2. The community may propose the compensation costs.
3. The Government will not give the compensation to the people who live in the goverment land.
4. If negotiations with the land owner are not agreeable, then the problem of compensation can be brought to the court.
5. The compensation costs is paid by government.
6. That procedure may be run during one year.

Based on the experience in the Surabaya city, the compensation by means of "money" is the succesfull factor of the land acquisition.

In construction phase, the man power from external will arise a suspicion of the local power who have no chance to get job from the project. To prevent that, the project must use the local man power. The use of external man power only if in specific condition.

In operation phase, the negative impact that need specific mitigation are the aesthetic disturbance, because the possibility of using

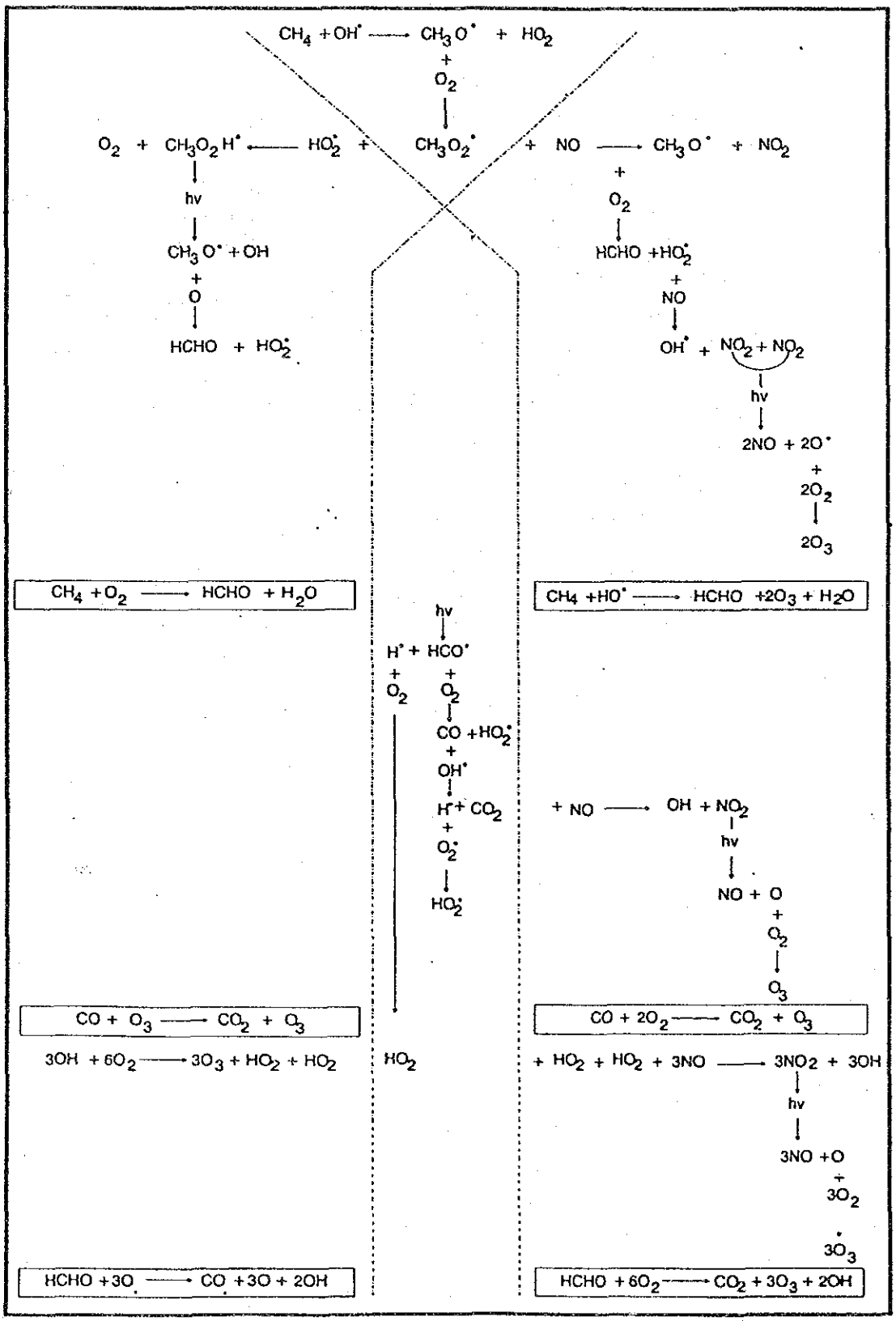
1. old trucks to bring the solid waste and
2. dispersion of paper and other waste by wind to nearest settlement.

The mitigation of that problem is described in chapter 6.1

The community restless rise. Because people have perseption that impact of activities will create security disturbances. Therefore the sanitary landfill authority must manage the activities, and give guarantee to community that the landfill activities is not disturbing.

Figure 16

CONVERSION CHAIN OF CH_4 TO CO_2



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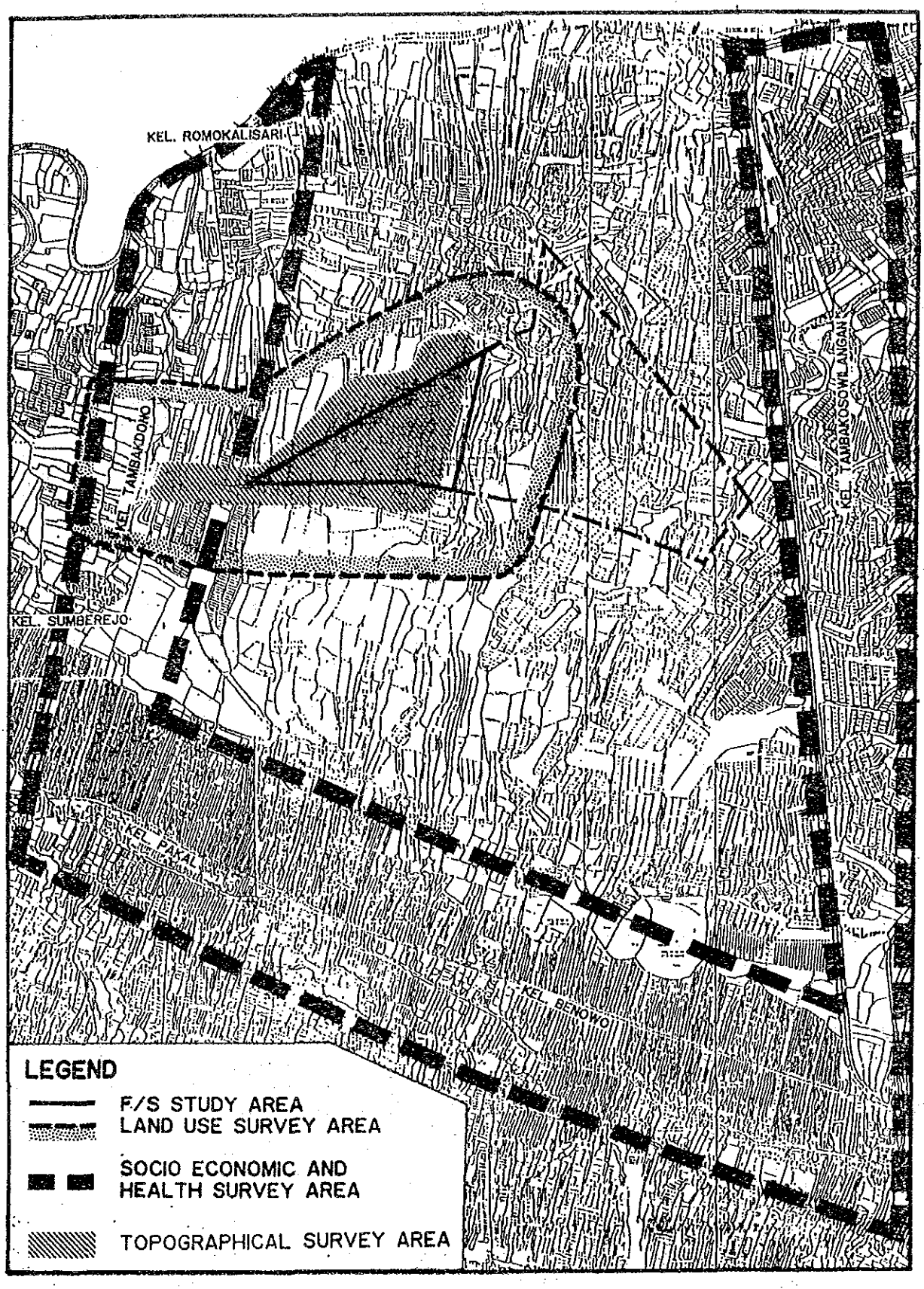
Attachments

FIGURE 2

LOCATION OF LAND USE, SOCIO ECONOMIC & HEALTH AND TOPOGRAPHIC SURVEY



SOCIO ECONOMIC & HEALTH CONDITIONS
SURVEY RESULTS

KELURAHAN : Romokalisari
No.of household Surveyed : 55 households

Community Structure	Kind of Community Livelihoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total / Average
1. Type of House								
* Permanent	1	10	11	5	8	4	9	48
* Semi Permanent	-	-	-	2	2	1	1	6
* Temporary	-	1	-	-	-	-	-	1
2. Average number of people in house	5	4	5	5	5	6	6	5
* With family	1	8	11	7	8	5	8	48
* With servant	-	3	-	-	2	-	2	7
* Other person	-	-	-	-	-	-	-	0
3. Own the house								
* Owner	1	10	11	7	10	5	10	54
* Tenant	-	1	-	-	-	-	-	1
* Monthly rent (for tenant in thousand)	-	25	-	-	-	-	-	- 25
4. a. Plot size (m^2)	54	67.3	66.0	17.5	55.6	58	114	61.78
b. Building coverage (m^2)	54	63	64.5	46	44	29	111	58.78
5. Job of family member (supporter)								
* Member	-	-	-	-	-	-	-	-
* Monthly income (in thousand)	108	152	150	89	97	158.5	279	147.6
6. Housing facilities								
* Telephone	-	-	-	-	-	-	-	-
* Electricity	1	9	11	6	10	5	9	51
* Water resources	-	1	-	-	-	1	-	2
* Bath room	-	8	7	5	2	6	9	37
* WC/ Toilet	-	3	1	1	-	2	1	8
* Living room	-	8	11	6	10		8	43
* Back yard	-	3	1	1	1	1	-	7
* Front yard	-	4	4	1	3	1	1	14
* Side yard	-	2	3	1	3	-	2	11
* Waste bin	-	5	6	4	1	3	8	27
* Dump place (only for home industry)	-	-	-	-	-	-	-	-
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking	-	-	-	-	1	-	-	1
- washing vegetables and fruits	-	-	-	-	-	-	-	-
- washing table ware	-	-	-	-	1	-	-	1
- take a bath	-	-	-	-	1	-	-	1
- other	-	-	-	-	1	-	-	1
b. Tank								
- drinking	1	5	5	5	6	3	6	31
- washing vegetables and fruits	1	5	5	5	6	3	6	31
- washing table ware	1	5	5	5	6	3	6	31
- take a bath	1	5	5	5	6	3	6	31
- other	1	5	5	5	6	3	6	31

Community Structure	Kind of Community Livelihoods							
	Govorment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2	Total / Average
c. Carrier								
- drinking	-	5	6	2	3	2	4	22
- washing vegetables and fruits	-	5	6	2	3	2	4	22
- washing table ware	-	5	6	2	3	2	4	22
- take a bath	-	5	6	2	3	2	4	22
- other	-	5	6	2	3	2	4	22
B. Shallow well								
a. With hand pump								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Open well								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
C. Deep well								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
D. Mineral Water								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
E. Rain								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour	-	-	-	-	-	-	-	
- saline	-	-	-	-	-	-	-	
- turbid	-	-	-	-	-	-	-	
- clear	-	-	-	-	-	-	-	
- colour	-	-	-	-	-	1	-	1
b. Tank								
- taste & odour	-	-	-	-	-	-	-	-
- saline	-	-	-	-	-	-	-	-
- turbid	-	-	-	-	-	-	-	-
- clear	1	4	5	5	6	2	6	29
- colour	-	-	-	-	-	-	-	-

Community Structure	Kind of Community Livelihoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2	Total / Average
c. Carrier								
- taste & odour	-	-	-	1	-	-	1	2
- saline	-	-	-	-	-	-	-	-
- turbid	-	-	-	-	-	-	-	-
- clear	-	4	6	1	3	2	3	19
- colour	-	-	-	-	-	-	-	-
B. Shallow well								
a. With hand pump								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Open well								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
C. Deep well								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
D. Mineral water								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
E. Rain								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
F. River								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
8. Go to bath if house has no bath room								
* public	1	1	3	2	7	1	-	15
* neigbour	-	-	-	-	-	-	-	-
* river	-	1	-	-	3	-	1	5
* other	-	-	2	-	-	-	-	2
9. Use toilet if house has no toilet								
* public	1	4	6	4	7	2	4	28
* neigbour	-	-	-	-	-	-	-	-
* river	-	1	-	-	3	-	2	6
* other	-	1	3	2	-	1	3	10
10. Use washing facility if house has no the facility								
* public	-	-	-	1	2	1	-	4
* neigbour	-	-	-	-	-	-	-	-
* river	-	1	-	-	-	1	-	2
* other	1	1	5	-	3	2	1	13

Community Structure	Kind of Community Livelihoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2	Total / Average
11. Waste disposal if house has no waste bin								
* burning	1	2	2	1	3	3	-	12
* channel	-	-	1	-	3	-	-	4
* everywhere	-	-	-	1	1	-	-	2
* other	-	2	4	1	2	2	-	11
12. Waste disposal if home industry has no waste dump								
* burning	-	-	-	-	-	-	1	1
* channel	-	-	-	-	-	-	-	
* everywhere	-	-	-	-	-	-	-	
* other	-	1	-	-	-	-	-	1
13. Pick up waste								
* everyday	-	4	4	4	-	3	7	22
* no of days in a week	-	-	-	-	-	-	-	-
14. Waste burning								
* by selft	1	6	4	1	4	2	3	21
* by other	-	-	-	-	-	-	-	-
15. Yard sweeping								
* everyday	1	6	3	1	4	1	2	18
* no of days in a week	-	-	-	-	-	-	-	-
16. Garbage disposal								
* everyday	1	6	10	7	7	5	10	46
* no of days in a week	-	-	-	-	-	-	-	-
17. Depo/ LPS/ LPA development project								
* agree	1	9	10	7	8	5	9	49
* disagree	-	-	-	-	2	-	1	3
* no opinion	-	2	1		-	-	-	3
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal	1	7	9	5	7	1	7	37
* no leachate	-	-	-	-	2	1	2	5
* other	-	1	1	2	1	3	1	9
19. Reason for depo/ LPS/ LPA disagreement								
* odourous	1	2	5	1	4	1		14
* source of contagious disease	-	-	1	-	1	1		3
* other	-	-	-	-	-	-		-
20. Waste smell from the nearest Depo/ LPS								
* very odourous	-	-	-	1	-	-	-	1
* not very odourous	-	-	-	1	-	-	-	1
* no odour	-	2	5	4	1	3	6	21
* no opinion	1	7	6	1	9	2	4	30
21. Vaccination		5	3	3	1	2	4	18
* type		Cacar	Cacar	Cacar	Cacar	Cacar	Cacar	
* age		dewasa	dewasa	dewasa	dewasa	dewasa	dewasa	
22. Daily meal								
* rice	1	9	11	7	10	5	10	53
* vegetables	1	9	10	7	10	5	16	58
* fishes	1	9	10	6	10	4	16	56
* eggs	1	6	5	3	-	5	4	24
* milk	1	6	2	3	-	2	4	18
* meat	1	6	2	1	1	3	4	18
* fruit	1	6	4	2	2	5	7	27

Community Structure	Kind of Community Livelihoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2	Total / Average
23. Disease & yearly frequency								
* influenza	-	2	7	4	4	-	7	24
* larynx	-	-	-	-	-	-	-	-
* typhus	-	3	-	-	-	-	-	3
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	-	-	1	-	-	1
* good health	-	4	1	-	1	4	-	10
* others	-	-	1	-	1	-	-	2
* more than 2	1	2	1	3	2	1	3	13
24. Common disease in family								
* influenza	1	7	5	6	7	3	10	39
* larynx	-	-	-	-	-	-	-	-
* typhus	-	-	-	-	-	-	-	-
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	1	-	-	-	-	1
* good health	-	4	5	-	1	1	-	11
* others	-	-	-	-	-	1	-	1
* more than 2	-	-	-	1	2	-	-	3
25. Health care								
* self medicine treatment	-	2	1	-	1	-	-	4
* buy medicine at	-	-	-	-	-	-	-	-
the market	-	-	-	-	1	-	-	1
* public health centre	-	3	8	3	3	2	5	24
* doctor	-	3	2	-	-	1	1	7
* other	3	1	-	4	5	2	4	19

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SOCIO ECONOMIC & HEALTH CONDITION
SURVEY RESULTS

KELURAHAN : Tambak Dono
No.of household surveyed : 70 households

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
1. Type of House								
* Permanent	2	7	1	2		15	12	39
* Semi Permanent			1	9		13	7	30
* Temporary							1	1
2. Average number of people in house	4	5	5	4		6	6	5
* With family	2	5	1	11		27	17	63
* With servant		2	1			1	3	7
* Other person								
3. Own the house								
* Owner	2	7	2	11		28	20	70
* Tenant								
* Monthly rent (for tenant-in thousand)								
4. a. Plot size (m^2)	89	65	55	57	-	70	51	64.5
b. Building coverage (m^2)	86	65	55	56	-	69	51	63.66
5. Job of family member (supporter)								
* Member	2	7	2	11	-	28	20	70
* Monthly income (in thousand)	150	201	168	183	-	173	196	178.5
6. Housing facilities								
* Telephone	-	-	-	-	-	-	-	0
* Electricity	2	7	2	11	-	28	20	70
* Water resources	0	0	0	1	-	0	0	1
* Bath room	2	7	2	11	-	28	20	70
* WC/ Toilet	1	2	1	0	-	3	2	9
* Living room	2	7	2	11	-	28	20	70
* Back yard	0	2	0	2	-	6	3	13
* Front yard	1	2	0	2	-	4	2	11
* Side yard	0	1	0	0	-	4	2	7
* Waste bin	0	0	1	0	-	2	2	5
* Dump place (only for home industry)	0	0	0	0	-	0	0	0
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Tank								
- drinking						1		1
- washing vegetables and fruits						1		1
- washing table ware						1		1
- take a bath						1		1
- other						1		1

