9. Basic Design of Bekasi Disposal Site

9. Basic Design of Bekasi Disposal Site

9.1 Landfill Capacity

1) Area

(ha)

	A	B	Total
Landfill area	20.0	14.4	34.4
Bed plate area	18.9	13.7	32.6
Top plate area	7.1	10.3	17.4

2) Landfill capacity

Area A 4.3 million m^3

Area B 3.8 million m^3

Total 8.1 million m^3

3) Disposal amount

Ratio of water in total capacity: 82%

Unit weight : 0.8 t/m^3

Disposal amount:

$8.1 \times 10^6\ m^3 \times 0.82 \times 0.8\ t/m^3 = 5.3 \times 10^6\ t$

4) Required amount of covering soil

Final covering soil

Thickness of official covering soil = 1.0 m

Area 34.4 ha

Ratio of final covering soil 4%

Amount of final covering soil

$34.4 \times 10^4\ m^2 \times 1.0 = 34.4 \times 10^4\ m^3 \rightarrow 0.4 \times 10^6\ m^3$

Daily covering soil

Thickness of covering soil 0.5 m

Thickness of waste 3.0 m

Amount of daily covering soil

$$8.1 \times 10^6\ m^3 \times 0.82\% \times \frac{0.5\ m}{3\ m} = 1.1 \times 10^6\ m^3$$

Total amount of covering soil $1.5 \times 10^6\ m^3$

9.2 Earth Work

Earth volume	Unit	A	B	Total
Banking area	ha	4.24	2.74	
Banking height	m	1.24	0.78	
Banking volume	1000 m^3	52.6	21.4	74.0
Cutting area	ha	1.35	10.37	
Cutting height	m	1.66	2.97	
Cutting volume	1000 m^3	238.2	308.0	546.2
Balance of earth volume	1000 m^3	185.6	286.6	472.2

9.3 Facilities Plan

1) Road

a. Access road

Design speed 40 km/h

Width composition Lane width 3.5 m, shoulder width 1.0 m, Protective shoulder width 0.5 m, total width 10 m

b. Onsite road

Design speed 30 km/h

Two-way two lane road shall have the same total width of 10 m as above; the one-way road shall be 6 m wide.

c. Patrol road

Design speed 30 km/h

One-lane road with total width of 6 m.

d. Standard

	40 km/h	30 km/h
Curve radius	60 m or more	30 m or more
Longitudinal slope	7% or less	8% or less
Longitudinal curve length	35 m or more	35 m or more
(Curve radius)	450 m or more	250 m or more

2) Receiving facility

At the receiving facility, the vehicles directly hauling in wastes will be weighed and its wastes will be checked. Semi-trailers will not be weighed, however.

Truck scale 1 set 20 t, with data processing device

3) Landfill site

Landfilling will be executed by the sandwich method of covering every 3 m of waste layer with 50 cm of soil. The final soil cover will be 1 m thick.

In order to prevent groundwater from being contaminated by leachate, the bottom of the landfill site will be made earth liner upon which leachate collecting pipes will be laid. Also, groundwater collecting pipes will be laid as necessary beneath the said impermeable layer.

The grade of compensation of the sloped face of landfill site will be made 1:3 or less in order to stabilize the filled ground.

The landfill site will be filled up to EL. 25 m having landfilling thickness of 30 m which will secure the necessary landfilling capacity.

4) Dike for storing waste

Dike for storing waste more than 3.5 m high from the bottom of the landfill site, which is a height equivalent to the thickness of one layer, will be provided on the outer periphery of the landfill site.

5) Leachate collecting and draining facility

The leachate collecting and draining facility will be composed of perforated huge pipes consisting of a main pipe of 60 cm and branch pipes of 30 cm in diameter. Branch pipes will be laid with a maximum pitch of 50 m.

