049.0
3. Depo/LPS construction & rehabilitation & Asemrowo Workshop Improvement								
3.1 Construction of Depo/LPS	0	0	31.0	22.9	36.3	25.5	0	115.7
3.2 Rehabilitation of Depo/LPS	0	0	5.3	4.4	3.9	4.8	0	18.4
3.3 Asemrowo Workshop Improvement	0	0	26.7	0	0	0	0	26.7
Sub-total of Item 3 (3.1 + 3.2 + 3.3)	0	0	63.0	27.3	40.2	30.3	0	160.8
4. Procurement of Heavy Equipment	0	0	26.9	89.4	126.9	236.9	236.9	717.0
Grand Total (1 + 2 + 3 + 4)	0	451.7	722.1	801.9	1,837.5	1,937.5	2,451.4	8,202.5

Table 6 Other SWM Expenditures (Other Than Those Related to the F/S Project)

Unit: Million Rupiah in 1992 price

Projects	92/93	93/94	94/95	95/96	96/97	97/98	98/99	Total
1. Haulage								
1.1 O & M of the existing trucks	1,328	610	238	45		0	0	2,221
1.2 Payment to contractor	1,788	2,509	2,952	3,414	3,800	4,224	4,680	23,367
1.3 Total (1.1+1.2)	3,116	3,119	3,190	3,459	3,800	4,224	4,680	25,588
2. Street Sweeping								
2.1 Personnel expenditure	1,458	1,336	1,215	1,094	972	850	729	7,654
2.2 Equipment	88	81	74	66	59	52.0	44	464
2.3 Payment to contractor	926	986	1,047	1,108	1,168	1,229	1,290	7,754
2.4 Total (2.1+2.2+2.3)	2,472	2,403	2,336	2,268	2,199	2,131	2,063	15,872
3. Cost Related to Heavy Equipment								
3.1 O & M of Heavy equipment	228	228	228	228	114	57	0	1,083
3.2 Personnel expenditure	18	18	18	18	9	4	0	85
3.3 Total (3.1+3.2)	246	246	246	246	123	61	0	1,168
4. Costs Related to LPA in the East								
4.1 Construction	0	0	0	0	(6,933)	(1,733)	0	8,666
4.2 Land purchase		0	0	3,542	0	0	0	3,542
4.3 Sub-total (4.1+4.2)	0	0	0	3,542	(6,933)	(1,733)	0	12,208
4.4 O&M	0	0	0	0	0	683	683	1,366
4.5 Total (4.3 + 4.4)	0	0	0	3,542	6,933	2,416	683	13,574
5. Incineration								
5.1 Operation	966	966	966	966	966	966	966	6,762
5.2 Repair & equipment	0	936	171	173	472	1,785	840	4,337
5.3 Repayment of principal & interest	4,400	4,129	3,868	3,606	3,344	3,083	2,821	25,251
5.4 Payment to Consultants & others	120	120	120	120	120	120	120	840
5.5 Total of Item 5.	5,486	6,151	5,125	4,865	4,902	5,954	4,747	37,230
6. Administration	632	632	632	632	632	632	632	4,424
Total (1+2+3+4+5+6)								
a. Investment for LPA	(0)	(0)	(0)	(3,542)	(6,933)	(1,733)	(0)	(12,208)
b. All other costs	11,952	12,551	11,529	11,470	11,656	13,685	12,805	85,648
c. Total (a + b)	11,952	12,551	11,529	15,012	18,589	15,418	12,805	97,856

Note: Amounts in the parenthesis () indicate investments needed for the construction of sanitary landfill in the east part of Surabaya.

Table 7 Ratios of Net SWM Cash Expenditures and Loan Repayment to the Total KMS Budget Unit: Million Rupiah (Nominal)

Year	Ratio of Net SWM Cash Expenditures to Total KMS Budget (1)	Ratio of Total Loan Repayments to Total KMS Budget (2)	Total (1) + (2) = (3)	KMS Budget (Nominal Million Rupiah) (4)
1985/86			7.4 %	31,700
1986/87			6.5 %	36,700
1987/88			6.5 %	50,400
1988/89			6.9 %	59,800
1989/90			12.0 %	62,100
1990/91			10.7 %	74,700
1991/92			11.3 %	99,400
1992/93	10.6 %	0.0%	10.6 %	112,700
1993/94	10.7 %	0.0%	10.7 %	134,902
1994/95	9.0 %	0.2%	9.2 %	161,478
1995/96	9.2 %	0.3%	9.5 %	193,289
1996/97	8.3 %	1.5%	9.8 %	231,367
1997/98	8.4 %	1.8%	10.2 %	276,946
1998/99	7.4 %	1.7%	9.1 %	331,504
Average During 1992/93 - 1998/99			9.9 %	

Note: Annual net SWM cash expenditures (N) are defined as follows:

$N = a + b + c - d$, where

a: Annual F/S projects expenditures

b: Annual operation and maintenance costs related to F/S projects

c: All other annual non-F/S projects expenditures

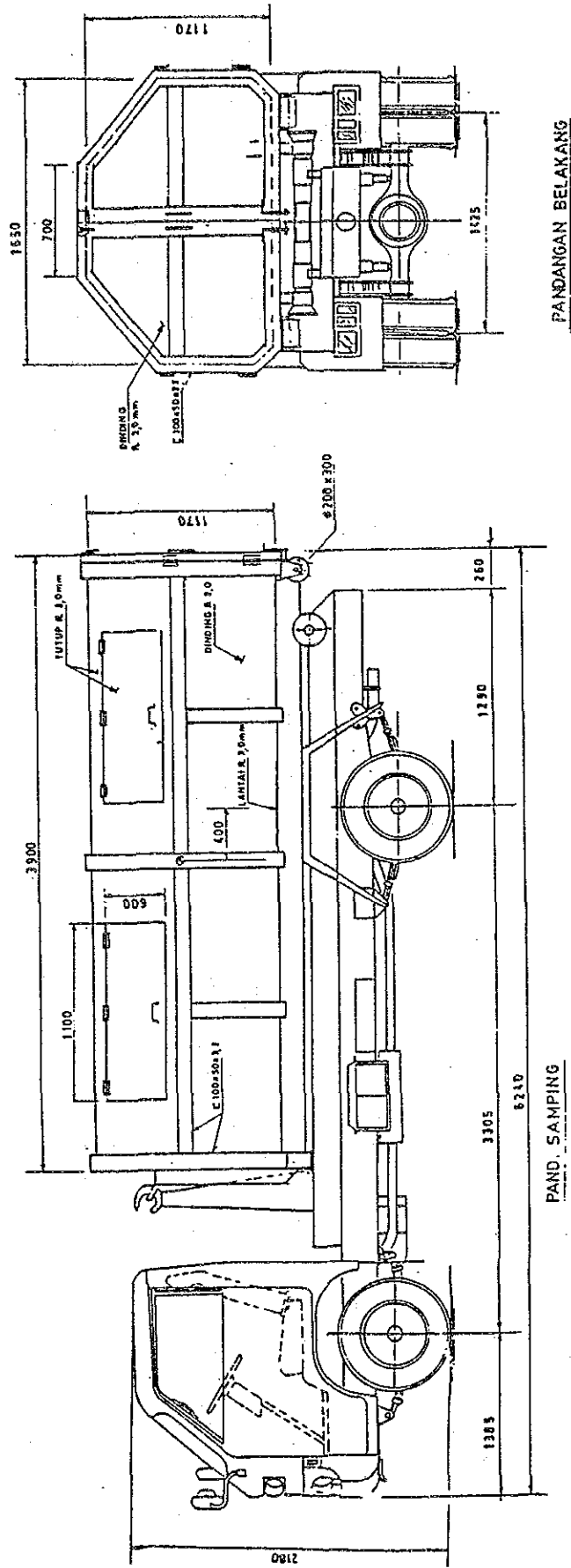
d: Annual revenue of the bilateral loans and Indonesian Government loan