Community Structure	Kinds of community livelihood							Total / Average
	Govermont Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
c. Carrier								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
B. Shallow well								
a. With hand pump								
- drinking			1					1
- washing vegetables and fruits			1					
- washing table ware			1					1
- take a bath			1					1
- other			1					1
b. Open well								
- drinking							2	2
- washing vegetables and fruits							2	2
- washing table ware							2	2
- take a bath							2	2
- other							2	2
C. Deep well								
- drinking	2	7	2	11		28	19	69
- washing vegetables and fruits	2	7	1	11		28	19	68
- washing table ware	2	7	2	11		28	19	69
- take a bath	2	7	2	11		28	19	69
- other	2	7	1	11		28	19	68
D. Mineral Water								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
E. Rain								
- drinking	2	7	2	11		28	19	69
- washing vegetables and fruits	2	7	1	11		28	19	68
- washing table ware	2	7	2	11		28	19	69
- take a bath	2	7	2	11		28	19	69
- other	2	7	1	11		28	19	68
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Tank								
- taste & odour								
- saline						1		
- turbid								
- clear								
- colour								

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
c. Carrier								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
B. Shallow well								
a. With hand pump								
- taste & odour								
- saline								
- turbid								
- clear								
- colour			1					1
b. Open well								
- taste & odour							2	2
- saline							5	5
- turbid								
- clear								
- colour							12	12
C. Deep well								
- taste & odour						2	1	3
- saline			9	2		10	5	26
- turbid			1					
- clear						1	1	2
- colour	2	7	1	2		15	12	39
D. Mineral water								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
E. Rain								
- taste & odour	1	1	1	1		6	1	11
- saline								
- turbid							4	4
- clear	1	6	1	10		20	18	56
- colour								
F. River								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
8. Go to bath if house has no bath room								
* public								
* neigbour								
* river								
* other								
9. Use toilet if house has no toilet								
* public								
* neigbour						1		1
* river	1	5		10		17	15	48
* other				1		7	3	11
10. Use washing facility if house has no the facility								
* public						4	1	5
* neigbour								
* river								
* other			1			3	4	8

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
11. Waste disposal if house has no waste bin								
* burning								
* channel								
* everywhere								
* other	2	7	1	11		26	17	64
12. Waste disposal if home industry has no waste dump								
* burning			1				1	2
* channel								
* everywhere								
* other								
13. Pick up waste								
* everyday								
* no of days in a week								
14. Waste burning								
* by selfi			1	1		4	2	8
* by other								
15. Yard sweeping								
* everyday	1	5		3		10	6	25
* no of days in a week								
16. Garbage disposal								
* everyday		3				9	7	19
* no of days in a week								
17. Depo/ LPS/ LPA development project								
* agree	2	7	1	5		20	16	51
* disagree				5		6	3	14
* no opinion			1	1		2	1	5
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal		2	1	5		8	5	21
* no leachate			1	4		4	3	12
* other	2	5		1		14	11	33
19. Reason for depo/ LPS/ LPA disagreement								
* odourous								
* source of contagious disease								
* other								
20. Waste smell from the nearest Depo/ LPS								
* very odourous						1		1
* not very odourous		2				4		6
* no odour	2	5	2	11		23	20	63
* no opinion								
21. Vaccination	2	8	2	8		14	11	45
* type	Cacar	Cacar	Cacar	Cacar		Cacar	Cacar	
* age	dewasa	dewasa	dewasa	dewasa		dewasa	dewasa	
22. Daily meal								
* rice	2	7	2	11		28	20	70
* vegetables	2	7	2	11		28	20	70
* fishes	2	7	2	10		28	19	68
* eggs	2	3	1	2		9	4	21
* milk	0	0	0	0		0	1	1
* meat	0	0	0	0		2	2	4
* fruit	1	0	1	0		2	0	4

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
23. Disease & yearly frequency								
* influenza	1	2		11		12	6	32
* larynx								
* typhus								
* cholera								
* diare								
* good health								
* others			1					1
* more than 2	1	5	1			16	14	37
24. Common disease in family								
* influenza	2	7	1	11		28	20	69
* larynx								
* typhus								
* cholera								
* diare								
* good health								
* others			1					1
* more than 2								
25. Health care								
* self medicine treatment								
* buy medicine at the market						2		2
* public health centre	1	2	1	1		2	1	8
* doctor								
* other	1	5	1	10		24	19	60

<SOSEK-2.wk1/# #1>

SOCIO ECONOMIC & HEALTH CONDITIONS

KELURAHAN : Sumber Rejo
Number of RW Surveyed : 8 households

Community stucture	Kind of Community Livelihoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total/ Average
1. Type of House								
* Permanent	-	2	-	3	-	1	2	8
* Semi Permanent	-	-	-	-	-	-	-	-
* Temporary	-	-	-	-	-	-	-	-
2. Average number of people in house	-	5	-	7	-	6	4	5
* With family	-	2	-	3	-	1	2	8
* With servant	-	-	-	-	-	-	-	-
* Other person	-	-	-	-	-	-	-	-
3. Own the house								
* Owner	-	2	-	3	-	1	2	8
* Tenant	-	-	-	-	-	-	-	-
* Monthly rent (for tenant in thousand)	-	-	-	-	-	-	-	-
4. a. Plot size (m^2)	-	57	-	74	-	60	98	72.25
b. Building coverage (m^2)	-	57	-	74	-	60	98	72.25
5. Job of family member (supporter)								
* Member	-	-	-	-	-	-	-	
* Monthly income (in thousand)	-	40	-	63	-	100	218	105.25
6. Housing facilities								
* Telephone	-	0	-	0	-	0	0	0
* Electricity	-	2	-	3	-	1	2	8
* Water resources	-	0	-	0	-	0	0	0
* Bath room	-	2	-	3	-	1	2	8
* WC/ Toilet	-	1	-	0	-	0	0	1
* Living room	-	2	-	3		1	2	8
* Back yard	-	0	-	0		0	0	0
* Front yard	-	0	-	0		0	0	0
* Side yard	-	1	-	0		0	0	1
* Waste bin	-	0	-	0		0	0	0
* Dump place (only for home industry)	-	0	-	0		0	0	0
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Tank								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								

Community stucture	Kind of Community Livehoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total/ Average
c. Carrier								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
B. Shallow well								
a. With hand pump								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Open well								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
C. Deep well								
- drinking	-	2	-	3	-	1	2	8
- washing vegetables and fruits	-	2	-	3	-	1	2	8
- washing table ware	-	2	-	3	-	1	2	8
- take a bath	-	2	-	3	-	1	2	8
- other	-	2	-	3	-	1	2	8
D. Mineral Water								
- drinking	-	-	-	-	-	-	-	-
- washing vegetables and fruits	-	-	-	1	-	-		1
- washing table ware	-	-	-	-	-	-	-	-
- take a bath	-	-	-	-	-	-	-	-
- other	-	-	-	-	-	-	-	-
E. Rain								
- drinking	-	2	-	3	-	1	2	8
- washing vegetables and fruits	-	2	-	3	-	1	2	8
- washing table ware	-	2	-	3	-	1	2	8
- take a bath	-	2	-	3	-	1	2	8
- other	-	2	-	3	-	1	2	8
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Tank								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								

Community stucture	Kind of Community Livehoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total/ Average
c. Carrier								
- taste & odour	-	-	-	-	-	-	-	-
- saline	-	-	-	-	-	-	-	-
- turbid	-	-	-	-	-	-	-	-
- clear	-	-	-	-	-	-	1	1
- colour	-	-	-	-	-	-	-	-
B. Shallow well								
a. With hand pump								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Open well								
- taste & odour	-	-	-	-	-	-	1	1
- saline	-	-	-	-	-	-	-	
- turbid	-	-	-	-	-	-	-	
- clear	-	-	-	-	-	-	-	
- colour	-	-	-	-	-	-	-	
C. Deep well								
- taste & odour	-	1	-	-	-	-	-	1
- saline	-	-	-	3	-	1	2	6
- turbid	-	-	-	-	-	-	-	-
- clear	-	-	-	-	-	-	-	-
- colour	-	1	-	-	-	-	-	1
D. Mineral water								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
E. Rain								
- taste & odour	-	2	-	2	-	-	2	6
- saline	-	-	-	-	-	-	-	-
- turbid	-	-	-	-	-	-	-	-
- clear	-	-	-	-	-	-	-	-
- colour	-							
F. River								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
8. Go to bath if house has no bath room								
* public								
* neigbour								
* river								
* other								
9. Use toilet if house has no toilet								
* public	-	-	-	-	-	-	-	-
* neigbour	-	-	-	-	-	-	-	-
* river	-	-	-	1	-	-	-	1
* other	-	2	-	2	-	1	3	8
10. Use washing facility if house has no the facility								
* public	-	-	-	-	-	-	-	-
* neigbour	-	-	-	-	-	-	-	-
* river	-	-	-	-	-	-	-	-
* other	-	-	-	1	-	-	-	1

Community stucture	Kind of Community Livehoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total/ Average
11. Waste disposal if house has no waste bin								
* burning	-	-	-	2	-	-	-	2
* channel	-	-	-	-	-	-	-	-
* everywhere	-	-	-	-	-	-	-	-
* other	-	2	-	1	-	1	2	6
12. Waste disposal if home industry has no waste dump								
* burning								
* channel								
* everywhere								
* other								
13. Pick up waste								
* everyday	-	1	-	1	-	-	1	3
* no of days in a week	-	-	-	-	-	-	-	-
14. Waste burning								
* by selit								
* by other								
15. Yard sweeping								
* everyday								
* no of days in a week								
16. Garbage disposal								
* everyday	-	1	-	3	-	1	-	5
* no of days in a week	-	-	-	-	-	-	-	-
17. Depo/ LPS/ LPA development project								
* agree	-	1	-	2	-	-	-	3
* disagree	-	-	-	-	-	1	-	1
* no opinion	-	1	-	1	-	-	2	4
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal	-	1	-	2	-	1	-	4
* no leachate	-	-	-	1	-	-	1	2
* other	-	1	-	-	-	-	1	2
19. Reason for depo/ LPS/ LPA disagreement								
* odourous								
* source of contagious disease								
* other								
20. Waste smell from the nearest Depo/ LPS								
* very odourous	-	-	-	-	-	-	-	-
* not very odourous	-	-	-	-	-	-	1	1
* no odour	-	1	-	3	-	-	2	6
* no opinion	-	1	-	-	-	-	-	1
21. Vaccination	-	-	-	1	-	-	-	1
* type	-	-	-	Cacar	-	-	-	-
* age	-	-	-	Dewasa	-	-	-	-
22. Daily meal								
* rice	-	2	-	3	-	1	2	8
* vegetables	-	2	-	3	-	1	2	8
* fishes	-	2	-	3	-	1	2	8
* eggs	-	-	-	-	-	-	-	-
* milk	-	-	-	-	-	-	-	-
* meat	-	-	-	-	-	-	-	-
* fruit	-	-	-	-	-	-	-	-

Community stucture	Kind of Community Livehoods							
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	Total/ Average
23. Disease & yearly frequency								
* influenza	-	1	-	1	-	1	1	4
* larynx	-	-	-	-	-	-	-	-
* typhua	-	1	-	-	-	-	-	1
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	-	-	-	-	-	-
* good health	-	-	-	-	-	-	-	-
* others	-	1	-	1	-	-	-	2
* more than 2	-	1	-	1	-	-	1	3
24. Common disease in family								
* influenza	-	1	-	2	-	1	2	6
* larynx	-	-	-	-	-	-	-	-
* typhus	-	-	-	-	-	-	-	-
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	-	-	-	-	-	-
* good health	-	1	-	1	-	-	-	2
* others	-	-	-	-	-	-	-	-
* more than 2	-	-	-	-	-	-	-	-
25. Health care								
* self medicine treatment	-	-	-	-	-	-	-	-
* buy medicine at the market	-	-	-	-	-	-	-	-
* public health centre	-	-	-	-	-	-	1	1
* doctor	-	1	-	1	-	1	-	3
* other	-	1	-	2	-	-	1	4

<SOSEK-3.wk1/##1>

SOCIO ECONOMIC & HEALTH CONDITION
SURVEY RESULTS

KELURAHAN : Pakal
No.of household Surveyed : 7 households

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
1. Type of House								
* Permanent	2	2		-			1	5
* Semi Permanent				2				2
* Temporary								
2. Average number of people in house	6	6		4			4	5
* With family	2	1		2			1	6
* With servant		1						1
* Other person								
3. Own the house								
* Owner	2	2		2			1	7
* Tenant								
* Monthly rent (for tenant-in thousand)								
4. a. Plot size (m^2)	175	154		146			420	223.7
b. Building coverage (m^2)	114	84		146			60	101
5. Job of family member (supporter)								
* Member	2	2		2			1	7
* Monthly income (In thousand)	205	106		109			163	145.7
6. Housing facilities								
* Telephone	-	-		-			-	0
* Electricity	2	2		2			1	7
* Water resources	1	2		1			1	5
* Bath room	2	2		1			1	6
* WC/ Toilet	2	2		0			1	5
* Living room	2	2		2			1	7
* Back yard	1	0		0			0	1
* Front yard	1	0		0			0	1
* Side yard	1	2		0			1	4
* Waste bin	2	0		0			0	2
* Dump place (only for home industry)	0	0		0			0	0
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Tank								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
c. Carrier								
- drinking	2	2		2			1	7
- washing vegetables and fruits	2	2		2			1	7
- washing table ware	2	2		2			1	7
- take a bath	2	2		2			1	7
- other	2	2		2			1	7
B. Shallow well								
a. With hand pump								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Open well								
- drinking		1		1			1	3
- washing vegetables and fruits		1		1			1	3
- washing table ware		1		1			1	3
- take a bath		1		1			1	3
- other		1		1			1	3
C. Deep well								
- drinking				2				2
- washing vegetables and fruits				1				1
- washing table ware				2				2
- take a bath				1				1
- other				2				2
D. Mineral Water								
- drinking	2	1						3
- washing vegetables and fruits	2	1						3
- washing table ware	2	1						3
- take a bath	2	1						3
- other	2	1						3
E. Rain								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Tank								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
c. Carrier								
- taste & odour								
- saline								
- turbid								
- clear	2	2		2			1	7
- colour								
B. Shallow well								
a. With hand pump								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Open well								
- taste & odour		1		1				2
- saline								
- turbid								
- clear								
- colour								
C. Deep well								
- taste & odour	1							1
- saline				3		1		4
- turbid								
- clear								
- colour								
D. Mineral water								
- taste & odour	1	1						2
- saline	1							1
- turbid								
- clear								
- colour								
E. Rain								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
F. River								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
8. Go to bath if house has no bath room								
* public				1				1
* neigbour								
* river								
* other								
9. Use toilet if house has no toilet								
* public				2				2
* neigbour								
* river								
* other								
10. Use washing facility if house has no the facility								
* public								
* neigbour								
* river								
* other								

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
11. Waste disposal if house has no waste bin								
* burning		1		2				3
* channel								
* everywhere								
* other	1	1					1	3
12. Waste disposal if home industry has no waste dump								
* burning								
* channel								
* everywhere								
* other								
13. Pick up waste								
* everyday		1		2				3
* no of days in a week								
14. Waste burning								
* by selft								
* by other								
15. Yard sweeping								
* everyday	2	2		2			1	7
* no of days in a week								
16. Garbage disposal								
* everyday	1	2		2			1	6
* no of days in a week								
17. Depo/ LPS/ LPA development project								
* agree	1	1					1	3
* disagree								0
* no opinion	1	1		2				4
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal	1	2					1	4
* no leachate				2		4	3	9
* other	1					14	11	26
19. Reason for depo/ LPS/ LPA disagreement								
* odourous								
* source of contagious disease								
* other								
20. Waste smell from the nearest Depo/ LPS								
* very odourous								
* not very odourous	1	1		2			1	5
* no odour	1	1						2
* no opinion								
21. Vaccination	2	1						3
* type	Cacar	Cacar						
* age	dewasa	dewasa						
22. Daily meal								
* rice	2	2		2			1	7
* vegetables	2	2		2			1	7
* fishes	1	1		2			1	5
* eggs	1	1		0			0	2
* milk	0	0		0			0	0
* meat	0	0		0			0	0
* fruit	0	0		0			0	0

Community Structure	Kinds of community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt-Farmer	More than 2 jobs	
23. Disease & yearly frequency								
* influenza	2			2			1	5
* larynx								
* typhus								
* cholera								
* diare								
* good health								
* others		1						1
* more than 2		1						1
24. Common disease in family								
* influenza	2	1		2			1	6
* larynx								
* typhus								
* cholera								
* diare								
* good health								
* others								
* more than 2		1						1
25. Health care								
* self medicine treatment								
* buy medicine at the market								
* public health centre				1				1
* doctor		2						2
* other	2			1			1	4

<SOSEK-4.wk1/###1>

SOCIO ECONOMIC & HEALTH CONDITION
SURVEY RESULTS

KELURAHAN : Tambak Osowilangun
Number of household Surveyed : 168 households

Community Structure	Kind of Community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
1. Type of House								
* Permanent	3	11	66	30		8	22	140
* Semi Permanent	-	1	7	6		2	7	23
* Temporary	-	2	1	1		-	1	5
2. Average number of people in house	6	6	6	5		5	6	6
* With family	2	11	71	30		8	24	146
* With servant	1	3	3	7		2	6	22
* Other person								
3. Own the house								
* Owner	3	12	73	35		10	27	160
* Tenant	-	2	1	2		-	3	8
* Monthly rent (for tenant,in thousand)		46		73			133	84
4. a. Plot size (m^2)	134.5	62.7	92.7	80.58		75.5	64.2	85.03
b. Building coverage (m^2)	134.5	56.27	85,5	80.58		70.55	61.6	67.25
5. Job of family member (supporter)								
* Member	3	14	74	37		10	30	168
* Monthly income in (in thousand)	150	206.7	205.4	154.8		133.5	307.3	192.9
6. Housing facilities								
* Telephone	-	-	-	-		-	-	0
* Electricity	3	14	72	32		9	29	159
* Water resources	3	1	6	-		1	1	12
* Bath room	3	9	52	8		7	18	97
* WC/ Tiolet	1	2	6	2		3	3	17
* Living room	3	13	62	36		7	25	146
* Back yard	-	2	4	3		-	1	10
* Front yard	1	1	10	6		2	5	25
* Side yard	1	1	5	3		2	3	15
* Waste bin	3	7	55	11		6	13	95
* Dump place (only for home industry)	1	1	9	5		-	4	20
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Tank								
- drinking	2	9	41	7		5	14	78
- washing vegetables and fruits	2	9	41	7		5	14	78
- washing table ware	2	9	41	7		5	14	78
- take a bath	2	9	41	7		5	14	78
- other	2	9	41	7		5	14	78

Community Structure	Kind of Community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
C. Carrier								
- drinking		7	74	29		5	16	131
- washing vegetables and fruits		7	33	29		5	16	90
- washing table ware		7	33	29		5	16	90
- take a bath		7	33	29		5	16	90
- other		7	33	29		5	16	90
B. Shallow well								
a. With hand pump								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Open well								
- drinking			4				1	5
- washing vegetables and fruits			4	1			1	6
- washing table ware			-	-			1	1
- take a bath			4	4			1	9
- other			4				1	5
C. Deep well								
- drinking	1			1				2
- washing vegetables and fruits	1			1				2
- washing table ware	1			1				2
- take a bath	1			1				2
- other	1			1				2
D. Mineral Water								
- drinking						1		1
- washing vegetables and fruits						1		1
- washing table ware						1		1
- take a bath						1		1
- other						1		1
E. Rain								
- drinking	4							4
- washing vegetables and fruits		4	1					5
- washing table ware		1	1					2
- take a bath		4	-					4
- other		4	1					5
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour								
- saline								
- turbid								
- clear	2	7						9
- colour								
b. Tank								
- taste & odour			4					4
- saline			1					1
- turbid			-					
- clear			36	7		5	14	62
- colour								