6) Storm sewage draining facility

A diversion channel, an outer peripheral water channel and a groundwater collecting facility will be provided for storm sewage draining. For the diversion channel, a width of 11 m will be secured.

a. As the site for water channel, an 11 m-wide strip of land shall be secured.

b. Cross-sectional area of flow 13.0 m^2
The current cross-sectional area of flow is 3.85 m^2 at the widest spot. This area will become about 3.4 times the current level.

c. Width of flowing water 9.5 m
The current width is 4.6 m at the widest spot which will become 2.1 times the current width.
The current gradient shall basically be secured.
For outer peripheral water channel, a U-shaped ditch necessary for the catchment area will be provided. Perforated pipes will be installed to collect and drain groundwater from the existing water paddy field area.

7) Leachate treatment facility

(1) Amount of leachate 780 m^3/d

a. Condition

Leaching coefficient: 0.5 during landfilling, 0.2 after landfilling

Amount of rainfall : Annual amount of rainfall 2,500 mm
Maximum monthly mean rainfall January 472 mm
90% probable monthly rainfall 400 mm/month
1973-1981 rainfall data recorded at Bekasi Setu Mean monthly rainfall 208 mm/month

Amount of leachate :

Filling Section A 199,600 m^2 x 0.5 x 0.208 m x 1/365 = 690 m^3/day

Filling Section B (144,200 m^2 x 0.5 + 199,600 m^2 x 0.2) x 0.208 x 1/365 = 780 m^3/day

Capacity of regulating pond:

A capacity to hold five days of leachate shall be secured for the regulating pond.