Table 8 Ratios of Net SWM Expenditures (Excluding Loan Repayments) to KMS' Total Budget

Unit: Million Rupiah in 1992 price

Projects	92/93	93/94	94/95	95/96	96/97	97/98	98/99	Total
A. Total SWM Expenditures including both F/S Projects & other expenditures	11,952.0	16,527.3	13,955.2	35,648.2	25,460.8	19,418.5	16,677.8	139,639.7
B. Bilateral Loan Revenue	0	3,204.2	1,475.6	18,031.1	4,453.9	1,850.9	1,291.8	30,307.5
C. The Indonesian Government Loan	0	0	0	3,542.0	6,933.0	1,733.0	0	12,208.0
D. Net Expenditures (A - B - C)	11,952.0 (10.6%)	13,323.1 (10.7%)	479.6 (9.0%)	14,075.1 (9.2%)	14,073.9 (8.3%)	15,834.6 (8.4%)	15,386.0 (7.4%)	97,124.2 (8.9%)
E. Net Revenue of the Sanitary Retribution	3,500.0 (3.1%)	5,744.0 (4.6%)	6,144.0 (4.4%)	6,544.0 (4.3%)	6,944.0 (4.1%)	7,380.0 (3.9%)	8,080.0 (3.9%)	44,336.0 (4.0%)
F. The Remaining to be Covered by the General KMS Budget (D - E)	8,452.0 (7.5%)	7,579.1 (6.1%)	6,335.6 (4.6%)	7,531.1 (5.5%)	129.9 (4.2%)	8,454.6 (4.5%)	306.0 (3.6%)	52,788.2 (4.9%)
G. KMS' Total Budget	112,700 (100%)	124,872 (100%)	138,358 (100%)	153,300 (100%)	169,857 (100%)	188,201 (100%)	208,527 (100%)	1,095,815 (100%)

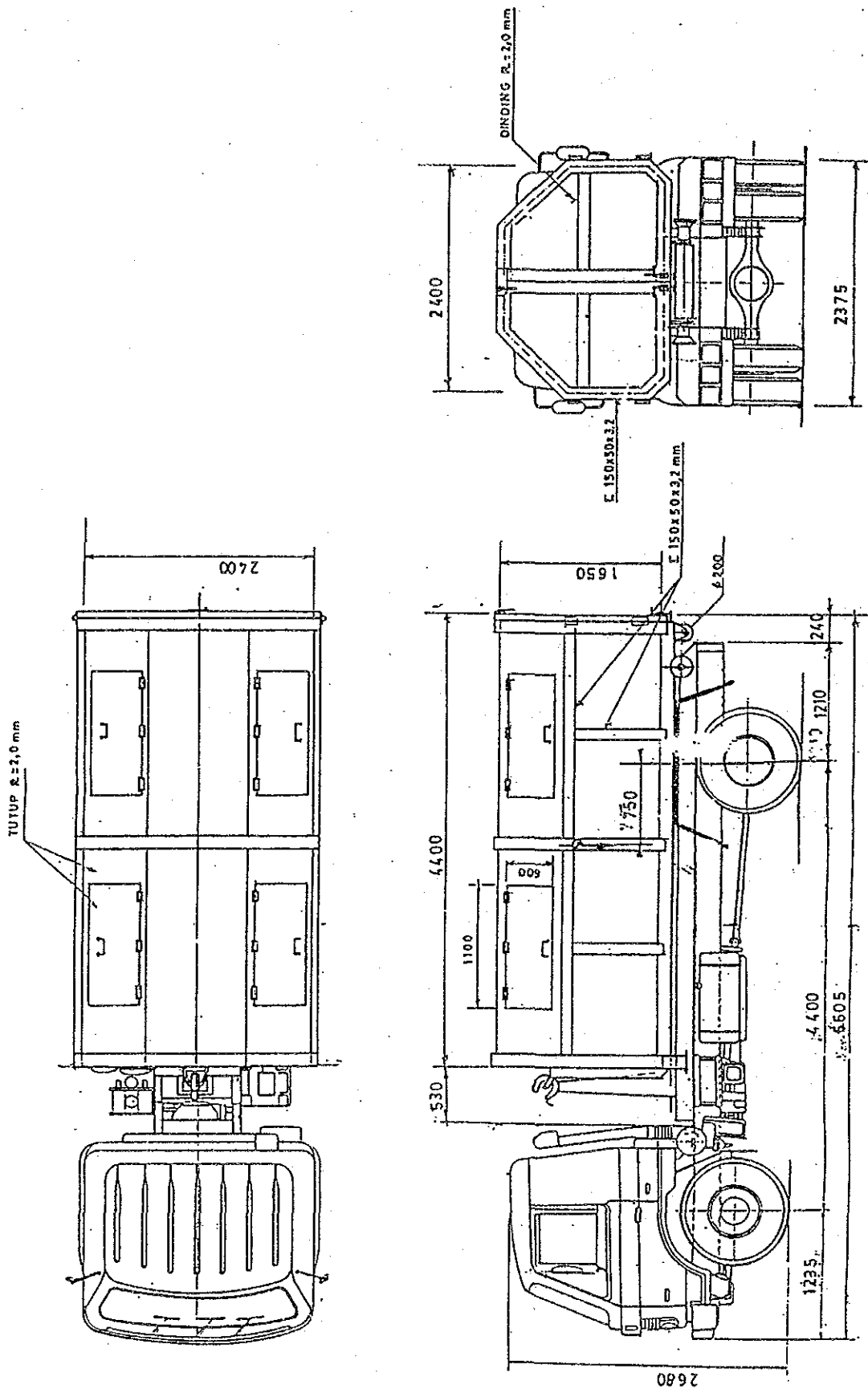
Note: It is assumed that KMS' total budget will increase by 10.8 %/year in real term, the same percentage as in the past.



Source : WIRA GULFINDO SARANA

FIG. 6

Example of 7 GVW Arm-Roll Truck with 8 M³ Container



Source : WIRA GULFINDO SARANA

FIG. 7

Example of 14 GVW Arm-Roll Truck with 14 m³ Container

Table 9 Future Amount of Waste to be Hauled by Type of Trucks

Unit : ton/day on rainy season base

Year	Waste Amount to be Hauled under KMS' Responsibility (1)	To be Hauled by K M S' Own Trucks				To be Hauled by Contractors			
		Arm-Roll Trucks [2]	Com-pactor Trucks (3)	Open Dump Trucks (4)	KMS Total (5)=(2)+(3)+(4)	Arm-Roll Trucks [6]	Com-pactor Trucks [7]	Open Dump Trucks [8]	Con-tractors' Total (9)=[6]+[7]+[8]= (1) - [5]
1992	989	539	121	31	691	0	0	298	298
1993	1,027	617	60	14	691	217	69	50	336
1994	1,070	658	30	5	691	246	108	25	379
1995	1,117	691	0	5	691	266	148	12	426
1996	1,167	691	0	5	691	312	158	6	476
1997	1,222	691	0	5	691	362	169	0	531
1998	1,282	691	0	5	691	410	181	0	591
1999	1,350	691	0	5	691	464	195	0	659

Note: Waste to be hauled by contractors' compactor trucks (column 7) will increase by a 20 % of annual incremental waste (column 1) in 1996 and thereafter.