Community Structure	Kind of Community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
c. Carrier								
- taste & odour								
- saline			1	1				2
- turbid			1					1
- clear								
- colour		7	30	26		5	16	84
B. Shallow well								
a. With hand pump								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Open well								
- taste & odour			1					1
- saline			-					0
- turbid			1					1
- clear			-					0
- colour			1					
C. Deep well								
- taste & odour								
- saline								
- turbid								
- clear								
- colour	1							1
D. Mineral water								
- taste & odour						-		
- saline						-		
- turbid						-		
- clear						-		
- colour						1	1	2
E. Rain								
- taste & odour		1	-					1
- saline			-					
- turbid			-					
- clear			1					1
- colour		2						2
F. River								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
8. Go to bath if house has no bath room								
* public	-	-	4	-		-	-	4
* neigbour	-	1	1	-		-	-	2
* river	-	1	6	15		-	6	28
* other	-	3	7	14		3	5	32
9. Use toilet if house has no toilet								
* public	-	3	10	-		-	1	14
* neigbour	-	-	-	-		-	-	0
* river	1	2	19	18		-	10	50
* other	1	7	37	17		-	16	78
10. Use washing facility if house has no the facility								
* public	-	-	-	-		-	-	
* neigbour	-	-	-	-		-	-	
* river	-	-	-	-		-	-	
* other	-	2	3	1		-	3	7

Community Structure	Kind of Communlty livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
11. Waste disposal if house has no waste bin								
* burning	-	2	12	8		1	2	25
* channel	-	1	3	6		-	4	14
* everywhere	-	-	-	-		-	-	0
* other	-	4	4	12		2	11	33
12. Waste disposal if home industry has no waste dump								
* burning	1	1	5	3		-	1	11
* channel	-	1	1	1		-	2	5
* everywhere	-	-	-	-		-	-	0
* other	-	4	6	12		3	4	29
13. Pick up waste								
* everyday	-	-	2	-		-	2	4
* no of days in a week	5	5	4	5		5	3	27
14. Waste burning								
* by self	1	4	18	11		1	-	35
* by other			1	1		-	6	8
15. Yard sweeping								
* everyday	2	3	14	6		1	4	30
* no of days in a week								
16. Garbage disposal								
* everyday	3	13	68	31		8	29	152
* no of days in a week								
17. Depo/ LPS/ LPA development project								
* agree	3	10	70	33		8	24	148
* disagree		1	3	1		-	2	7
* no opinion		3	1	3		2	4	13
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal	1	7	40	29		6	22	105
* no leachate	1	3	8	3		-	3	18
* other	1	4	25	5		4	5	44
19. Reason for depo/ LPS/ LPA disagreement								
* odourous								
* source of contagious disease								
* other								
20. Waste smell from the nearest Depo/ LPS								
* very odourous	-	2	6	9		1	5	23
* not very odourous	-	1	2	4		1	1	9
* no odour	-	5	24	3		2	7	41
* no opinion	2	6	42	28		6	17	101
21. Vaccination	2	5	21	13		6	15	62
* type	Cacar	Cacar	Cacar	Cacar		Cacar	Cacar	
* age	Dewasa	Dewasa	Dewasa	Dewasa		Dewasa	Dewasa	
22. Daily meal								
* rice	3	14	74	37		10	30	168
* vegetables	3	14	73	36		10	30	166
* fishes	3	14	58	29		9	24	137
* eggs	3	6	44	12		5	14	84
* milk	1	3	17	6		1	7	35
* meat	2	5	36	9		3	10	65
* fruit	3	6	46	17		6	14	92

Community Structure	Kind of Community livelihood							Total / Average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
23. Disease & yearly frequency								
* Influenza	2	3	27	2		5	10	49
* larynx			2	17			2	21
* typhus			6				1	7
* cholera							1	1
* diare						1	1	2
* good health		2	20	6		2	7	37
* Other	1	7	15	9		1	6	39
* More than 2		2	4	3		1	2	12
24. Common disease in family								
* Influenza	3	9	37	25		8	20	102
* larynx		1						1
* typhus							2	2
* cholera							1	1
* diare			7	5		1		13
* good health		1	19	7		1	7	35
* Other		3	11					14
* More than 2								
25. Health care								
* self medicine treatment	1	-	7	4		2	2	16
* buy medicine at the market	-	2	3	1		1	1	8
* public health centre	-	5	37	16		3	14	75
* doctor	1	3	11	6		3	4	28
* other	1	4	16	10		1	9	41

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SOCIO ECONOMIC & HEALTH CONDITION
SURVEY RESULTS

KELURAHAN : Benowo
No. of household Surveyed : 127 households

Community Structure	Kind of community livelihood							Total / average
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
1. Type of House								
* Permanent	4	20	19	2	-	9	8	62
* Semi Permanent	5	18	4	8	-	8	11	54
* Temporary	1	4	-	-	-	4	2	11
2. Average number of People in house	4	5	5	4	-	6	6	5
* With family	7	31	19	6	-	16	15	94
* With servant	3	11	4	4	-	5	6	33
* Other person	-	-	-	-	-	-		
3. Own the house								
* Owner	10	41	22	10		21	20	124
* Tenant	-	1	1	-	-	-	1	3
* Monthly rent (for tenant in thousand)	-	80	120	-	-		100	100.0
4. a. Plot size (m^2)	115.6	94.4	111.6	86.7	-	95.1	174.0	112.9
b. Building coverage (m^2)	90.5	84.6	96.4	64.8	-	82.3	74.7	82.2
5. Job of family member (supporter)								
* Member	10	42	23	10	-	21	21	127
* Monthly income (in thousand)	135.9	180.9	170.3	145.3	-	146,875	288.4	153.5
6. Housing facilities								
* Telephone	-	-	-	-	-	-	-	-
* Electricity	10	40	21	9	-	14	20	114
* Water resources	7	33	19	5	-	5	16	85
* Bath room	9	41	22	7	-	15	19	113
* WC/ Toilet	8	33	18	5	-	7	14	85
* Living room	10	41	23	10	-	20	21	125
* Back yard	5	22	11	6	-	9	12	65
* Front yard	6	26	9	7	-	12	14	74
* Side yard	3	12	7	2	-	8	6	38
* Waste bin	4	18	6	3	-	3	8	42
* Dump place (only for home industry)	-	-	-	-	-	-	-	-
7. Water								
* Resources & use								
A. PDAM								
a. Pipe								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
b. Tank								
- drinking	7	40	10	5	-	13	11	86
- washing vegetables and fruits	7	40	10	6	-	13	11	87
- washing table ware	7	40	10	6	-	13	11	87
- take a bath	7	40	10	6	-	13	11	87
- other	3	2	3	3	-	6	9	26

Community Structure	Kind of community livelihood							Total
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
c. Carrier								
- drinking			1		-	1	1	3
- washing vegetables and fruits			1		-	1	1	3
- washing table ware			1		-	1	1	3
- take a bath			-		-	1	1	2
- other			1		-	1	1	3
B. Shallow well								
a. With hand pump								
- drinking			1			1	1	1
- washing vegetables and fruits			1				1	1
- washing table ware			1				1	1
- take a bath			4				1	4
- other		3	1			1	1	4
b. Open well								
- drinking	10	2	15	7		11	11	56
- washing vegetables and fruits	3	2	11	1		2	7	26
- washing table ware	3	2	11	1		2	7	26
- take a bath	3	2	11	1		2	7	26
- other	7	35	4	6		9	11	72
C. Deep well								
- drinking		2	7	1			1	11
- washing vegetables and fruits			1	1				2
- washing table ware			1	-				1
- take a bath			1					1
- other		2	6	1		5	1	15
D. Mineral Water								
- drinking							7	7
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
E. Rain								
- drinking				-		1		1
- washing vegetables and fruits				1		1		2
- washing table ware				1		1		2
- take a bath				1		1		2
- other				1		-		-
F. River								
- drinking								
- washing vegetables and fruits								
- washing table ware								
- take a bath								
- other								
* Resources & quality								
A. PDAM								
a. Pipe								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
b. Tank								
- taste & odour	2	-	8	1	-	1	4	16
- saline	-	-	2	-	-	-	2	4
- turbid	-	-	-	-	-	-	-	-
- clear	8	42	14	8	-	18	12	102
- colour								

Community Structure	Kind of community livelihood							Total
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
c. Carrier								
- taste & odour	-	-	-	-	-	-		
- saline	-	-	-	-	-	-		
- turbid	-	-	-	-	-	-		
- clear	-	-	1	-	-	1	1	3
- colour	-	-	-	-	-	-		
B. Shallow well								
a. With hand pump								
- taste & odour	-	-	-	-	-	1	-	1
- saline	-	3	-	-	-	-	-	3
- turbid	-	-	-	-	-	-	-	-
- clear	-	-	1	-	-	-	1	2
- colour	-	-	-	-	-	-	-	-
b. Open well								
- taste & odour	6	15	4	1	-	8		34
- saline	2	21	-	4	-	2		29
- turbid	-	-	-	-	-	-		0
- clear	2	-	11	2	-	1		16
- colour	-	-	-	-	-	-		0
C. Deep well								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
D. Mineral water								
- taste & odour								
- saline								
- turbid								
- clear								
- colour								
E. Rain								
- taste & odour								
- saline				1		1		2
- turbid								
- clear								
- colour								
F. River								
- taste & odour								
- saline				1				1
- turbid								
- clear						1		1
- colour								
8. Go to bath if house has no bath room								
* public								
* neigbour								
* river								
* other								
9. Use toilet if house has no toilet								
* public								
* neigbour								
* river								
* other								
10. Use washing facility if house has no the facility								
* public								
* neigbour								
* river								
* other								

Community Structure	Kind of community livelihood							Total
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
11. Waste disposal if house has no waste bin								
* burning	4	20	13	6	-	13	10	66
* channel	-	-	-	-	-	-	-	-
* everywhere	1	4	-	-	-	3	-	8
* other	2	-	4	1	-	2	3	12
12. Waste disposal if home industry has no waste dump								-
* burming	1	2	1	4	-	1	-	9
* channel	1	-	-	1	-	-	-	2
* everywhere	1	3	3	-	-	1	3	8
* other	-	-	1	-	-	-	-	1
13. Pick up waste								
* everyday	1	-	-	1	-	-	-	2
* no of days in a week	1	-	-	1	-	-	-	2
14. Waste burning								
* by selft	7	31	18	7		20	14	97
* by other	-	-	-	-		-	-	-
15. Yard sweeping								
* everyday	9	31	15	9	-	14	16	94
* no of days in a week	-	-	-	-	-	-	-	-
16. Garbage disposal								
* everyday	8	41	23	10	-	20	17	119
* no of days in a week	-	-	-	-	-	-	-	-
17. Depo/ LPS/ LPA development project								
* agree	8	39	20	10	-	17	20	114
* disagree	1	2	3	-	-	1	1	8
* no opinion	1	1	-	-	-	3	-	5
18. Reason for depo/ LPS/ LPA agreement								
* suitable waste disposal	1	6	3	1	-	2	2	15
* no leachate	2	14	8	5	-	5	5	39
* other	7	22	13	4	-	12	14	72
19. Reason for depo/ LPS/ LPA disagreement								
* odourous								
* source of contagious disease								
* other								
20. Waste smell from the nearest Depo/ LPS								
* very odourous	-	-	-	-	-	1	1	2
* not very odourous	6	12	10	6	-	9	5	48
* no odour	4	29	11	4	-	10	13	71
* no opinion	-	1	2	-	-	1	2	6
21. Vaccination	5	22	15	5	-	11	12	70
* type	Cacar	Cacar	Cacar	Cacar	Cacar	Cacar	Cacar	
* age	Dewasa	Dewasa	Dewasa	Dewasa	Dewasa	Dewasa	Dewasa	
22. Daily meat								
* rice	10	42	24	10	-	20	21	127
* vegetables	8	42	21	9	-	19	3	102
* fishes	9	37	22	7	-	16	19	110
* eggs	2	6	8	2	-	4	8	30
* milk	2	-	6	-	-	-	3	11
* meat	4	4	11	1	-	2	9	31
* fruit	3	4	11	3	-	2	7	30

Community Structure	Kind of community livelihood							Total
	Goverment Official	Private Official	Business-man	Employer	Fisherman	Salt Farmer	More than 2 jobs	
23. Disease & yearly frequency								
* influenza	7	21	15	3	-	17	13	76
* larynx	-	-	-	-	-	-	-	-
* typhus	-	-	1	-	-	-	-	1
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	-	-	-	-	-	-
* good health	-	-	1	5	-	-	-	6
* others	-	1	6	-	-	-	-	7
* more than 2	3	20	-	2	-	4	8	37
24. Common disease in family								
* influenza	10	42	20	10	-	21	13	116
* larynx	-	-	-	-	-	-	-	-
* typhus	-	-	-	-	-	-	-	-
* cholera	-	-	-	-	-	-	-	-
* diare	-	-	-	-	-	-	-	-
* good health	-	-	2	-	-	-	-	2
* others	-	-	1	-	-	-	-	1
* more than 2	-	-	-	-	-	-	8	8
25. Health care								
* self medicine treatment	-	4	7	3	-	10	2	26
* buy medicine at the market	6	3	3	2	-	-	1	15
* public health centre	4	20	2	5	-	11	14	56
* doctor	-	13	10	-	-	-	4	27
* other	-	2	1	-	-	-	-	3

<SOSEK-6.wk1/#1>

2.

RESULT OF SANITARY LANDFILL TEST

2 Result of Sanitary Landfill Test

I Scope of Work

1.1 Objective

The Sanitary Landfill Test is implemented to know the adaptability of sanitary landfill method to the daily operation of Dinas Kebersihan. Generally speaking the aim of sanitary landfill method is intended to have the following function :

1. Prevention of scattering waste
2. Prevention of odor emission
3. Prevention of water pollution by leachate
4. Prevention of breeding flies and vectors

Considering the economy and prompt execution as well as achieving the above mentioned functions the aim of the test is placed on confirming the adaptability of the following practical operation which is not fully adopted in Surabaya yet :

a. To control the dumping point uncovered as small as possible
b. To cover the dumped waste within a day or two
c. To install the underdrain to keep the dry condition in waste layer
d. To install the gas vent to release the gas to prevent spontaneous fire
e. To retain the leachate water within the site for a certain period

Application of these method may encourage the improvement of sanitary condition in final disposal site.

1.2 Location of the Test Site

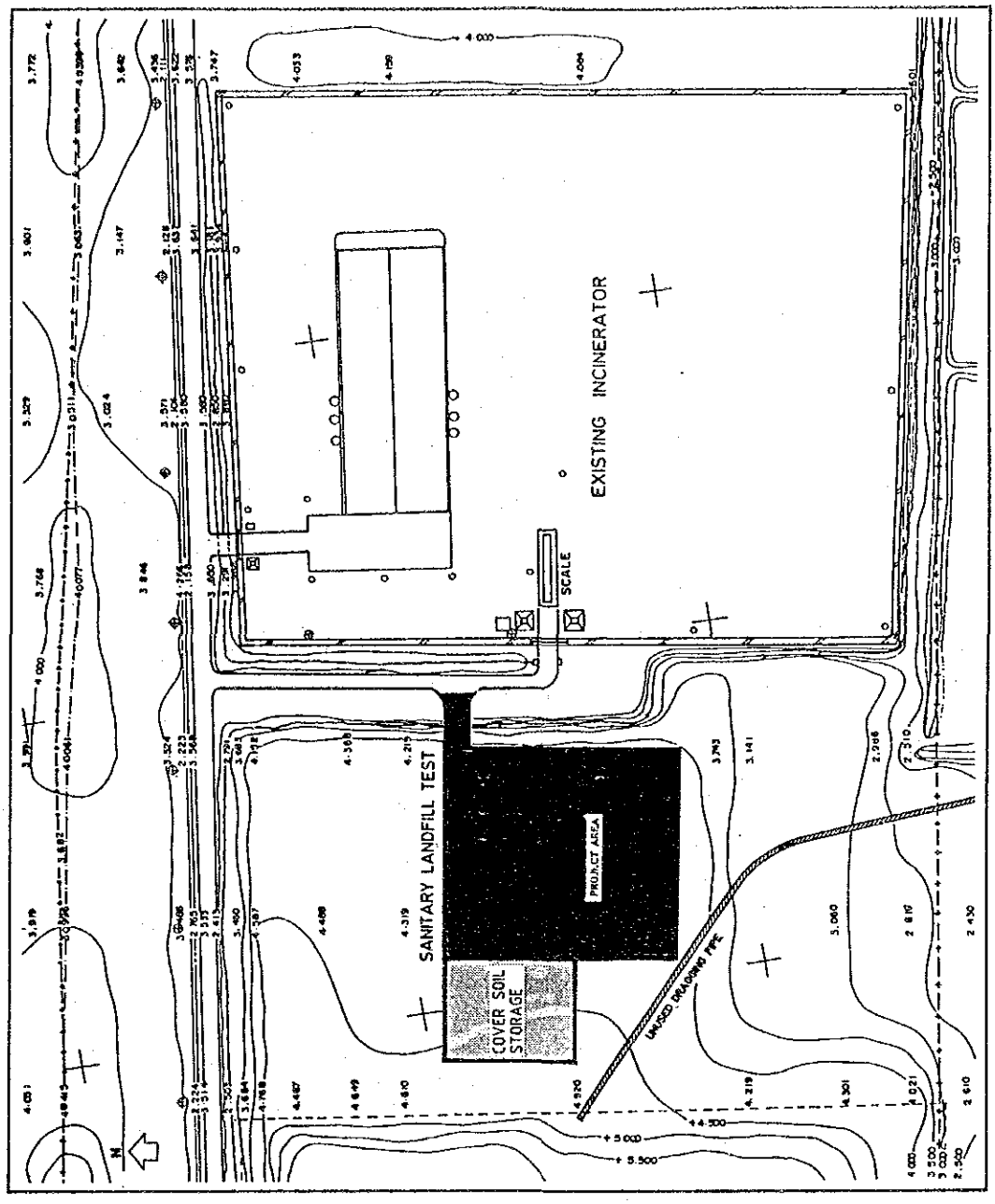
The test site is selected in Keputih LPA through the discussion between the Cleansing Department KMS and the Study Team. The advantage of this site is explained from the technical point of view as follows :

a. It is located in Keputih the nearest LPA to the Central Part therefore it is easier to accept garbage for test execution.