780 x 5 = 3,900 m^3

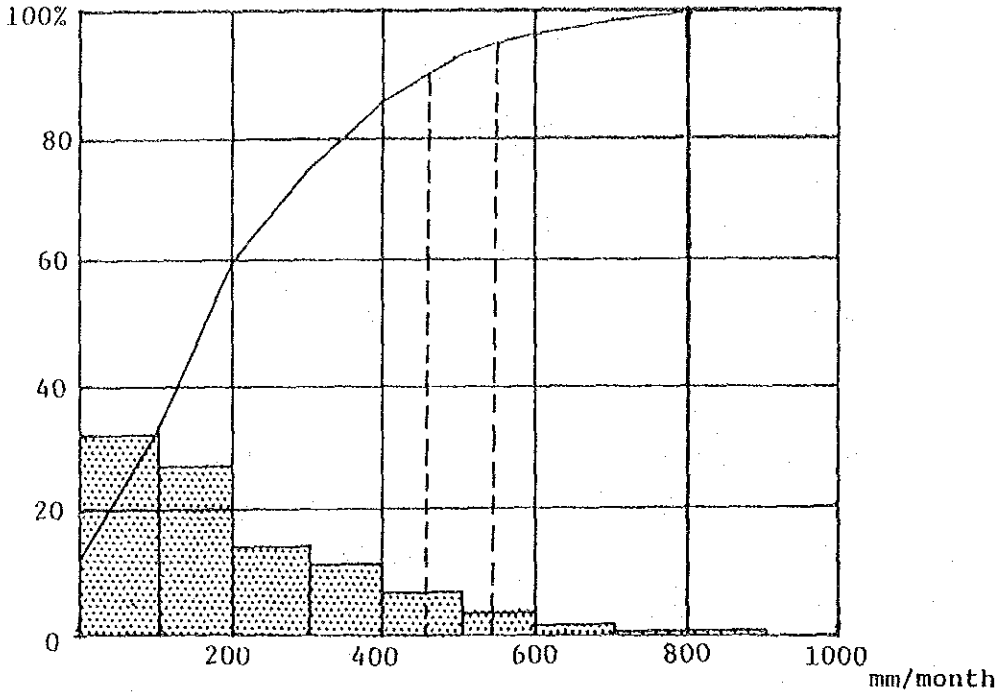


Fig. 9-1 Monthly Rainfall

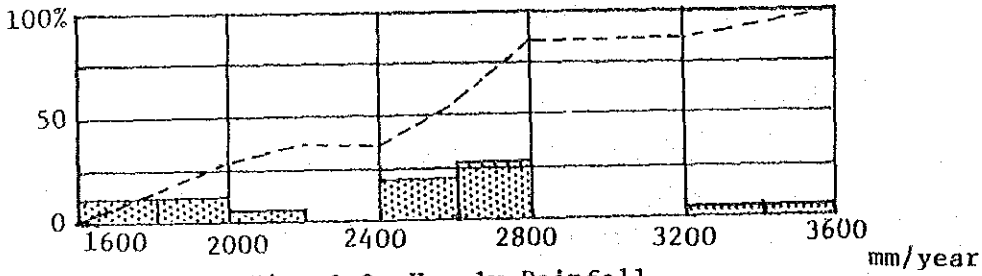


Fig. 9-2 Yearly Rainfall

(2) Prediction of the water quality of leachate of landfill disposal sites in DKI Jakarta

Water quality of leachate is generally predicted estimated by either one of the following two methods. One is the method of determining the water quality based on the actual data of other landfill disposal site of similar scale and similar contents used for filling. The other method is to estimate water quality by referring to the "Study on Development of Leachate Treatment Facility at Landfill Disposal Site" published by the Japan Waste Management Association (Fiscal Year 1979 Report). The water quality was estimated according to the both method this time. Considering these results, quantity of leachate is set as follows.

Items	Leachate	Treated water
pH	5 - 8.6	5.8 - 8.6
BOD	3,200 ppm	120 ppm
COD	600 ppm	-
SS	300 ppm	150 ppm
T-N	200 ppm	-

Quantity of treated water is set referring the Japanese Standard.

(3) Treatment Flow

a. The BOD value of the leachate is high (3,200 ppm) and the discharged volume of it is 780 m^3/day. As a result, the BOD load is approximately 2,500 kg/day.

b. The treatment method to be adopted is either the lagoon method or the rotary disk method in view of their easy maintenance. In the case of the rotary disk method, as the BOD value of the leachate exceeds the scope of its normal application, a reduction of the BOD value at the inlet of the biological treatment process will be made by the following measures:

1) intake of 780 m^3 from the river to dilute the leachate, as a result, the daily treated amount will be 1,560 m^3,
2) return of the treated water (3,120 m^3/day) to contribute to the required dilution of the leachate
3) 1,560 m^3 of the treated water will be discharged daily to the river.

c) In the case of the rotary disk method, the BOD load can be increased in accordance with the higher BOD value. Therefore, the planned load will be higher than usual to reduce the treatment cost. In comparison, the rate of removal and the treated water quality will rapidly deteriorate in accordance with the higher BOD load. Preliminary aeriation and an intermediate sedimentation tank will be provided to prevent the worsening of the treated water quality.

d) In case of the lagoon method, the inlet BOD value and the treated water amount will be set at 3,200 ppm and 780 m^3/day respectively to deal with the high BOD value due to the long airation time involved. The required area for the treatment site, however, will be larger than that required for the rotary disk method.

(4) Treatment facility

	Rotary disk	Lagoon
Reguration pond	3,900 m^3 (5 days) (980 m^2)	3,900 m^3 (5 days) (980 m^2)
Pre airation	1,560 M^3 (1 day) (390 m^2)	---
Rotary disk (Lagoon)	16 unit (920 m^2)	16,700 m^3 (4,200 m^2)
Intermediate Sedimentation pond	234 m^2	---
Sedimentation pond	78 m^2	78 m^2
Quantity of treatment water	1,560 m^3/day (including diluting water)	780 m^3/day

8) Earth liner

Thickness of earth liner	2.0 m
Area	34.4 ha

9.4 Layout Plan

Layout Plan is shown in Fig. 9-4 and 9-5. Cross section of the Disposal site is shown in Fig. 9-6.