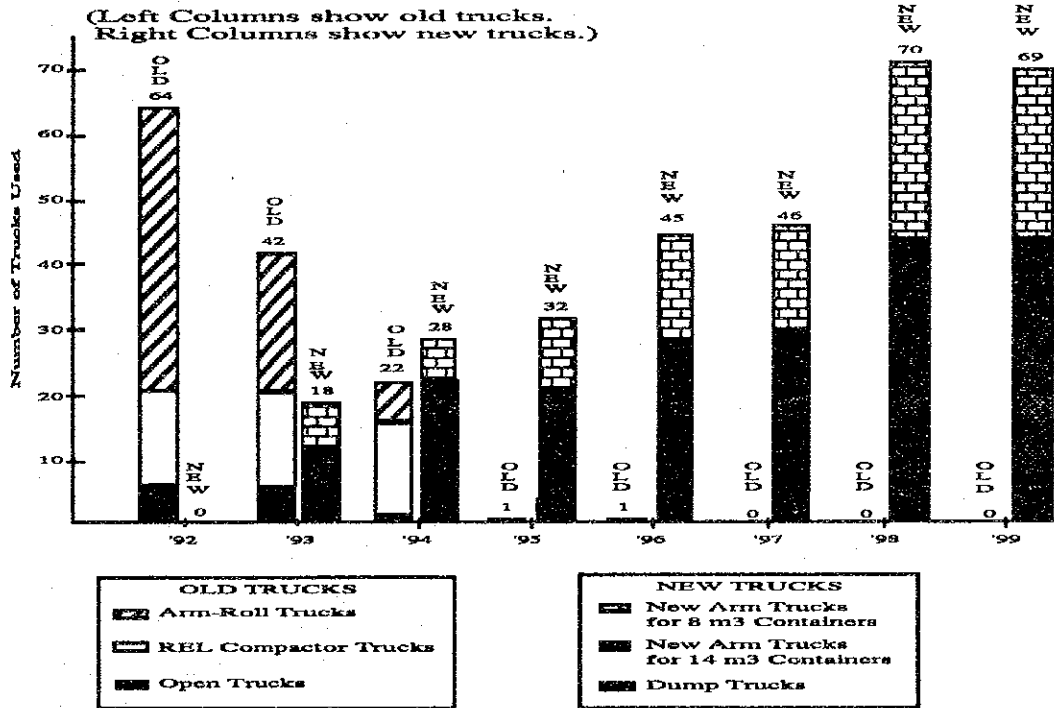


Fig. 8 Number of the Existing and New Trucks in Comparison

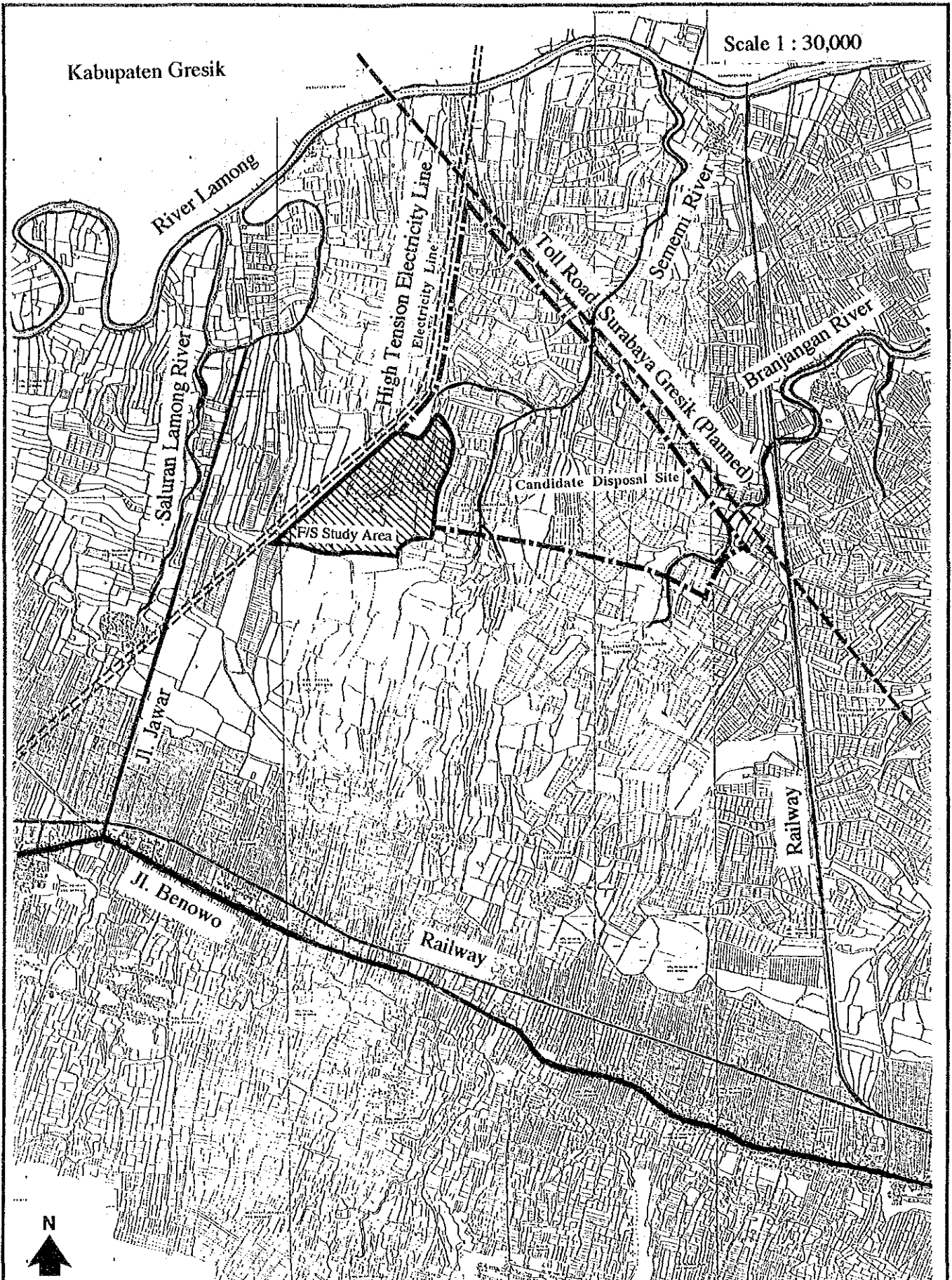


FIG. 9

Access to the Planned Landfill Site in Benowo

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

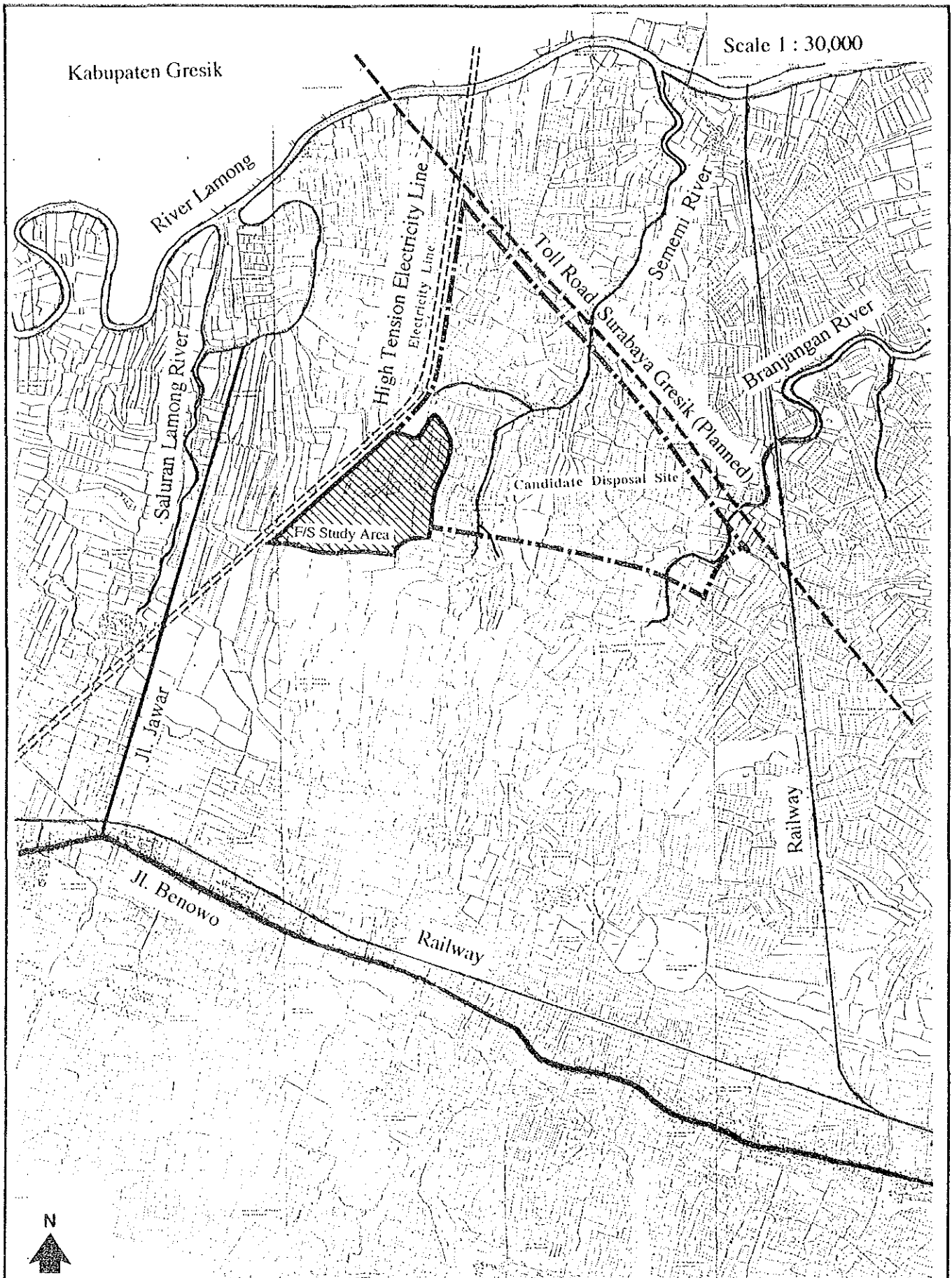


FIG. 9

Access to the Planned Landfill Site in Benowo

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

LEGEND

	KELURAHAN BOUNDARY
	PROJECT SITE
	SURVEY AREA
	TREE
	WIND MILLS
	ELECTRICITY TOWER
	SALT FARM
	FISH POND
	RESIDENTIAL LOT & AREA
	TEMPORARY RESIDENCE
	WAREHOUSE
	PASTURE
	OPEN AREA WITH NO USAGE
	POND AREA WITH NO USAGE
	ROAD
	TREAD
	RIVER
	DITCH

STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

TITLE: Fig. 10
Present Land Use of Planning Site

PROPOSED BENOWO FINAL DISPOSAL SITE

LOCATION: RACHMAT
 DATE: URUSHIBATA
 SCALE: 1:10,000

DRAWN: JICA
 CHECKED: Japan-International Cooperation Agency
 PT.INDULEXCO Consulting Group



PRESNT LAND USE

LEGEND

- KELURAHAN BOUNDARY
- PROJECT SITE
- SURVEY AREA
- ◇◇◇◇ TREE
- ◇◇◇◇ WIND MILLS
- ◇◇◇◇ ELECTRICITY TOWER

- ▭ SALT FARM
- ▭ FISH POND
- ▭ RESIDENTIAL LOT w/ ARFA
- ▭ TEMPORARY RESIDENCE
- ▭ WAREHOUSE
- ▭ PASTURE
- ▭ OPEN AREA WITH NO USAGE
- ▭ POND AREA WITH NO USAGE
- ▭ ROAD
- ▭ TREAD
- ▭ RIVER
- ▭ DITCH