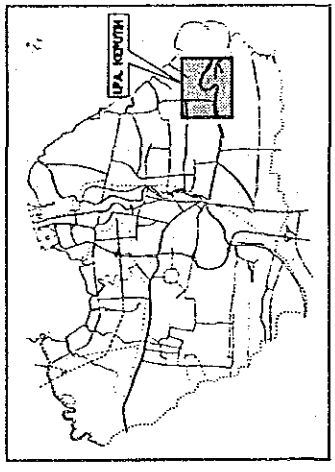
b. It is located in the remoted area from present working face, so the construction of the test site does not affect the daily disposal operation in the other part of Keputih Landfill Site.

c. It is located at the dead end of paved road, so the time for preparation of access road can be saved greatly.

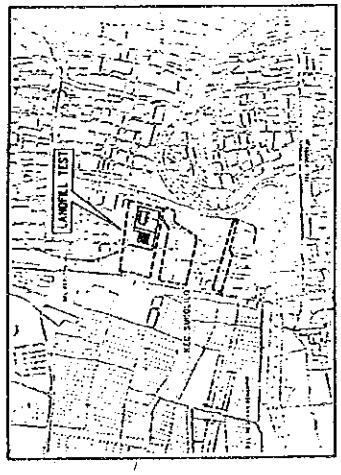
The location of the test site and layout plan is shown in Fig. 2-1.



INDONESIA



SURABAYA



LPA. KEPUTIH

FIG. 2-1	LAYOUT PLAN OF TEST SITE

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

JICA

1.3 Design of the Test Site

The principal facility of sanitary landfill test is listed in Table 2-1 and illustrated in Fig. 2-2 to Fig. 2-5

Table 2-1 Principal Facility of Test Site

Facility	Remarks
Test Site	a. Size : 5,000 m^2 including soil deposit b. Dumping area : 2,200 m^2 c. Bottom altitude : +2.1 ~ 2.7 m above sea level
Enclosure Dike	a. Made of soil b. Height : 2.4 m
Access Road	a. Paved with gravel and sandy soil b. Width : 6.0 m c. Thickness: 0.6 m
Retention Pond	a. Clay lined oblong pond b. Width : 150 m^2 c. Depth : 1.5 m below underdrain level
Underdrain	a. Made of perforated PVC pipe and cobble in general b. Width : 2.0 m, PVC Ø 150 mm c. Depth : 0.7 m
Surrounding Ditch	a. Divert the runoff from the other area b. V shape ditch with soil surface
Gas Vent	a. Made of PVC pipe and cobble contained in bamboo cage (keranjang) for vertical vent b. Made of perforated PVC pipe and cobble for creeping vent on the interior slope of dike c. Diameter of PVC pipe : 150 mm
Culvert	a. To ensure the stream of the existing ditch crossing the access road b. Made of prefabric concrete tube c. Diameter : 0.8 m
Weigh Bridge	a. Portable axle weigh bridge with automated data logger b. Weighing capacity : 2x10=20 ton

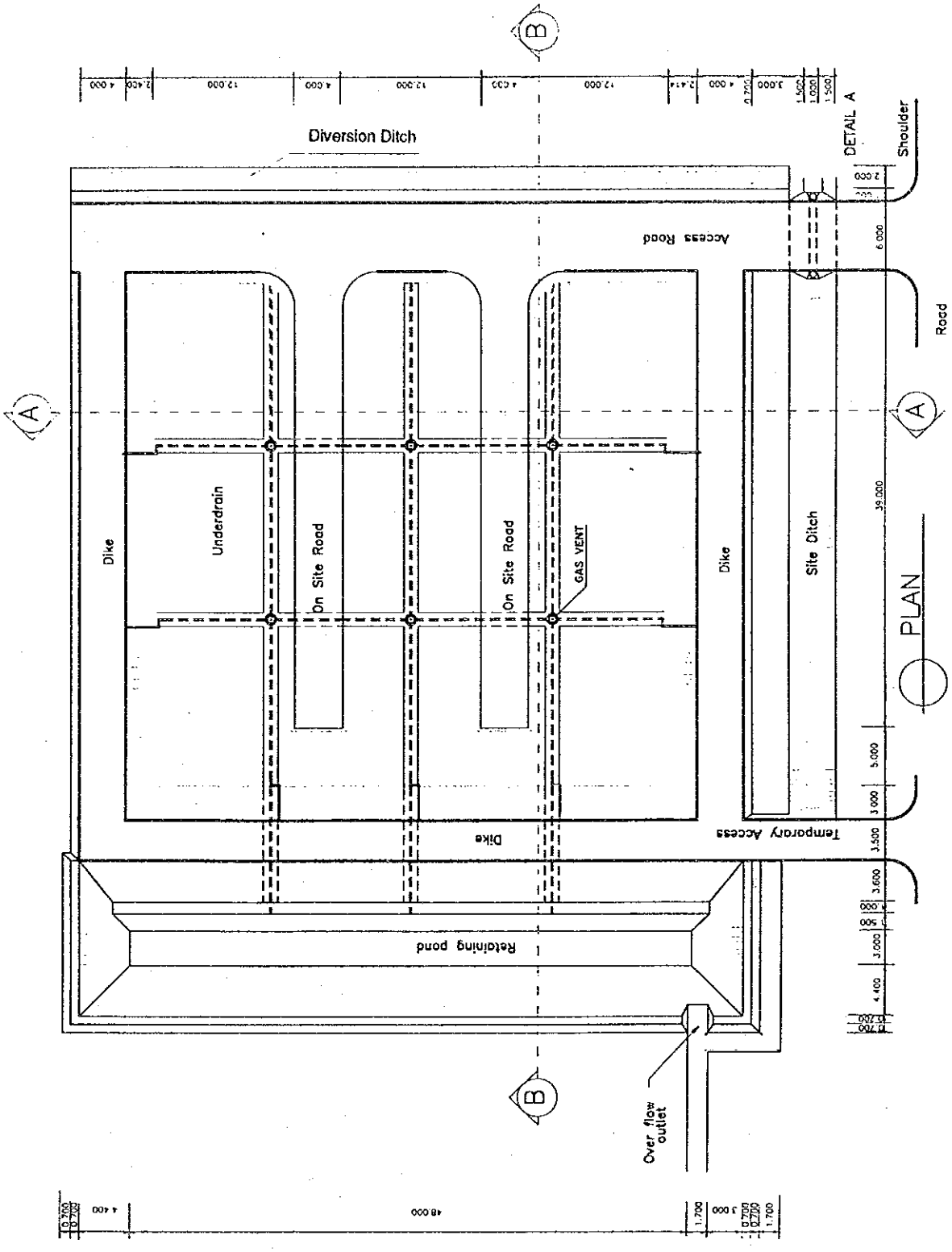
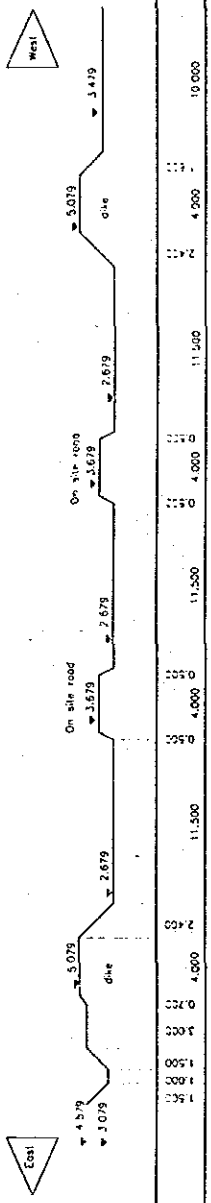
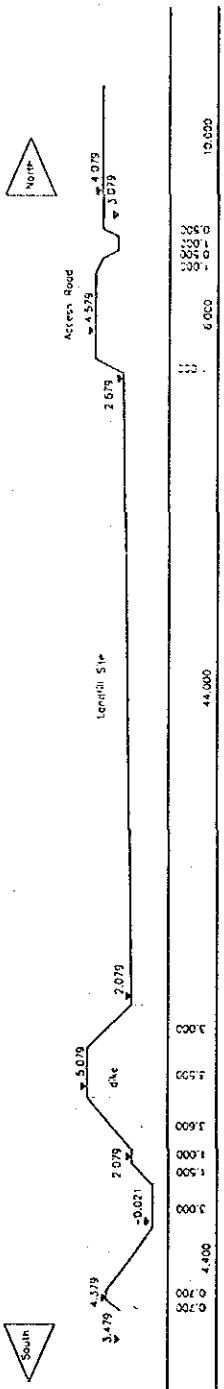


FIG. 2-2 **PLAN OF TEST FACILITY**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY



SECTION A–A



SECTION B–B

FIG. 2-3 **ELEVATION OF TEST FACILITY**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

JICA

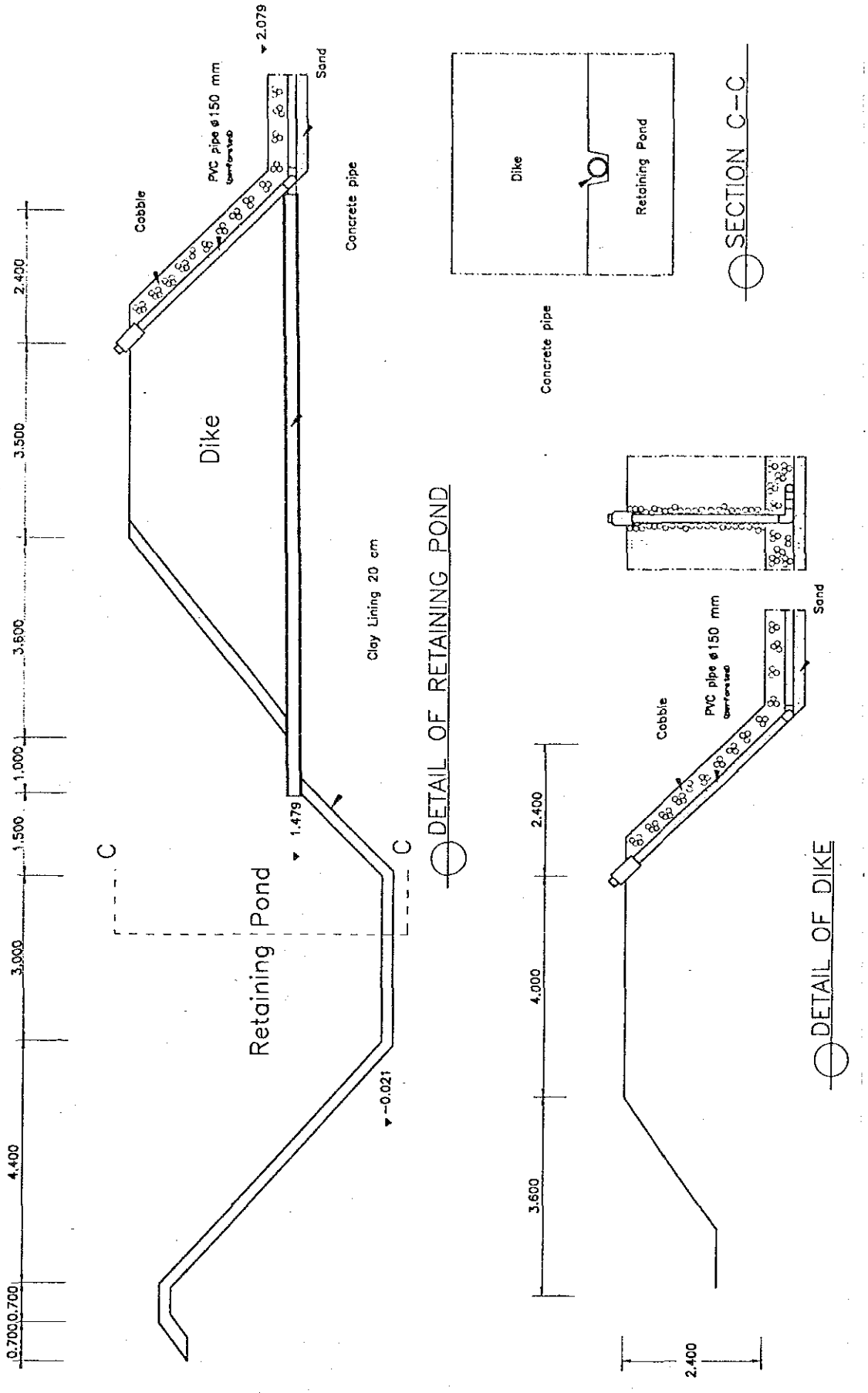


FIG. 2-4 **STRUCTURE OF COMPONENT FACILITY (1)**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

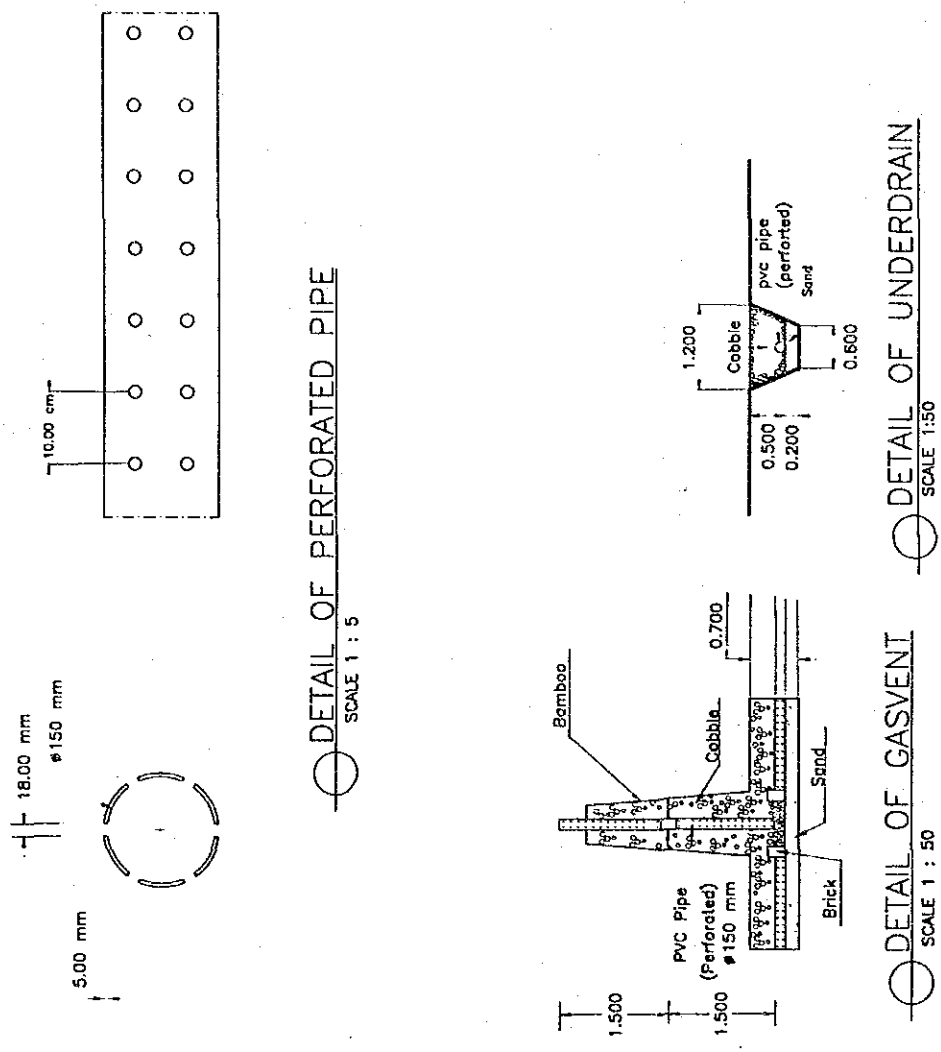


FIG. 2-5 **STRUCTURE OF COMPONENT FACILITY (2)**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

1.4 Specification of Landfill Operation

Landfill operation is executed at a limited area for one day operation, so called a "cell". Each cell is formed with garbage and cover soil one after another. The whole landfill area is assigned to 16 cells overlaid in double layers. The progress of landfill is explained in Fig. 2-6.

The first layer is divided into 4 rows of cell in East-West section. The first working cell is designated just beside the dike, then the next cell is treated next day. The third working cell is the opposite one beside the dike. Soil cover is started since the third day of operation at the first cell and second. Thus it is executed one day or two behind the dumping operation. When the first layer of cell is filled up, the operation is transferred to the upper layer. It takes 19 days to fill up all the cells and finally covered as shown in Fig. 2-7. The specification of landfill operation is summarized below.

a.	Daily garbage amount	:	about 120 t, 40 trucks	
b.	Total garbage amount	:	1,800 t	
c.	Cover layer	:	intermediate	0.2 m to 0.3 m
			final	1.0 m (Southern most Side)
				0.8 m (Northern most Side)
d.	Solid demand	:	3,000 m^3	
e.	Capacity	:	4,760 m^3	

The Capacity of the Test Site is estimated as follows:

- Spatial volume within the dyke

  $V_1 = \frac{1}{2} \{ (47.0 \times 48.8) + 44.0^2 \} \times \frac{1}{2} \{ (4.879 - 2.079) + (4.679 - 2.679) \}$

  $= 5{,}076\ m^3$

- Invalid volume by on-site roads

  $V_2 = 2 \times \{ \frac{1}{2} \times (4.0 \times 1.9 \times 39.0) + \frac{1}{2} \times \frac{1}{3} \times 1.0 \times 1.9 \times 39.0 \} = 320\ m^3$

- Effective volume to contain garbage and cover soil

  $V = V_1 - V_2 = 4{,}756\ m^3$

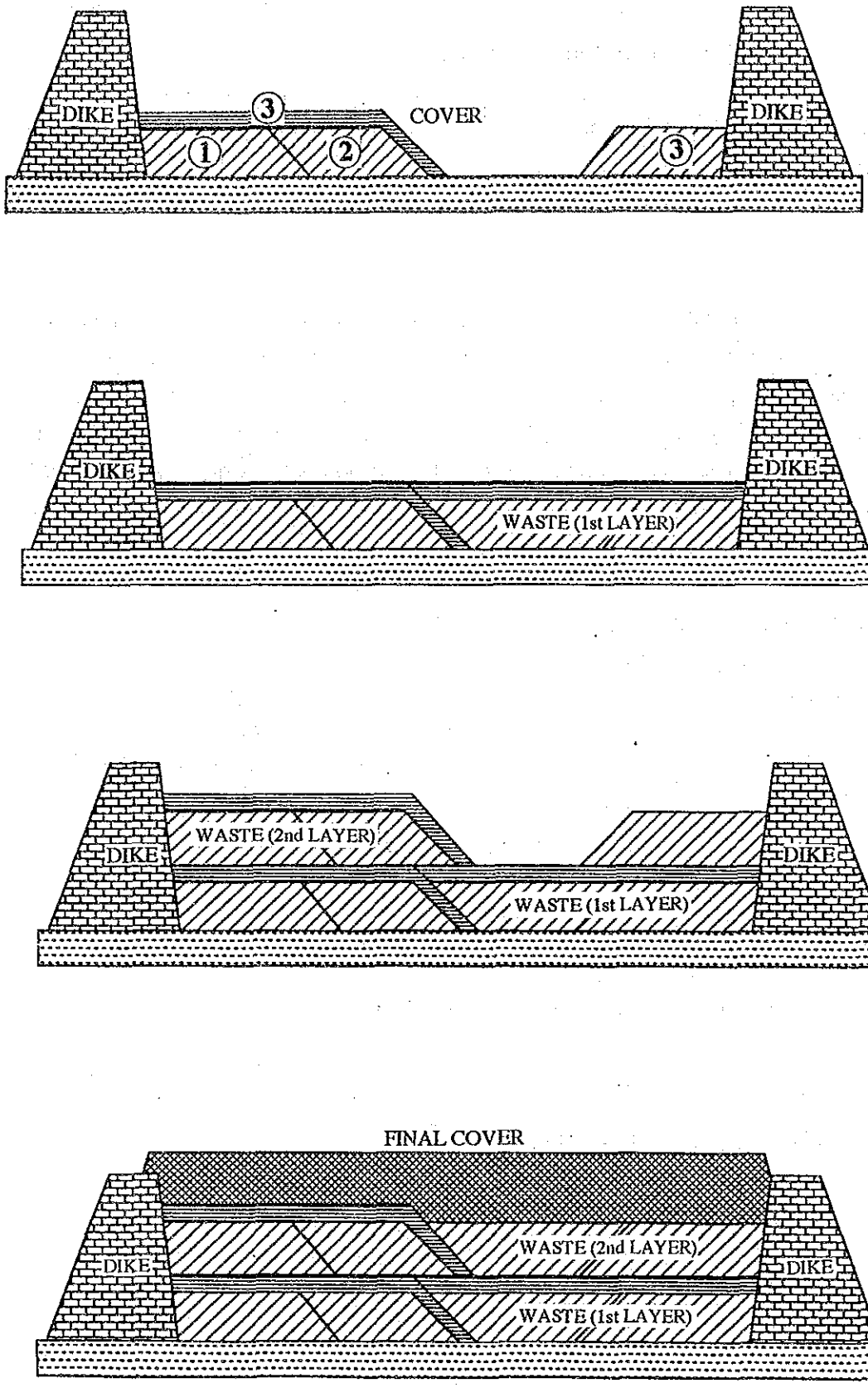


FIG. 2-6 **PROCESS OF FORMING CELL**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

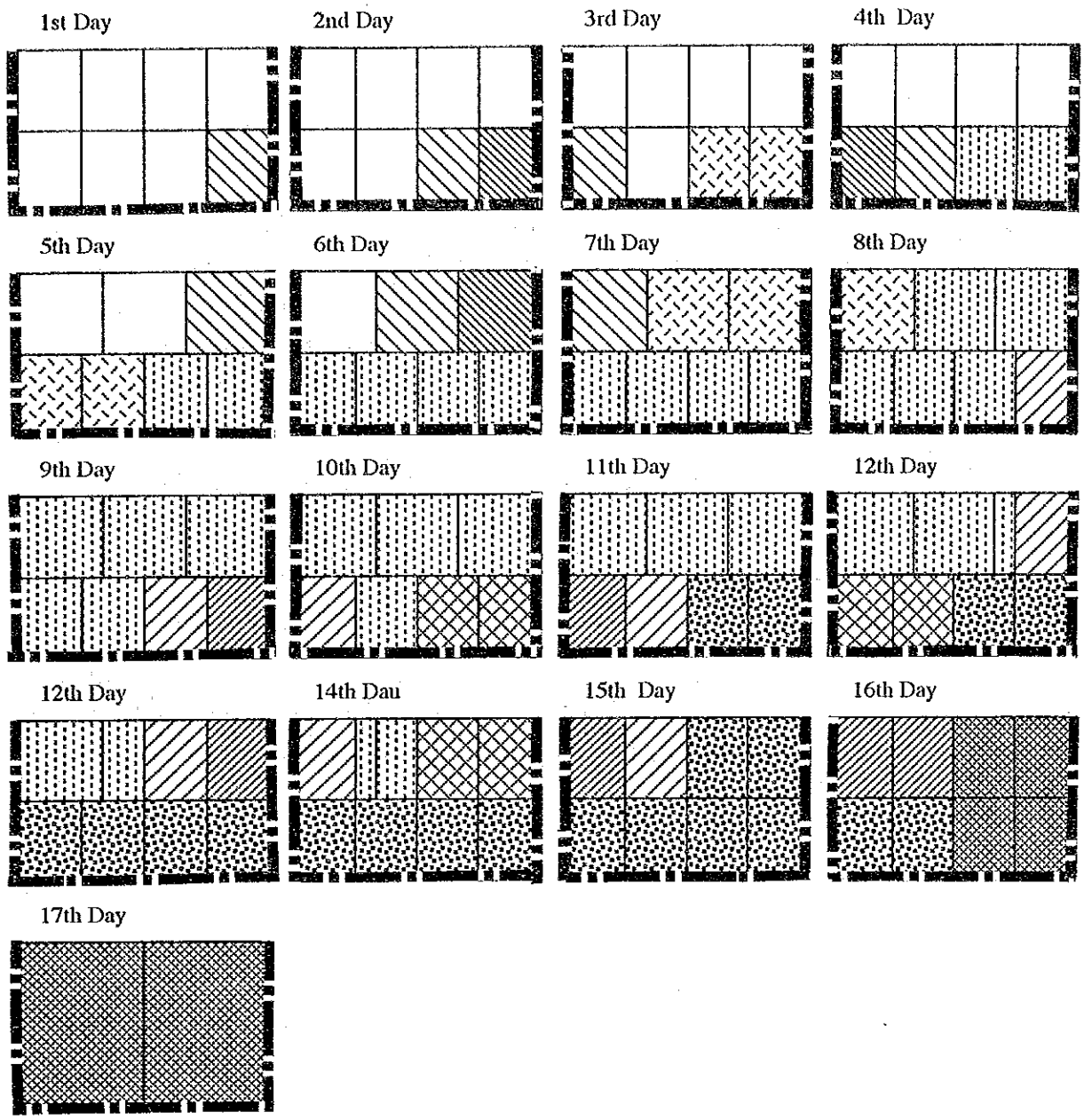


FIG. 2-7	OPERATION PLAN OF LANDFILLING

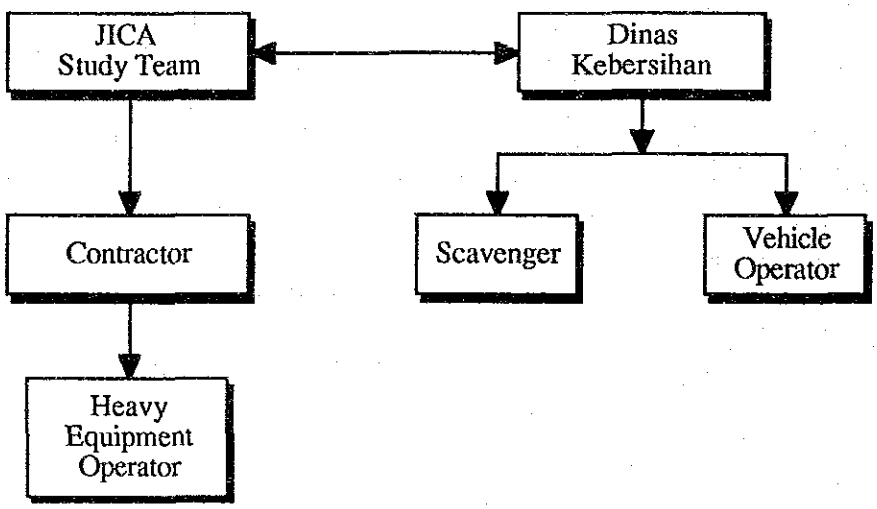
THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

1.5 Execution Plan

1) Organization of Implement

The test should be executed by the contractor in close collaboration with the garbage vehicle operators. Therefore, the operation of both sides are to be coordinated adequately based on the plan of the test. Operators are organized as shown below, so that the Study Team and the Cleansing Department had a meeting to clarify the detail of test execution prior to commencement.

Organization of the Test



2) Landfill Operation

Garbage which is hauled into the test site should be measured its weight and volume at the entrance by using portable axle weigh bridge. The measurement is done two times for one vehicle, namely first measurement for the fully loaded weight and second for the empty weight. The actual amount dumped in the site is calculated with two measured figure stated above and recorded.

Operation is planned to last for 15 days and the following matters are recorded everyday.

a. Number of vehicle for garbage and cover soil
b. Dumped weight of garbage by each vehicle
c. Dumped volume of garbage and cover soil by each vehicle

3) Finishing

When dumping is finished, final cover is applied on the top. The slope is shaped in order to facilitate the discharge of rainwater directly to the neighboring ditch as much as possible. The runoff from landfill area is planned to flow into the central sag and lead to the north side along the access road. Then the runoff is discharged at the crossing culvert.

The naked soil surface of dike and retention pond is planned to be covered with grass. The kind of grass is selected out of common species in the surrounding landfill site.

II Execution of the Test

2.1 Waste Amount

The waste amount disposed during test period is totally about 1,940 t and 129 t in daily average as summarized in Table 2-2 and Fig. 2-8. The volume was estimated by the following means for each type of vehicle.

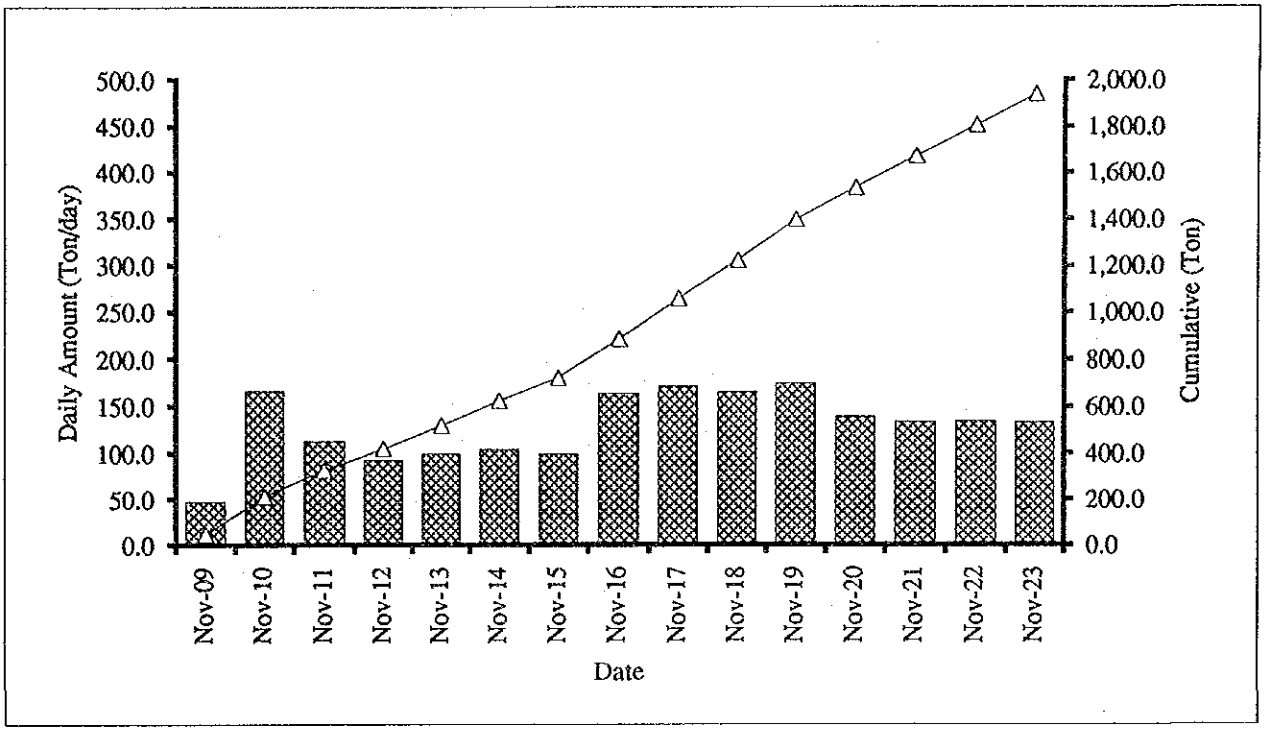
a. Container truck : discriminate the rated capacity and evaluate the loading rate

b. Dump truck or Flat body truck : measure the dimension, height, width, length.

The initial density of garbage just before dumping is calculated at 0.4 t/m3 by total weight and volume.

Table 2-2 Waste Amount Accepted

Date	Number of Vehicle	Amount of Waste			
		Daily	Cumulative	Daily	Cumulative
	No./day	(Ton/day)	(Ton)	(m3/day)	(m3)
Nov-09	21	47.3	47.3	144	144
Nov-10	51	166.2	213.5	417	561
Nov-11	38	112.8	326.3	286	847
Nov-12	33	92.8	419.1	265	1,112
Nov-13	32	99.5	518.6	269	1,381
Nov-14	31	104.1	622.7	256	1,637
Nov-15	34	99.5	722.2	259	1,896
Nov-16	59	163.3	885.5	427	2,323
Nov-17	60	171.3	1,056.8	429	2,752
Nov-18	59	165.5	1,222.3	415	3,167
Nov-19	54	173.6	1,395.9	408	3,575
Nov-20	47	139.5	1,535.4	339	3,914
Nov-21	47	134.0	1,669.4	332	4,246
Nov-22	45	134.4	1,803.8	322	4,568
Nov-23	51	133.6	1,937.4	386	4,954
Total	662	1,937		4,954	



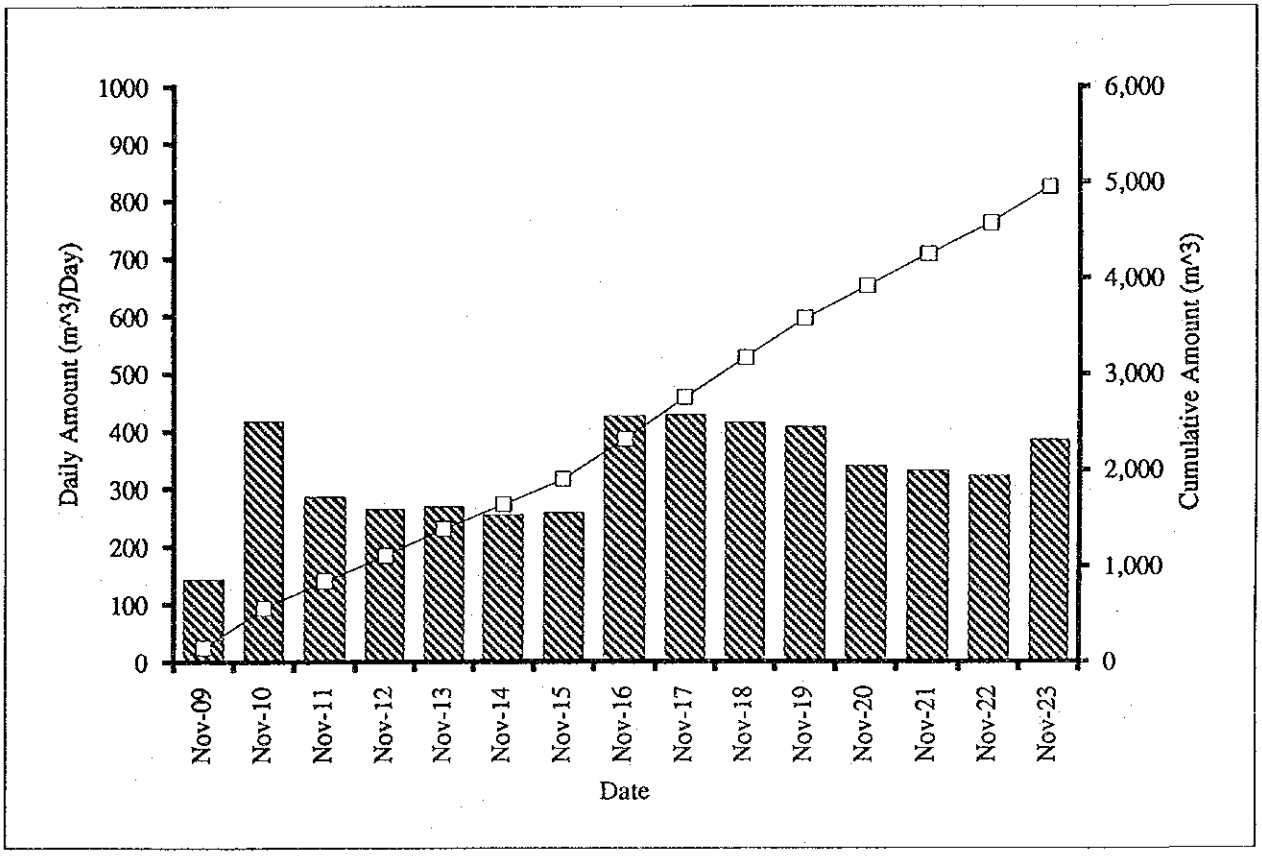


FIG. 2-8	FINAL FORM OF TEST SITE

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

2.2 Cover Soil Amount

The cover soil amount placed during test period is totally about 2,700 m^3 as summarized in Table 2-3.

Table 2-3 Cover Soil Amount Accepted

Date	Number of Vehicle	Amount (m3/day)
Nov. 09	5	57.5
Nov. 10	6	69.0
Nov. 11	4	46.0
Nov. 12	6	68.0
Nov. 13	7	80.5
Nov. 14	3	34.5
Nov. 15	5	57.5
Nov. 16	5	57.5
Nov. 17	6	69.0
Nov. 18	11	136.0
Nov. 19	0	0
Nov. 20	6	34.0
Nov. 21	6	69.0
Nov. 22	2	23.0
Nov. 23	9	106.0
Nov. 24	17	208.0
Nov. 25	41	469.0
Nov. 26	46	504.0
Nov. 27	41	457.0
Nov. 28	14	155.0
Total	240	2,700.5

2.3 Form of Completion

The landfill area has been finally filled up with the garbage and soil. the contents are summarized as follows :

- Total : 4,760 m^3
- cover soil : 2,700 m^3
- garbage : 2,060 m^3

As a result, the garbage has been compressed to 42% (2,060 m^3) of original volume (4,954 m^3), and the density has become 0.95 t/m^3.

The final cover is formed to facilitate the runoff to flow directly into the neighboring ditch as shown in Fig. 2-9.

After finishing landfill operation, the underdrain is already discharging the leachate with dark color. But the leachate is reserved in the pond and not overflowing to outside.