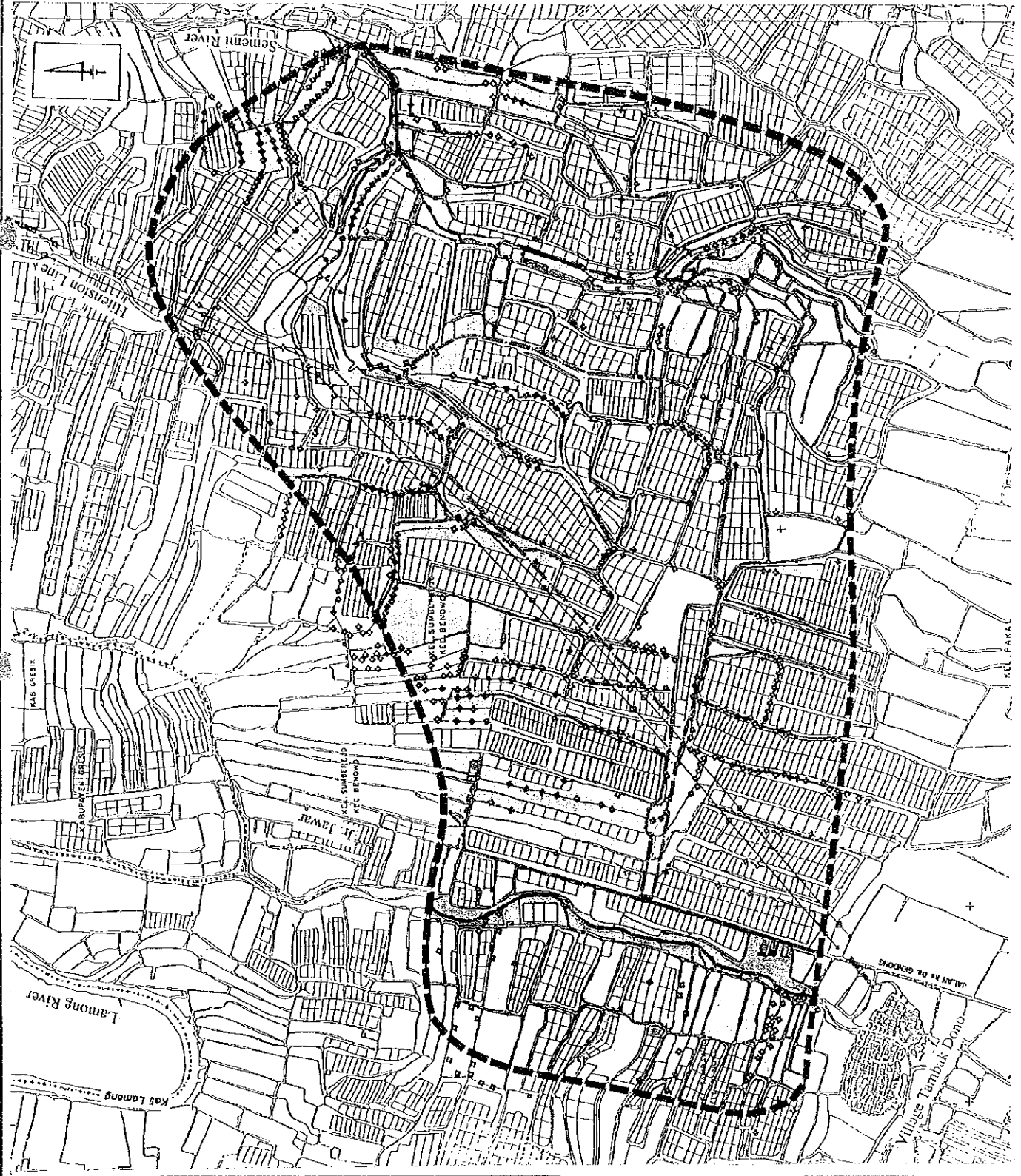
STUDY ON THE SOLID WASTE
MANAGEMENT IMPROVEMENT
FOR SURABAYA CITY

TITLE : Fig. 10
Present Land Use of
Planning Site

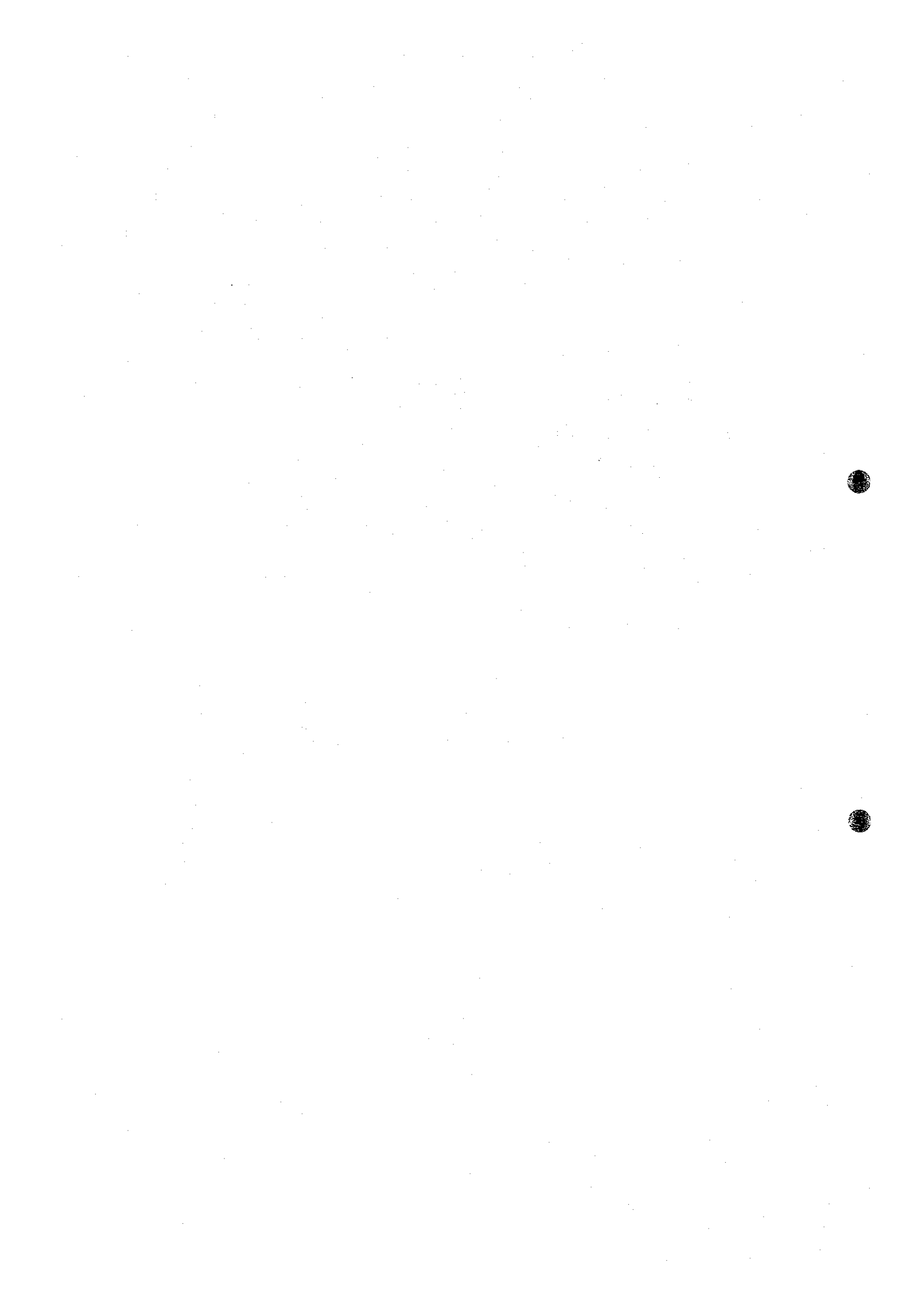
LOCATION :
PROPOSED BENOWO
FINAL DISPOSAL SITE