2.4 Tentative Evaluation

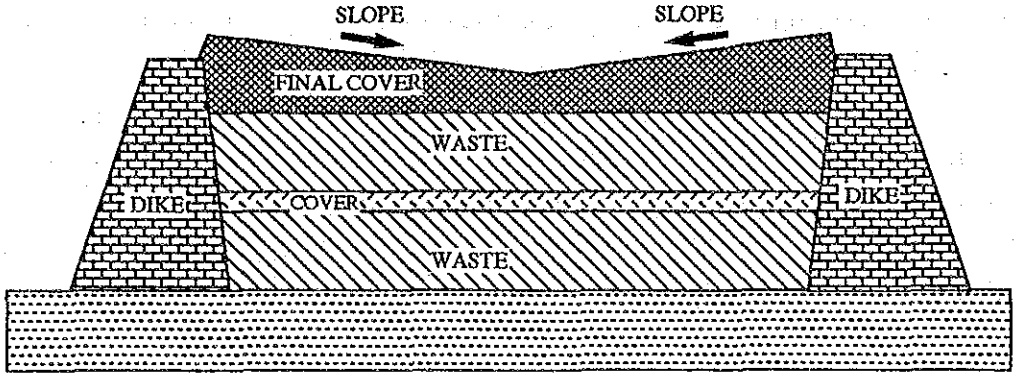
The formation of a type of sanitary landfill is completed successfully. It was properly controlled to limit the working face and form the cell without so much difficulties except the presence of waste pickers gathering close to the heavy equipment during operation.

Soil cover was practiced periodically as designed in advance. Underdrain is now performing the designed function to eject leachate out of site. It was found that the vertical gas vent was installed rather easily to form the stable and continual conduit of cobble amid the working range of heavy equipment.

On the contrary, the inclined gas vent was not easy to install on the slope because of the difficulty to confine the cobble around the PVC tube. This means it requires a special device to install if it is applied to a practical design.

As for the maintenance of test site, it is desirable to keep the form as completed now because it is adaptable to a further investigation. For example, it is possible to use the site to evaluate the effect of sanitary landfill applied in this test in view of the following points:

a. leachate water recirculation
b. transition of gas generation during the duration of time after landfill operation
c. transition of settlement
d. growth of vegetation



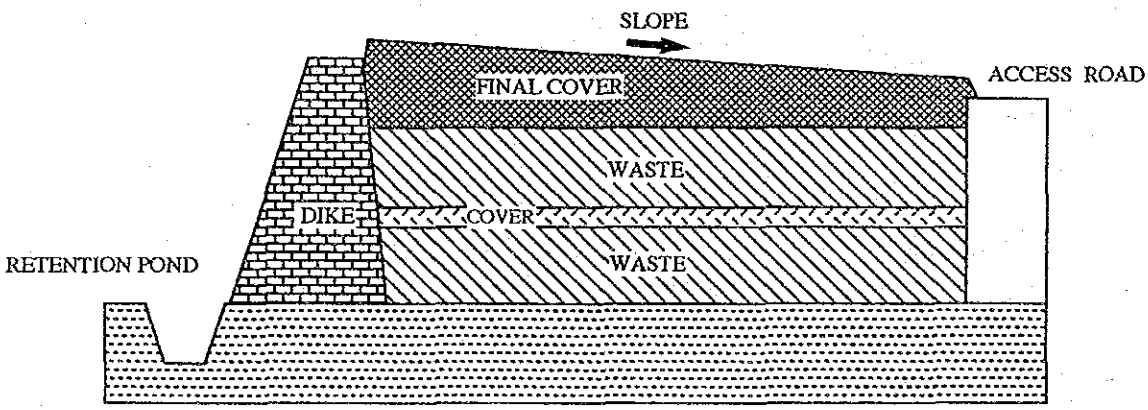


FIG. 2-9 **FINAL FORM OF TEST SITE**

THE STUDY ON THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR SURABAYA CITY

JICA

3.

EXISTING ENVIRONMENTAL CONDITIONS

FIELD SURVEY

I. Introduction

This Field Survey implementation is for the Benowo proposed disposal site Survey location oriented can be seen at Figure 1.1.

This report consists of data collection from field survey and laboratory test.This field survey covers the environmental components of air quality, surface water quality, ground water quality, traffic volume, noise level, ecological condition, socio economic and health condition.

II. Field Work and Staff Schedule

The time which is given to complete the field survey is informed in the field work schedule as shown in Table 1.1. The time of each sampling is also noted in the survey-result form.

For the laboratory test we joint with Institute Technology of Surabaya Sanitary Laboratory, Core Lab Laboratory and Balai Teknik Kesehatan Lingkungan Laboratory (BTKL).

III. Survey Method

The survey method which is used in this study is suitable to the environmental components which is evaluated refers to the test standard method for East Java. Generally the survey method which is used is shown in Table I-2 (A,B,C,D). Whereas the location of sample points for each environmental survey are shown in Figure 1.2.

Table I-1
FIELD SURVEY SCHEDULE

No	ACTIVITY	OCTOBER												NOVEMBER												
		19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	ENVIRONMENT SURVEY :																												
1.	- Air Quality																												
2.	- Surface Water Quality																												
3.	- Ground Water Quality																												
4.	- Traffic Volume																												
5.	- Noise Level																												
6.	- Socio - economic and Health Condition																												
7.	- Ecology																												

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FIGURE II

PROPOSED LPA SITE ORIENTATION

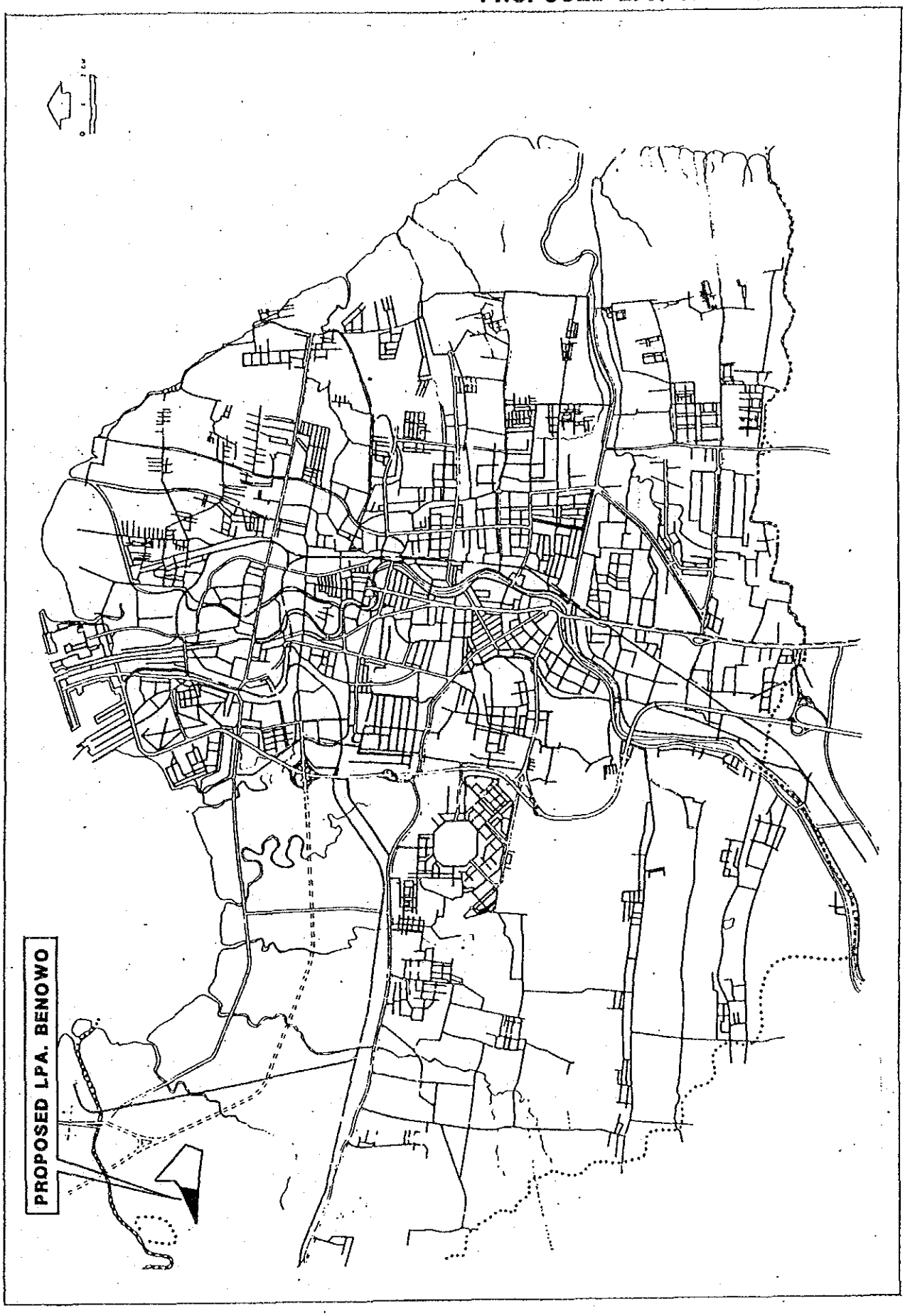
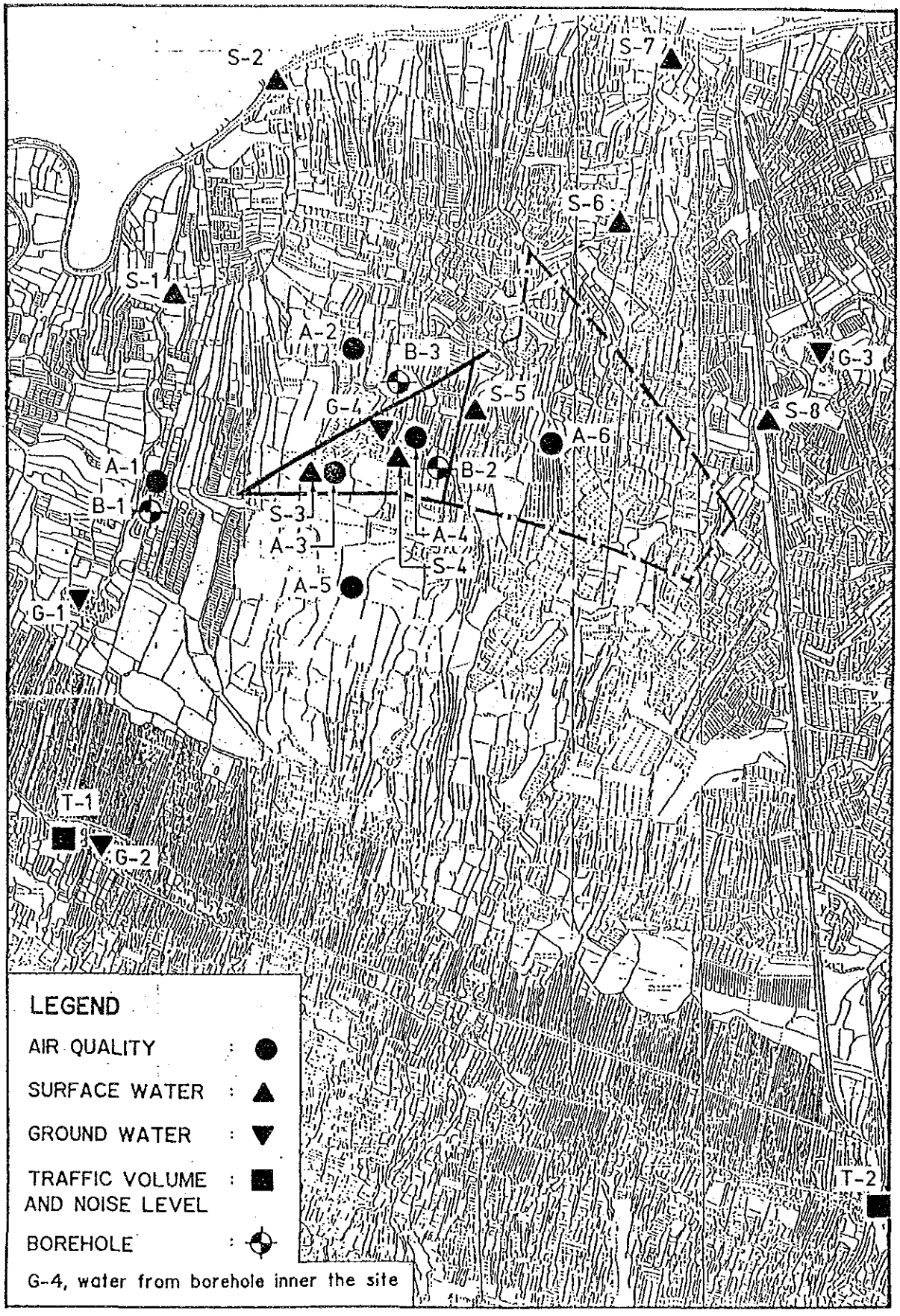


FIGURE 1.2

LOCATION OF ENVIRONMENTAL SURVEY POINTS



IV. Result of Surveys

4.1. Air Quality

4.1.1. Result

Result of air quality survey is presented by Table 1.3 respectively in study area in Benowo.

Table I-3
Air Quality Analysis Result

Date	November 9, 1992		November 10, 1992		November 11, 1992		Standard
Time	24 hours						
Stations (See Fig.)	A - 1	A - 2	A - 3	A - 4	A - 5	A - 6	
Parameters :							
NH_3 (ppm)	0.008	0.0026	0.0003	0.00016	0.0003	0.00042	2.0
H_2S (ppm)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.03

4.1.2. Analysis

The maximum standard value for NH_3 and H_2S are 2.0 and 0.03 ppm.From air quality analysis, we found that number of NH_3 this area is very small and there are no H_2S in this area.Number of NH_3 and H_2S are very small because these location is salt farm, fish ponds and there are no community in this study area.

The analysis of air quality is shown that the air in this area has not poluted yet.

4.2. Surface Water Quality

4.2.1. Hydrology

There are Kali Lamong River and some small river (Kali Sememi and Kali Slower) around the study area. In the study area there are one small river and some ditches or small channel at the side of the salt farm. Location of this rivers are shown in Figure 1.3.

The water stream and water usage can be explain as follows :

The natural water stream in this area is normally in good condition, this stream is influenced by back water effect from the sea.

Kali Lamong's water is only used to washing and cleaning, because the water is salty. In the rainy seasons the water is not salty, so they can used

to more usages. The requirement of drink water they used PDAM water that supplied by Kotamadya Surabaya.

4.2.2. Result

Result of Surface Water Quality is presented in Table 1.4.

4.2.3. Analysis

In general, number of DO, and Total-N is exceed the limitation standard. Analysis for heavy metal parameter: Pb and As have a high polution level about 3 until 4 times higher than the limitation standard.

Number of Colibacillus is also high, but there are no Organic Phosphorus (Parathion and Metyl Parathion) can be founded and PCB is less than 1 ppb.

Environment and Population Bureau East Java has standard of ambient water quality as shown in Table 1.5.

4.3. GroundWater Quality

4.3.1. Result

The result of ground water quality survey is presented in Table 1.5.

4.3.2. Analysis

The degree of Disolved Oxigen (DO) is low, but Total-N value is high enough with the average value exceed the standard.

Cl^- is high, so the water taste is salt. The value of heavy metal (Pb and As) are poluted this water with 3 until 4 times higher than standard value.

Number of Colibacillus and E-Coli are also high, but there are no Organic Phosphorus (Parathion and Metyl Parathion) can be founded and PCB is less than 1 ppb.

Table I-4
Surface Water Quality

Date		October, 28, 1992								Standard	Method / Equipment
Time		11.40	12.04	12.59	14.00	13.15	17.15	17.20	16.30		
Stations (See Fig.1.2.)		S - 1	S - 2	S - 3	S - 4	S - 5	S - 6	S - 7	S - 8		
Parameter :											
1. Temperature	°C	30.0	31.0	32.5	33.5	32.0	32.0	31.0	31.8	normal + 3	Thermometer
2. pH		8.7	8.9	8.6	8.6	8.5	8.5	9.1	8.3	6 - 9	Potentiometry/ pH meter
3. Disolved Oxygen (DO)	mg/l	3.50	4.00	4.00	4.00	4.00	3.60	1.60	3.80	min 3	Titrimetry/Azida Modification
4. Chemical Oxigen Demand (COD)	mg/l	159.00	216.00	426.00	512.00	312.00	469.00	27.00	635.00	*	Dichromat Reflux Method
5. Biological Oxigen Demand (BOD)	mg/l	46.00	65.00	128.00	156.00	94.00	142.00	10.00	190.00	*	Argentometry/Azida Modification
6. Suspended Solid	mg/l	616.00	608.00	672.00	816.00	712.00	964.00	316.00	940.00	1000	Titrimetry/ Gravitymetry
7. Chlorida (Cl^-)	mg/l	14,003.28	12,666.29	23,080.79	22,949.05	21,110.48	20,125.32	11,821.87	22,377.10	*	Titrimetry/Argenthometry Method
8. Total-N (T-N)	mg/l	130.52	49.18	63.54	68.32	73.10	70.71	58.75	51.57	0.06	Kjeldahl/ Nessler, Spectrofometre
9. Sulfat (SO_4^{2-})	mg/l	1,787.00	1,551.20	2,376.49	2,470.81	2,117.12	2,470.81	1,480.46	2,282.17	*	Spectrophotometry/Turbidimetric
10. Cadmium (Cd)	mg/l	undetected	0.08	0.08	0.04	0.17	0.08	0.04	0.08	0.01	Spectrometry/ AAS
11. Plumbum (Pb)	mg/l	0.39	0.39	1.16	0.77	1.16	0.77	0.77	0.77	0.03	Spectrophotometry/Spect.ph.meter
12. Chromium (Cr(VI))	mg/l	0.02	0.04	0.05	0.06	0.04	0.09	0.04	0.04	0.05	Spectrometry/ AAS
13. Arsen (As)	mg/l	2.90	2.90	4.30	2.90	2.10	2.10	2.10	2.90	1	Spectrometry/ AAS
14. Cyanida (CN^-)	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	Spectrometry/ AAS
15. Mercury (Hg)	mg/l	0.04	0.06	0.10	0.06	0.19	0.12	0.10	0.05	0.002	Spectrometry/ AAS
16. Colibacillus	Cell / 100 ml	14×10^4	20×10^3	31×10^4	120×10^3	30×10^3	10×10^3	21×10^3		*	MPN/ Multitubes
17. Escherichia coli (E-Coli)	MPN / 100 ml	12×10^4	15×10^3	21×10^4	43×10^3	21×10^3	4×10^3	15×10^3		*	MPN/ Multitubes
19. Parathion	mg/l				0.0000		0.0000			*	Chromatography/ GC or HPLC
20. Methylparathion	mg/l				0.0000		0.0000			*	Chromatography/ GC or HPLC
21. PCB	ppb				< 1		< 1			*	Chromatography/ GC or HPLC

Notes :
Temperatur and pH measurement are in situ measurement
* : N.A
Limitation Standard based on "Standard Saku Mutu Air Golongan C" (Water Quality Standard)

Table I-5
Ambient Water Quality Standard (extract)
Government Regulation of Republic Indonesia (No. 20,1990) Maximum Value

Parametre	Unit	Class A	Class B	Class C	Class D
Temperature	°C	normal + 3	normal	normal + 3	normal
pH		6.5 - 8.5	5 - 9	6 - 9	5 - 9
Disolved Oxygen (DO)	mg/l	*	min 6	min 3	*
Chemical Oxigen Demand (COD)	mg/l	*	*	*	*
Biological Oxigen Demand (BOD)	mg/l	*	*	*	*
Suspended Solid	mg/l	1000	1000	1000	2000
Chlorida (Cl^-)	mg/l	250	600	*	*
Total-N (T-N)	mg/l	11	11	0.06	*
Sulfat (SO_4^{2-})	mg/l	400	400	*	*
Cadmium (Cd)	mg/l	0.005	0.01	0.01	0.01
Plumbum (Pb)	mg/l	0.05	0.1	0.03	1
Chromium (Cr(VI))	mg/l	0.05	0.05	0.05	1
Arsen (As)	mg/l	0.05	0.05	1	1
Cyanida (CN^-)	mg/l	0.1	0.1	0.02	*
Mercury (Hg)	mg/l	0.001	0.001	0.002	0.005
Colibacillus	Cell/1ooml	3	3-10000	*	*
Escherichia coli (E-Coli)	MPN/100ml	*	*	*	*
Parathion	mg/l	*	*	*	*
Methylparathion	mg/l	*	*	*	*
PCB	ppb	*	*	*	*

Notes :
" - " : shows there is no standard defined
Class A to Class D represents the type of water resources usage that shown bellow

Classifications	Usage
Class A	The water which is health to drink.
Class B	The water which is used as standard water to process for drinking and households water.
Class C	The water which is used for fisheries and animal husbandary.
Class D	The water which is used for agricultural and for urban business, industries and electricity of water energy.

Table I-6
Ground Water Quality

Date		October 28, 1992			October 31	Standard	Method / Equipment
Time		11.06	10.10	15.58	(24 hours)		
Stations (See Fig.1.2.)		G - 1	G - 2	G - 3	G - 4		
Parameter							
1. Temperature	°C	28.0	28.2	27.8	28.0	normal	Thermometer
2. pH		8.7	7.7	7.2	7.85	5 - 9	Potentiometry/ pH meter
3. Disolved Oxygen (DO)	mg/l	1.50	1.65	2.15	1.20	min 6	Titrimetry/Azida Modification
4. Chemical Oxigen Demand (COD)	mg/l	120.00	76.00	159.00	1708.00	*	Dichromat Reflux Method
5. Biological Oxigen Demand (BOD)	mg/l	28.00	17.00	48.00	512.00	*	Argentometry/Azida Modification
6. Suspended Solid	mg/l	76.00	48.00	108.00	800.00	1000	Titrimetry/ Gravitymetry
7. Chlorida (Cl^-)	mg/l	633.31	1055.52	3518.41	27302.88	600	Titrimetry/Argenthometry Method
8. Total-N (T-N)	mg/l	23.99	67.12	93.44	55.44	11	Kjeldahl/ Nessler, Spectrofometre
9. Sulfat (SO_4^{2-})	mg/l	115.37	351.00	362.96	1526.77	400	Spectrophotometry/Turbidimetric
10. Cadmium (Cd)	mg/l	undetected				0.01	Spectrometry/ AAS
11. Plumbum (Pb)	mg/l	0.39	0.39	0.39	0.387	0.1	Spectrophotometry/Spect.ph.meter
12. Chromium (Cr(VI))	mg/l	0.03	0.01	0.02	0.015	0.05	Spectrometry/ AAS
13. Arsen (As)	mg/l	2.10	1.45	1.45	1.45	0.05	Spectrometry/ AAS
14. Cyanida (CN^-)	mg/l	0.40	0.01	0.00	0.35	0.1	Spectrometry/ AAS
15. Mercury (Hg)	mg/l	0.09	0.09	0.10	0.10	0.001	Spectrometry/ AAS
16. Colibacillus	Cell / 100 ml	80×10^3	100×10^3	30×10^3	24×10^3	10000	MPN/ Multitubes
17. Escherichia coli (E-Coli)	MPN / 100 ml	43×10^3	75×10^3	28×10^3	9×10^3	*	MPN/ Multitubes
19. Parathion	mg/l	0.0000		0.0000		*	Chromatography/ GC or HPLC
20. Methylparathion	mg/l	0.0000		0.0000		*	Chromatography/ GC or HPLC
21. PCB	ppb	< 1		< 1		*	Chromatography/ GC or HPLC

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Notes :
Temperatur and pH measurement are in situ measurement
* : N.A
Limitation Standard based on "Standard Baku Mutu Air Golongan B" (Water Quality Standard)

4.4. Traffic Volumes and Noise Level

4.4.1. Result of Traffic Volume Survey

Traffic Counting has been done at 2 locations, at the major junction Jl. Margomulyo and at the minor junction Jl. Jawar during 24 hours.

In this survey there are four classifications of vehicle type are used. The classifications are :

- Small Vehicle : consists of private car, bemos, taxi, small good vehicle.
- Large Vehicle : consists of truck, bus, trailler
- Motorcycle
- Non motorized Vehicle : consists of becak, bicycle

Passenger Car Unit (PCU) for each type of vehicles (based on Surabaya Urban Transport Study)are :

- Small Vehicle : 1
- Large Vehicle : 2.5
- Motorcycle : 0.3
- Non motorized Vehicle : 0.5

The result of traffic volume survey is presented in Table 1.7.

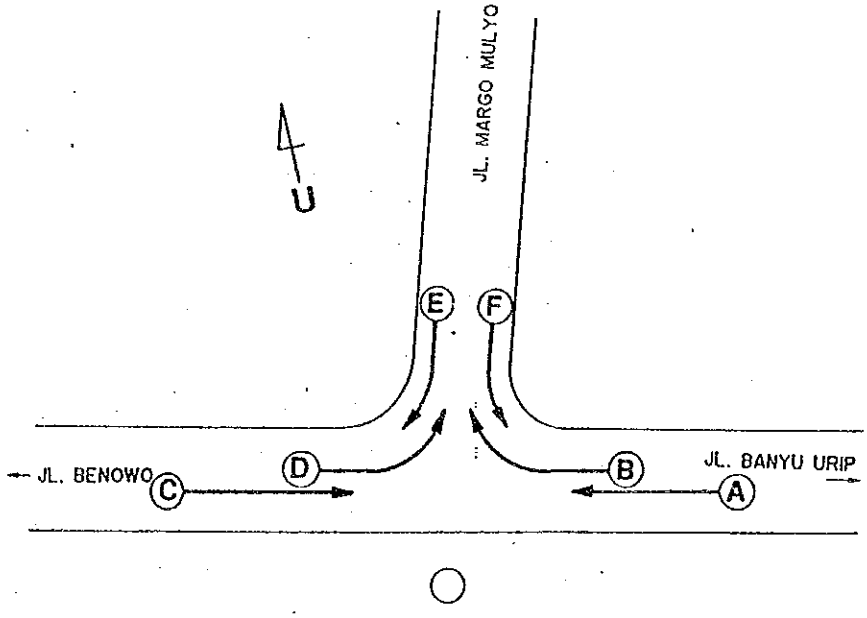
4.4.2. Result of Noise Level Survey

Noise level measurement has been done at the same station and time as traffic volume counting. Result of noise level survey is presented in Table 1.8

4.4.3. Analysis of Traffic Volume Survey

According the traffic counting survey at Jl. Margomulyo and is known that traffic volume in this junction is quite high. The most vehicles passed in this road are motorcycles and small vehicle (about 43.8% and 31% from total vehicles). At Jl. Jawar junction the most vehicles are motorcycle and non motorized vehicles about 53.5% and 23.5 % from total vehicles.

PERSIMPANGAN JL. MARGOMULYO



PERSIMPANGAN JL. JAWAR

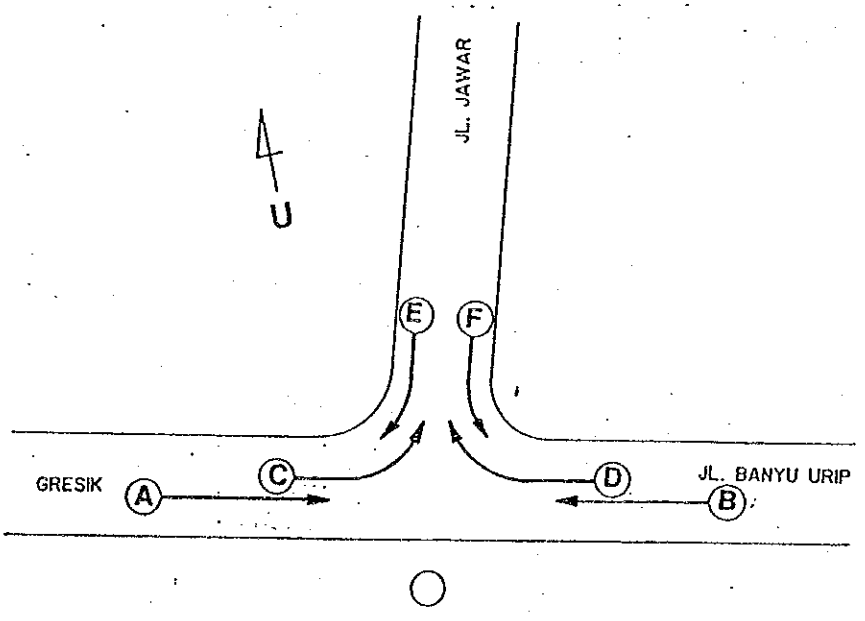


Table I-7
TRAFFIC COUNTING SURVEY RESULT

Location : Margomulyo Junction
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : A						Direction : B					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	388	16	364	236	0	655	118	30	516	460	0	578
2	07.00-08.00	311	17	401	225	0	587	171	33	432	316	0	542
3	08.00-09.00	337	5	97	46	0	401	153	45	195	53	0	352
4	09.00-10.00	352	13	349	152	0	566	131	47	131	47	0	310
5	10.00-11.00	377	20	393	125	0	608	133	55	224	79	0	377
6	11.00-12.00	471	20	369	132	0	697	111	29	123	39	0	240
7	12.00-13.00	441	25	355	177	** 1	700	92	43	123	39	0	255
8	13.00-14.00	180	49	252	84	2	422	135	31	125	51	6	277
9	14.00-15.00	200	45	288	85	4	444	111	27	127	56	5	246
10	15.00-16.00	163	37	263	137	8	407	104	31	77	29	1	219
11	16.00-17.00	205	21	417	277	3	524	75	35	103	35	3	211
12	17.00-18.00	180	29	533	183	2	506	44	20	87	15	0	127
13	18.00-19.00	140	11	553	156	3	412	49	8	72	32	4	109
14	19.00-20.00	158	4	300	88	0	302	62	16	74	28	1	139
15	20.00-21.00	125	11	267	96	0	280	25	13	85	17	1	93
16	21.00-22.00	136	1	237	56	0	239	27	8	47	13	10	72
17	22.00-23.00	105	4	199	44	0	197	33	5	57	33	4	83
18	23.00-24.00	47	1	91	39	0	97	9	3	8	12	1	25
19	00.00-01.00	45	0	89	35	0	89	19	5	5	7	5	39
20	01.00-02.00	32	0	42	30	0	60	6	0	4	3	0	9
21	02.00-03.00	28	4	32	9	0	52	3	2	3	0	0	9
22	03.00-04.00	29	2	34	21	0	55	2	2	27	3	0	17
23	04.00-05.00	99	5	89	113	0	195	8	2	28	42	0	42
24	05.00-06.00	306	12	241	250	0	533	22	10	85	76	0	111
TOTAL (vehicle)		4,856	354	6,256	2,797	23	9,029	1,642	499	2,757	1,484	41	4,480
TOTAL (pcu) :		9,029 pcu per days						Total (pcu) :			4,480 pcu per day		

Notes : PCU factor for:
- Small Vehicle (Group I) : 1,0
- Large Vehicle (Group II) : 2,5
- Motor cycle (Group III) : 0,3
- Non motorized Vehicle (Group IV) : 0,5
- Others Vehicle (Group V) : 0,5

** : waste vehicle

Table I-7
TRAFFIC COUNTING SURVEY RESULT

Location : Margomulyo Junction
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : C						Direction : D					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	152	14	468	384	0	519	118	30	516	460	0	578
2	07.00-08.00	120	17	393	215	0	389	188	20	725	419	0	665
3	08.00-09.00	152	36	269	69	was 1	358	99	21	267	39	0	251
4	09.00-10.00	176	53	215	64	0	406	101	13	131	19	0	183
5	10.00-11.00	179	18	65	24	0	255	108	1	30	8	0	124
6	11.00-12.00	207	33	212	49	0	378	91	21	77	7	0	171
7	12.00-13.00	199	36	253	51	0	390	135	16	135	41	0	236
8	13.00-14.00	203	55	185	37	0	414	140	23	132	55	0	264
9	14.00-15.00	211	51	244	68	1	445	157	36	189	96	0	352
10	15.00-16.00	223	40	252	81	1	439	148	29	169	79	0	311
11	16.00-17.00	193	29	324	173	0	451	160	31	192	61	0	325
12	17.00-18.00	179	27	301	81	2	377	149	27	159	28	0	278
13	18.00-19.00	181	17	295	105	2	367	152	13	216	32	0	266
14	19.00-20.00	114	18	242	64	2	265	48	4	154	44	0	126
15	20.00-21.00	109	5	276	10	0	210	63	12	124	23	1	142
16	21.00-22.00	105	4	161	39	0	183	48	5	88	21	2	99
17	22.00-23.00	99	4	93	44	0	159	25	12	64	41	0	95
18	23.00-24.00	44	4	45	11	0	73	33	4	28	7	0	55
19	00.00-01.00	48	0	39	43	0	81	21	0	12	5	0	28
20	01.00-02.00	23	1	19	60	0	61	6	2	4	0	0	12
21	02.00-03.00	23	2	48	54	0	69	12	4	6	2	0	25
22	03.00-04.00	34	4	35	46	0	78	14	1	8	6	0	22
23	04.00-05.00	74	7	80	107	0	169	47	2	39	29	0	78
24	05.00-06.00	149	22	243	110	2	333	144	17	263	92	3	313
TOTAL (vehicle)		3,196	498	4,759	1,990	11	6,869	2,208	345	3,728	1,613	6	4,998
TOTAL (pcu) :		6,869 pcu per days						Total (pcu) :			4,998 pcu per day		

Notes : PCU factor for:

- Small Vehicle (Group I)	: 1,0
- Large Vehicle (Group II)	: 2,5
- Motor cycle (Group III)	: 0,3
- Non motorized Vehicle (Group IV)	: 0,5
- Others Vehicle (Group V)	: 0,5

** : waste vehicle

Table I-7
TRAFFIC COUNTING SURVEY RESULT

Location : Margomulyo Junction
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : E						Direction : F					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	170	10	206	226	0	370	300	22	130	186	0	487
2	07.00-08.00	149	27	197	132	0	341	141	31	255	132	0	360
3	08.00-09.00	131	20	145	45	w-c 1	247	103	89	137	49	0	392
4	09.00-10.00	139	33	153	39	0	287	129	79	163	49	0	399
5	10.00-11.00	160	51	201	39	0	366	132	15	42	16	0	190
6	11.00-12.00	156	40	201	35	0	334	164	85	135	56	0	446
7	12.00-13.00	169	27	141	20	0	288	100	51	125	32	0	280
8	13.00-14.00	185	45	197	35	0	375	133	35	105	27	6	269
9	14.00-15.00	211	37	281	75	** 1	426	129	34	134	42	7	279
10	15.00-16.00	192	39	449	229	2	539	129	48	162	88	3	343
11	16.00-17.00	183	33	627	364	1	637	207	39	230	155	8	455
12	17.00-18.00	231	25	412	111	1	473	117	10	176	105	0	247
13	18.00-19.00	177	15	163	72	0	299	73	12	111	111	0	192
14	19.00-20.00	164	6	268	28	0	273	74	4	104	32	0	131
15	20.00-21.00	129	4	175	17	0	200	71	8	89	29	1	133
16	21.00-22.00	80	5	89	13	1	127	35	4	24	15	1	60
17	22.00-23.00	61	7	95	33	1	124	25	4	65	41	0	76
18	23.00-24.00	49	16	40	12	2	108	23	20	41	27	0	98
19	00.00-01.00	20	0	16	7	0	28	25	4	15	12	0	46
20	01.00-02.00	12	2	7	3	0	21	7	7	3	11	0	31
21	02.00-03.00	11	2	1	0	1	17	8	3	3	8	1	21
22	03.00-04.00	8	4	10	3	1	23	3	10	5	5	0	32
23	04.00-05.00	32	10	32	42	0	88	12	6	11	10	0	35
24	05.00-06.00	81	34	85	76	1	230	47	27	42	36	0	145
TOTAL (vehicle)		2,901	492	4,193	1,655	13	6,223	2,187	647	2,307	1,275	27	5,147
TOTAL (pcu) :		6,223 pcu per days						Total (pcu) :			5,147 pcu per day		

Notes : PCU factor for:
- Small Vehicle (Group I) : 1,0
- Large Vehicle (Group II) : 2,5
- Motor cycle (Group III) : 0,3
- Non motorized Vehicle (Group IV) : 0,5
- Others Vehicle (Group V) : 0,5

** : waste vehicle

Table I-7
TRAFFIC COUNTING

Location : Jl. Jawar Junction
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : A						Direction : B					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	85	46	705	422	1	623	115	21	397	220	2	398
2	07.00-08.00	79	19	394	153	1	322	44	4	104	42	0	106
3	08.00-09.00	77	28	214	68	1	246	81	25	198	64	3	236
4	09.00-10.00	69	14	175	39	2	177	91	33	171	50	2	251
5	10.00-11.00	83	22	149	33	0	199	92	38	163	49	0	260
6	11.00-12.00	77	23	121	25	1	184	95	46	190	54	1	295
7	12.00-13.00	101	26	216	81	0	271	131	19	130	97	1	267
8	13.00-14.00	94	37	158	53	0	260	84	23	140	39	0	203
9	14.00-15.00	84	30	137	60	0	230	93	29	110	46	0	222
10	15.00-16.00	77	55	225	192	0	378	90	52	170	34	0	288
11	16.00-17.00	106	52	398	255	2	484	103	38	232	37	0	286
12	17.00-18.00	79	21	333	143	0	303	104	26	228	47	0	261
13	18.00-19.00	58	11	274	85	1	211	83	18	246	43	0	223
14	19.00-20.00	53	11	195	52	1	166	45	10	143	32	1	129
15	20.00-21.00	44	7	169	27	0	126	36	19	97	10	0	118
16	21.00-22.00	34	2	113	11	0	78	19	1	35	16	0	40
17	22.00-23.00	25	5	55	11	0	60	17	9	45	15	0	61
18	23.00-24.00	17	8	35	58	0	77	7	5	25	0	1	28
19	00.00-01.00	9	4	12	14	0	30	12	3	14	4	1	26
20	01.00-02.00	3	1	11	3	0	10	7	3	9	14	0	24
21	02.00-03.00	7	2	9	9	0	19	7	2	11	11	0	21
22	03.00-04.00	4	1	21	10	0	18	11	3	18	18	0	33
23	04.00-05.00	17	5	67	43	0	71	34	11	28	28	0	84
24	05.00-06.00	51	23	113	52	0	168	44	12	143	103	0	168
TOTAL (vehicle)		1,333	453	4,299	1,899	10	4,710	1,445	450	3,047	1,073	12	4,027
TOTAL (pcu) :		4,710 pcu per day						4,027 pcu per day					