DRAWN : RACHMAT DATE :
CHECKED : URUSHEATA SCALE : 1 : 10,000

JICA
Japan International
Cooperation Agency
PT. INDUJALEXCO
Consulting Group



PRESNT LAND USE



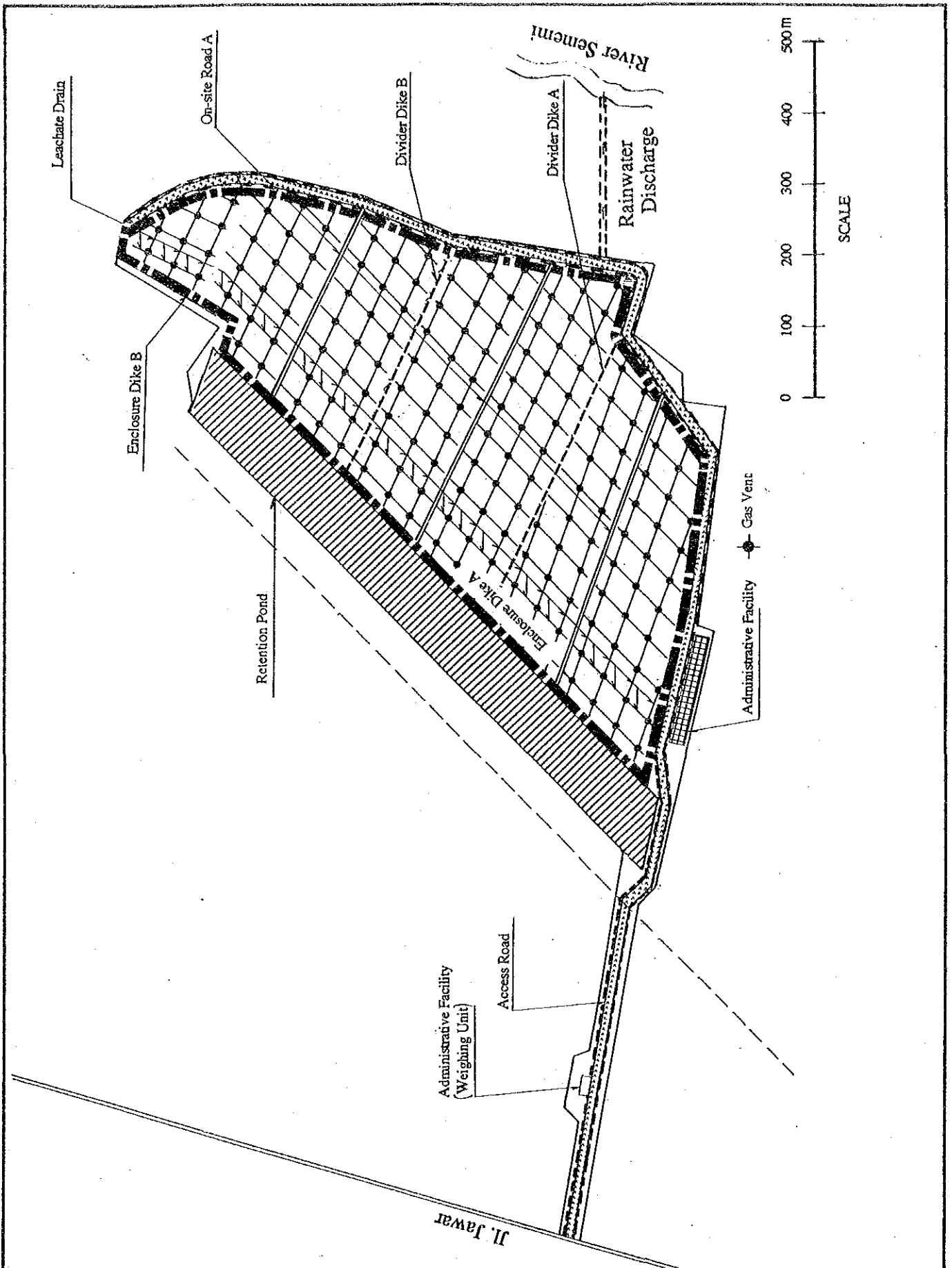
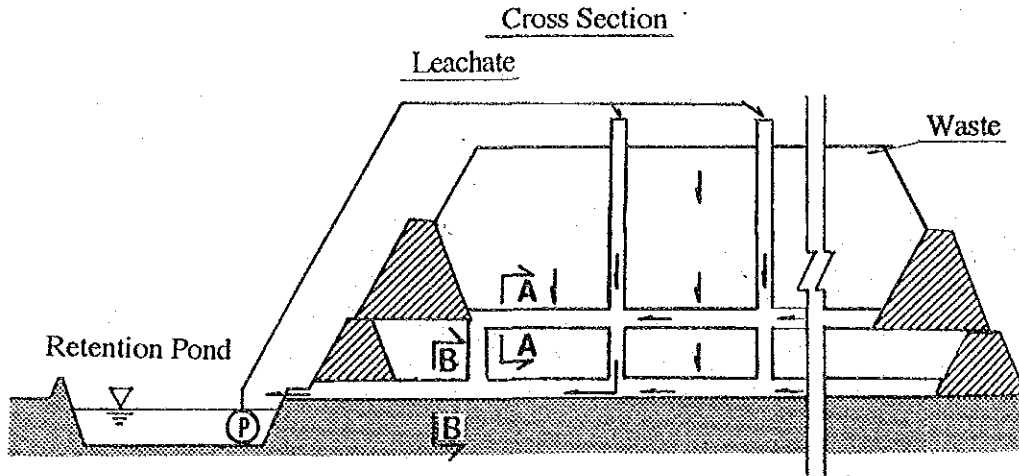


FIG 11

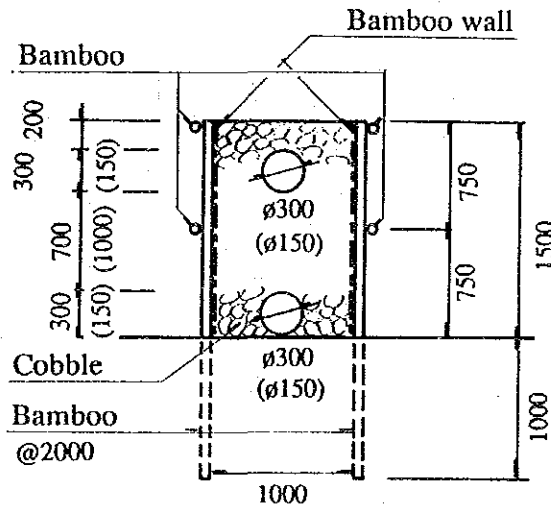
Facility Layout Plan for the Planned Sanitary Landfill in Benowo