Notes : PCU factor for
- Small Vehicle (Group I) : 1,0
- Large Vehicle (Group II) : 2,5
- Motorcycle (Group III) : 0,3
- Non motorized Vehicle (Group IV) : 0,5
- Others Vehicle (Group V) : 0,5

Table I-7
TRAFFIC COUNTING

Location : Jl. Jawar Junction (Direction : C)
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : C						Direction : D					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	1	0	60	55	2	48	0	0	8	20	0	12
2	07.00-08.00	3	0	51	36	3	38	0	0	8	4	0	4
3	08.00-09.00	2	0	45	29	2	31	0	0	10	5	0	6
4	09.00-10.00	1	0	40	12	1	20	0	0	11	5	0	6
5	10.00-11.00	1	0	33	26	1	24	0	0	4	4	0	3
6	11.00-12.00	1	0	34	8	1	16	0	0	14	9	0	9
7	12.00-13.00	0	0	31	10	0	14	2	0	23	8	0	13
8	13.00-14.00	1	0	33	11	0	16	3	0	23	11	0	15
9	14.00-15.00	0	0	14	14	0	11	1	0	15	5	0	8
10	15.00-16.00	1	0	10	14	0	11	1	0	7	0	0	3
11	16.00-17.00	1	0	20	17	1	16	0	0	3	0	0	1
12	17.00-18.00	0	0	24	16	0	15	0	0	3	0	0	1
13	18.00-19.00	0	0	24	6	0	10	2	0	10	6	0	8
14	19.00-20.00	1	0	21	8	0	11	2	0	5	2	0	5
15	20.00-21.00	0	0	12	5	0	6	0	0	16	1	0	5
16	21.00-22.00	0	0	11	3	0	5	1	0	21	12	0	13
17	22.00-23.00	1	0	2	4	0	4	3	0	24	28	0	24
18	23.00-24.00	1	0	1	1	0	2	2	0	22	9	0	13
19	00.00-01.00	1	0	1	2	0	2	21	0	12	5	0	28
20	01.00-02.00	0	0	0	1	0	1	6	2	4	0	0	12
21	02.00-03.00	0	0	6	0	0	2	12	4	6	2	0	25
22	03.00-04.00	1	0	39	1	0	13	14	1	8	6	0	22
23	04.00-05.00	0	0	56	4	0	19	47	2	39	29	0	78
24	05.00-06.00	1	0	60	53	0	46	144	17	263	92	3	313
TOTAL		18	0	628	336	11	380	261	26	559	263	3	627
TOTAL (pcu) :		380 pcu per day						627 pcu per day					

Notes : PCU factor for
- Small Vehicle (Group I) : 1,0
- Large Vehicle (Group II) : 2,5
- Motorcycle (Group III) : 0,3
- Non motorized Vehicle (Group IV) : 0,5
- Others Vehicle (Group V) : 0,5

Table I-7
TRAFFIC COUNTING

Location : Jl. Jawar Junction
Date : Thursday, October 29, 1992
Time : 06.00-06.00 (24 hours)

No.	TIME	Direction : E						Direction : F					
		I	II	III	IV	V	Sub total (in PCU's)	I	II	III	IV	V	Sub total (in PCU's)
1	06.00-07.00	2	0	81	75	3	65	1	0	33	17	0	19
2	07.00-08.00	4	0	58	45	2	45	2	0	13	8	0	10
3	08.00-09.00	2	0	32	19	2	22	1	0	13	2	0	6
4	09.00-10.00	2	0	33	25	2	25	1	0	7	3	0	5
5	10.00-11.00	2	0	34	19	0	22	2	0	5	2	0	5
6	11.00-12.00	3	0	21	24	0	21	2	0	14	19	0	16
7	12.00-13.00	1	0	27	14	0	16	1	0	18	7	0	10
8	13.00-14.00	2	0	24	17	2	19	2	1	4	7	0	9
9	14.00-15.00	0	0	13	18	2	14	0	0	6	2	0	3
10	15.00-16.00	1	0	21	39	1	27	0	0	23	15	0	14
11	16.00-17.00	0	0	23	25	0	19	4	0	16	9	0	13
12	17.00-18.00	1	0	13	20	1	15	0	0	16	7	0	8
13	18.00-19.00	0	0	30	7	0	13	1	0	26	11	0	14
14	19.00-20.00	2	0	14	5	0	9	1	0	16	11	0	11
15	20.00-21.00	0	0	23	5	0	9	2	0	7	4	0	6
16	21.00-22.00	0	0	5	1	1	3	0	0	6	1	0	2
17	22.00-23.00	0	0	2	2	1	2	2	0	5	2	0	5
18	23.00-24.00	0	0	1	2	2	2	0	0	1	1	0	1
19	00.00-01.00	0	0	1	0	0	0	0	0	2	0	0	1
20	01.00-02.00	0	0	0	0	0	0	0	0	0	0	0	0
21	02.00-03.00	0	0	2	0	1	1	0	0	0	0	0	0
22	03.00-04.00	1	0	35	3	1	14	0	0	0	0	0	0
23	04.00-05.00	2	0	70	9	0	28	0	0	2	1	0	1
24	05.00-06.00	1	0	60	21	1	30	0	0	11	6	0	6
TOTAL (vehicle)		26	0	623	395	22	421	22	1	244	135	0	165
TOTAL (pcu) :		421 pcu per day						165 pcu per day					

Notes : PCU factor for
- Small Vehicle (Group I) : 1,0
- Large Vehicle (Group II) : 2,5
- Motorcycle (Group III) : 0,3
- Non motorized Vehicle (Group IV) : 0,5
- Others Vehicle (Group V) : 0,5

Table I-8A
Noise Level Survey Result at
Jl. Margomulyo Junction

Time	Minimum (dB)	Average (dB)	Maximum (dB)
01.00 - 01.10	43	55	75
02.00 - 02.10	43	43	73
03.00 - 03.10	45	55	75
04.00 - 04.10	50	70	86
05.00 - 05.10	48	68	88
06.00 - 06.10	60	75	95
07.00 - 07.10	65	75	85
08.00 - 08.10	73	78	88
09.00 - 09.10	63	72	86
10.00 - 10.10	65	73	85
11.00 - 11.10	70	77	86
12.00 - 12.10	65	79	85
13.00 - 13.10	70	80	89
14.00 - 14.10	69	77	85
15.00 - 15.10	65	75	85
16.00 - 16.10	72	79	95
17.00 - 17.10	68	76	95
18.00 - 18.10	65	75	90
19.00 - 19.10	64	74	89
20.00 - 20.10	59	73	88
21.00 - 21.10	60	72	88
22.00 - 22.10	59	70	85
23.00 - 23.10	53	65	84
24.00 - 24.10	45	58	80

Table I-8
Noise Level Survey Result at
Jl. Jawar Junction

Time	Minimum (dB)	Average (dB)	Maximum (dB)
01.00 - 01.10	40	40	70
02.00 - 02.10	40	40	65
03.00 - 03.10	43	55	78
04.00 - 04.10	45	60	83
05.00 - 05.10	47	65	83
06.00 - 06.10	55	65	82
07.00 - 07.10	60	70	85
08.00 - 08.10	60	70	89
09.00 - 09.10	50	60	80
10.00 - 10.10	50	65	79
11.00 - 11.10	51	59	84
12.00 - 12.10	52	69	82
13.00 - 13.10	50	69	84
14.00 - 14.10	52	70	83
15.00 - 15.10	50	65	82
16.00 - 16.10	50	65	85
17.00 - 17.10	49	60	82
18.00 - 18.10	45	65	85
19.00 - 19.10	50	67	83
20.00 - 20.10	42	58	95
21.00 - 21.10	40	55	90
22.00 - 22.10	40	51	85
23.00 - 23.10	41	50	83
24.00 - 24.10	40	43	78

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4.4.4. Analysis of Noise Level Survey

The noise level at Jl. Margomulyo junction is higher than at the Jl.Jawar junction because the traffic volume in Jl. Margomulyo junction is higher than at Jl. Jawar junction.

4.5. Ecology

4.5.1. Flora and Unique Flora

The dominant flora in the study area are "rumput / Grass" (Sporobulus sp. and Fimbristylis sp.), "alur / leaves fleshly mangrove", (Suaeda sp.), "api-api / Mangrove" (Avicennia sp.), "nyiri" (Xylocarpus.sp) , "tanjang" (Bruguera sp.), "tinggi" (Ceriops sp.), and "gelang laut" (Sesuvium sp.).

Api-api, nyiri, tanjang and tinggi are kinds of Mangrove.

Kind of trees that lives in this area usually used as fire woods. Suaeda sp. that have the famous name "alur" is an eatable plant but it is non commercial plant.

4.5.2. Fauna and unique fauna

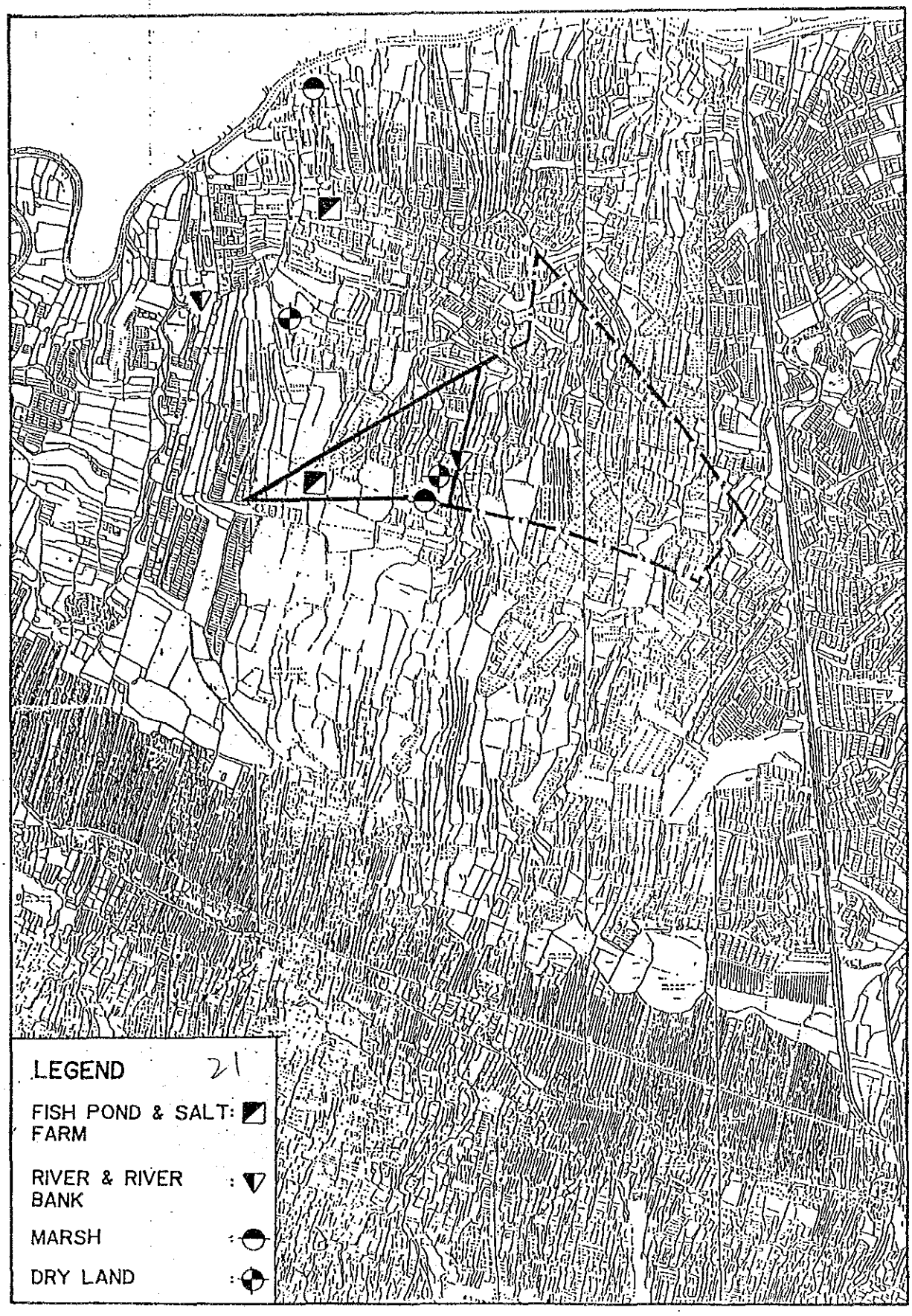
The dominant species in Benowo study area are "kuntul / Little Egret" (Egreta Garzetta), "dara laut / Black-naped Tern" (Sterna Sumatrana), "Trinil / Terek Sand piper" (Xenus Cinereus), and "kupu / Butterfly" (Lycaenidae). Kuntul (Little Egret) and Dara Laut (Black-naped Tern) are classified as protected fauna.

In the rainy seasons this salty farm function as fish ponds. Kind of fish that live in this ponds are : "bandeng or Milk Fish" (Chanos chanos), "mujair or Jawa Tilapia" (Tilapia mossambica), and "udang putih or white shrimp" (Metapenaeus sp.).

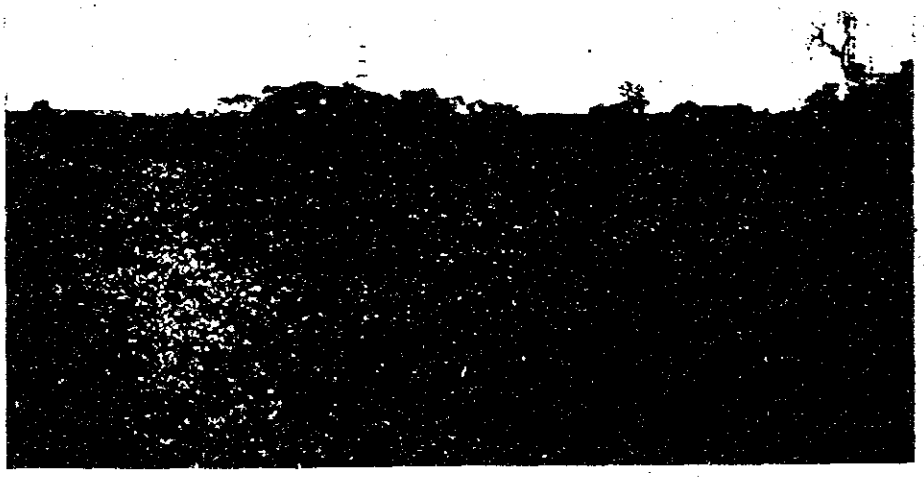
All kind of fauna that was found by the ecological survey is shown in Table I-9 and Figure 1.4. .

FIGURE 1.4

LOCATION OF ECOLOGICAL SURVEY AREA

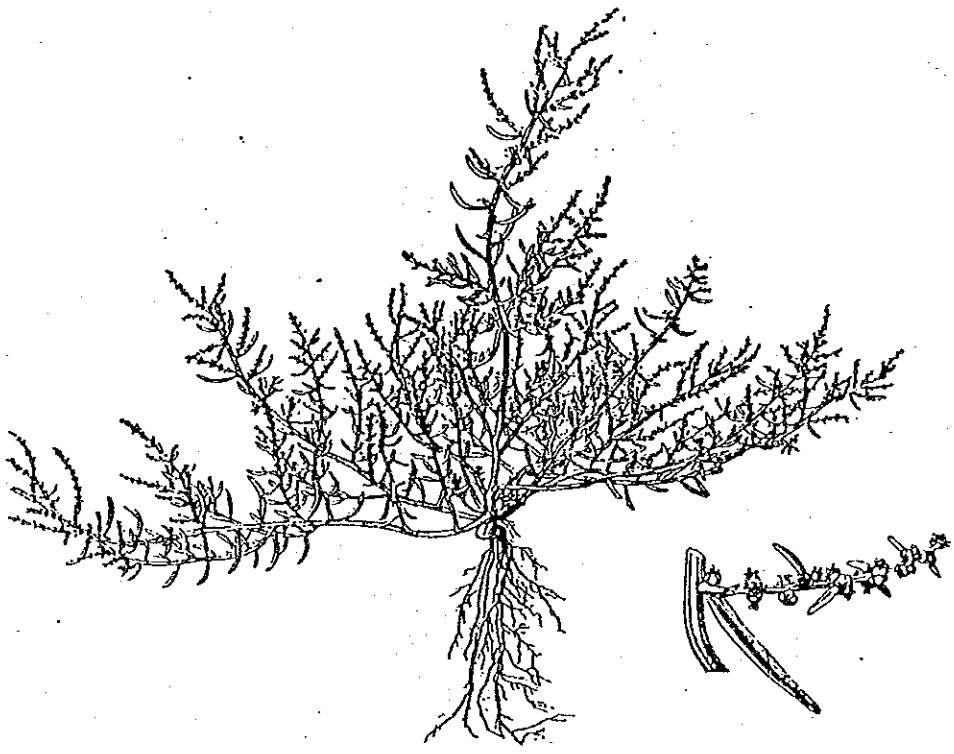


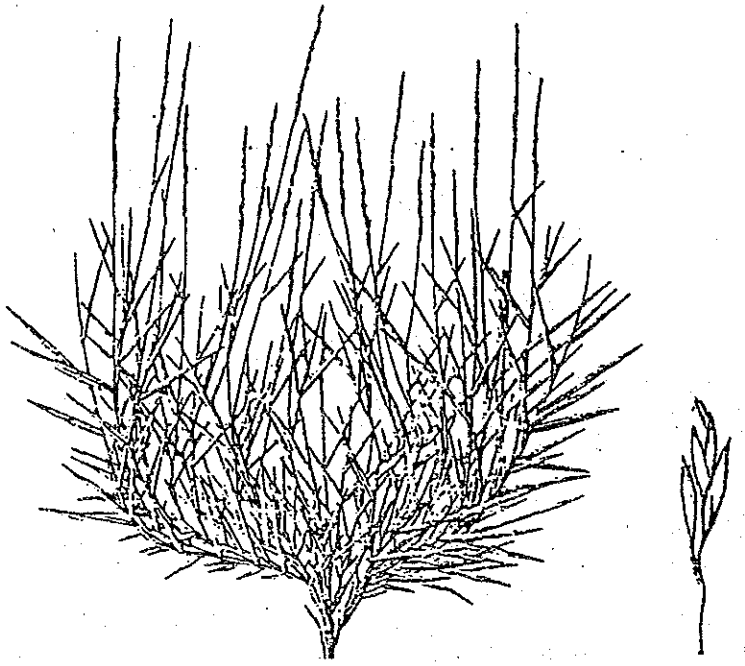
Avicennia Sp. (Api-api)



Plucea indica (Luntas)

Suaeda Sp. (Alur)





Sporobulus virginicus

Sesuvium portulocastum