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY



Cross Section of Leachate Drain

1st Stage Main Drain
(Branch Drain)
B - B



2nd Stage Main Drain
(Branch Drain)
A - A

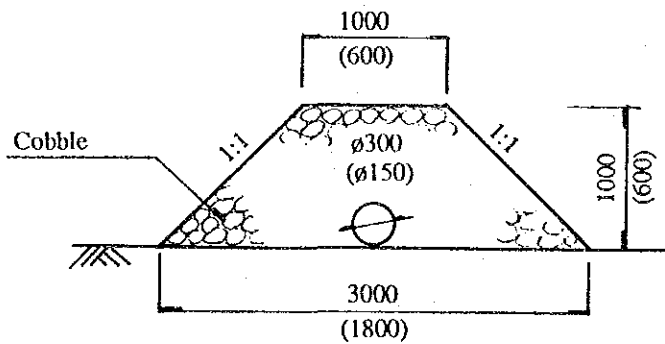
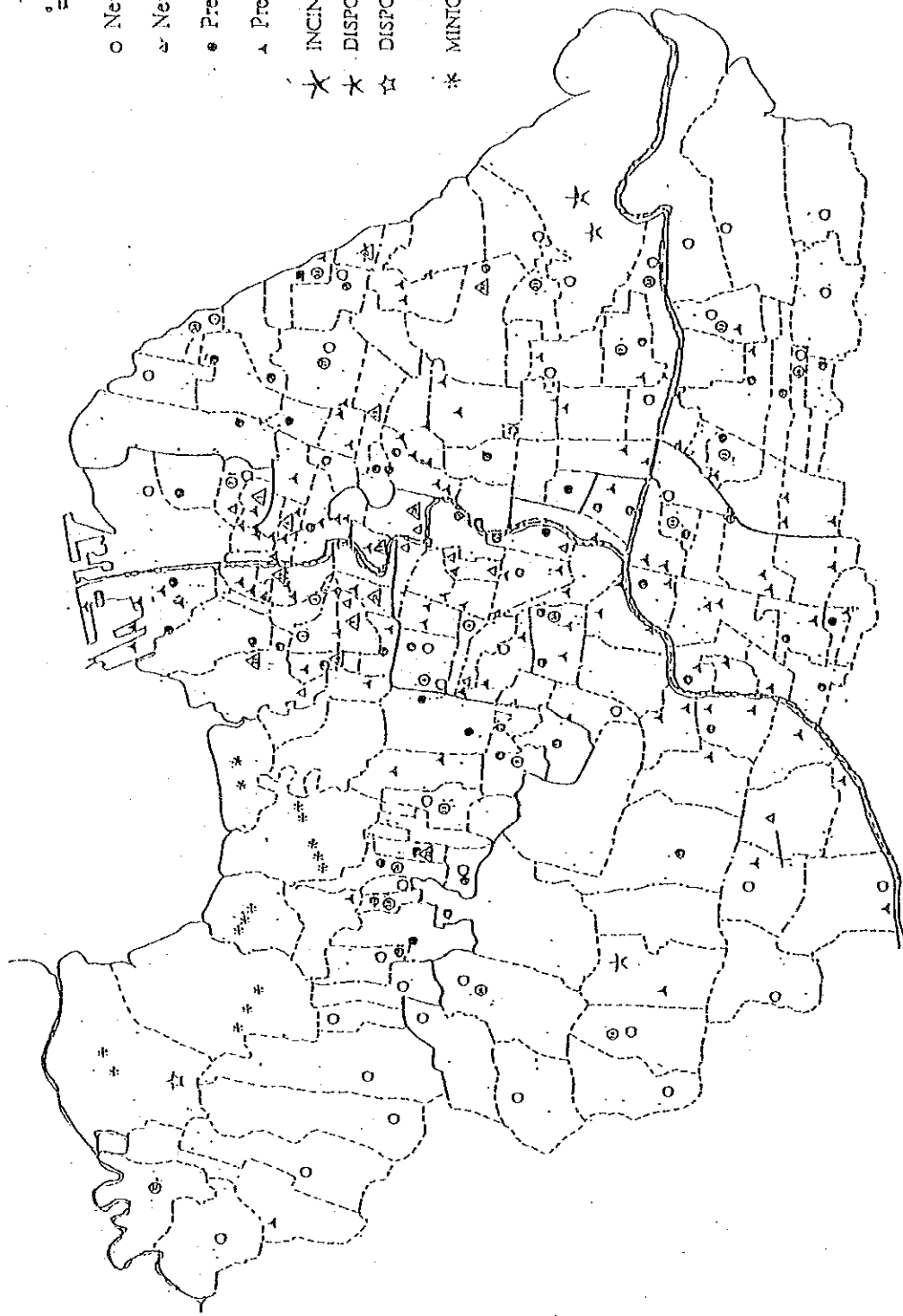


FIG 12

Leachate Control System

- New Depo Site
- △ New LPS Site
- Present Depo Site
- ▲ Present LPS Site
- ✱ INCINERATOR
- ✱ DISPOSAL SITE (LPA)
- ☆ DISPOSAL SITE PLAN (RENCANA LPA)
- ✱ MINICONTAINER



- LEGEND :
- DISTRICT BOUNDARY
 - - - - - KECAMATAN BOUNDARY
 - · · · · ROTAMADA BOUNDARY
 - ||| MAIN RIVER

FIG. 13

Planned Location of New Depo and LPS

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY



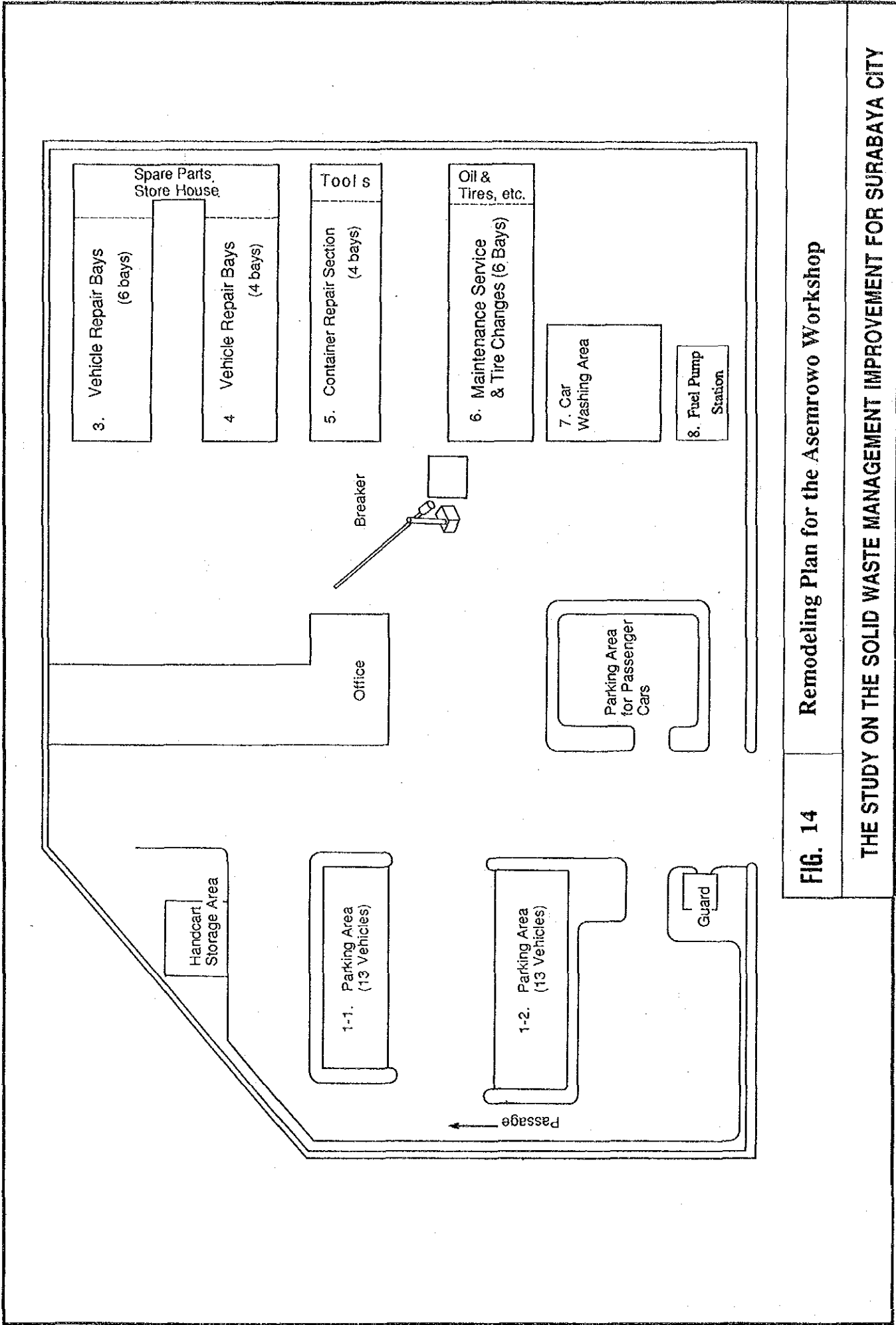


FIG. 14 Remodeling Plan for the Asemrowo Workshop



Appendix 1 Persons Involved in the Study

1. Indonesian Side

A. Steering Committee:

1. Mr. Rachmadi B.S. : Director General of Human Settlements, Ministry of Public Works.
2. Mr. Saad Basaib : Head of Bureau of Social Welfare, BAPPENAS.
3. Mr. Nabel Makarim : Deputy I, Environmental Impact Assessment Agency (BAPEDAL).
4. Mr. Darmawan Saleh : Director of Environmental Sanitation, Ministry of Public Works (DPU).
5. Mr. P. Sidabutar : Director of Development Programme, DGHS, Ministry of Public Works (DPU).
6. Mr. Soedarsono Soekardi : Director of Urban Development, Ministry of Home Affairs.
7. Mr. Yusuf Anwar : Director of Foreign Fund, Ministry of Finance.
8. Mr. Gembong Priyono : Head of Bureau for International Cooperation, DPU.
9. Mr. Didie Herkamto : Agency for Assessment and Application of Technology (BPPT).
10. Mr. Chusen Chasbullah : Head of BAPPEDA, Surabaya City
11. Mr. Eddy Indrayana : Head of Cleansing Department, Surabaya City

B. Technical Committee:

1. Mr. Deka Paranoan : Sub. Dir. of Solid Waste, Directorate of Environmental Sanitation, DPU.
2. Mr. Dwityo Akoro S. : Staff of Sub. Dir. of Solid Waste, PLP.
3. Mr. Rayas Satyadharma : Staff of Cleansing Department, Surabaya City.

4. Mr. Cholik : Staff of Cleansing Department, Surabaya City.
5. Mr. Boni Tobogu : Staff of Cleansing Department, Surabaya City
6. Mr. Benyamin Hilly : BAPPEDA, Surabaya City
7. Ms. Biempi Harbi Maharani : Urban Planning Department, Surabaya City
8. Ms. Saptorini : Directorate of Development Programme, DPU
9. Mr. Bambang Heruhadi : BPPT (Agency for Assessment and Application of Technology)
10. Mr. Masnelyarti Hilman : BAPEDAL
11. Mr. Akio ISHII : JICA SWM Expert

C. Counterparts:

1. Mr. Cholik (Part Time) : Cleansing Department, Surabaya City
2. Ms. Erna (Full Time) : Cleansing Department, Surabaya City
3. Ms. Dahlia Erawati (Part Time) : Staff of PLP for East Java Province
4. Mr. Rudi Lesmono (Full Time) : Staff of PLP for East Java Province

D. Counterparts of Ad Hoc Base:

1. Collection : Mr. Suwito, Garbage Collection Division
Cleansing Dept., Surabaya City
2. Disposal : Mr. Sugiri, Planning & Monitoring
Division, Cleansing Dept. Surabaya City
3. Vehicle Maintenance : Mr. W.J. Pattikawa, Haulage Division,
Cleansing Dept. Surabaya City
4. Finance : Mr. Suryanto, Evaluation Division,
Cleansing Dept. Surabaya City

2. Japanese Side

A. JICA Advisory Committee:

1. Dr. Masaru TANAKA : Chief of Solid Waste Engineering
(Chairman of the Committee) Department,
The Institute of Public Health
2. Dr. Kunitoshi SAKURAI : Professor of Urban Engineering in
(Treatment & Disposal) Faculty of Engineering, Tokyo University
3. Mr. Yoshiaki ISHIKAWA : Director of Construction Section,
(Waste Administration) Plant Construction Division,
Bureau of Public Cleansing,
Tokyo Metropolitan Government

B. Study Team:

1. Mr. Kihachiro URUSHIBATA : Team Leader (PCI)
2. Mr. Kiichiro SAKAGUCHI : Organization & Institution/Project
Evaluation Analyst (EX)
3. Mr. Shin'ichi SUZUKI : Waste Collection Planner (EX)
4. Mr. Ramli : Organization & Institution Analyst (EX)
5. Mr. Shunsuke Aoyama : Intermediate Treatment Planner (EX)
6. Mr. Minoru Murata : Equipment Maintenance Expert (EX)
7. Mr. Norio Kan'no : Waste Quality Analyst (PCI)
8. Mr. Masafumi Aikawa : Final Disposal Planner (PCI)
9. Mr. Akinori Sato : Environment Analyst (PCI)
10. Mr. Kazuhiro Nakaishi : Facility Designer (PCI)

Abbreviations:

Ex: EX Corporation

PCI: Pacific Consultants International

Appendix 2. Notificaiton of ANDAL Evaluation Result



**GUBERNUR KEPALA DAERAH TINGKAT I
JAWA TIMUR**

SURABAYA, 7 Januari 1993

Nomer : 660/16/201.3/93 Kepada
Sifat : P E N T I N G
Lampiran : - Yth. Sdr. Kepala Dinas Kebersihan
Perihal : Penilaian Analisis Pemerintah Kotamadya Da-
Dampak Lingkungan erah Tingkat II Surabaya
(ANDAL) di

S U R A B A Y A

Sehubungan dengan pengajuan atas berkas dokumen ANDAL Rencana LPA Baru didesa Romo Kalisari Kecamatan Benowo Kotamadya Daerah Tingkat II Surabaya, yang saudara sampaikan ke Komisi AMDAL Propinsi Daerah Tingkat I Jawa Timur, maka dapat disampaikan hal-hal sebagai berikut :

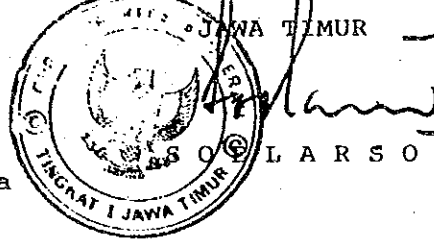
- A. Penulisan disusun berdasarkan Surat Keputusan Departemen Pekerjaan Umum Republik Indonesia.
- b. Materi dapat diterima dan hal-hal yang harus saudara diperhatikan adalah ;
 1. Agar memperhatikan dampak sosial budaya yang mungkin timbul akibat kegiatan rencana LPA Baru tersebut, terutama dampak negatipnya.
 2. Tetap memperhatikan estetika lingkungan setelah menjadi LPA Baru.
 3. Menangani limbah cair dan harus membuat bak pengolah limbah cair dan memperhatikan nilai ambang batasnya.
 4. Menangani pencemaran udara seperti bau, debu dan lain-lain.
 5. Mengadakan penghijauan baik didalam maupun di sekitar LPA Baru.

6. Arus lalu lintas umum yang berada pada jalur jalan baik yang menuju atau dari LPA Baru tidak boleh terganggu akibat kegiatan LPA, sehingga tidak terjadi kemacetan lalu lintas.

C. Berdasarkan uraian tersebut diatas ANDAL Rencana LPA BARU di Benowo dapat disetujui dan segera menyusun RKL dan RPLnya.

Demikian untuk menjadikan maklum.

GUBERNUR KEPALA DAERAH TINGKAT I



Tembusan :

Yth. Sdr. Walikota Kepala
Daerah Tingkat II
Surabaya di Surabaya.

RENCANA

PEMBUKAAN DAN PENGOPERASIAN

LOKASI PEMBUANGAN AKHIR SAMPAH

DI KELURAHAN ROMO KALISARI - KECAMATAN BENOWO

KOTAMADYA SURABAYA

LAPORAN AKHIR

STUDI ANDAL
RENCANA LPA BARU DI BENOWO

DINAS KEBERSIHAN
PEMERINTAH KOTAMADYA DAERAH TINGKAT II SURABAYA

Dengan dibantu oleh :

Direktorat Penyehatan Lingkungan Pemukiman
Direktorat Jenderal Cipta Karya - Departemen PU

Lewat Team Teknis

JICA STUDY TEAM on SOLID WASTE MANAGEMENT
IMPROVEMENT FOR SURABAYA CITY

November - 1992

JICA