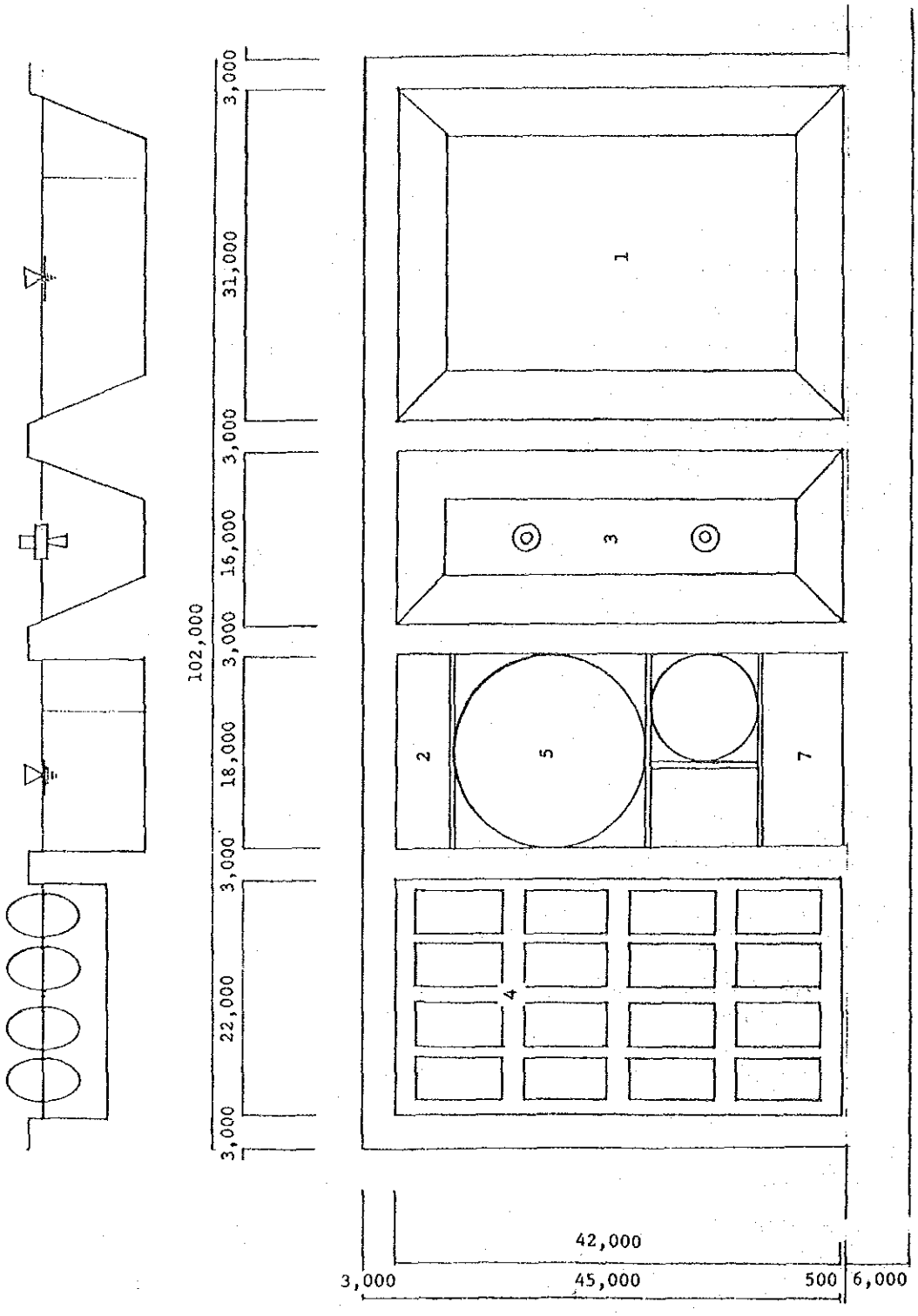
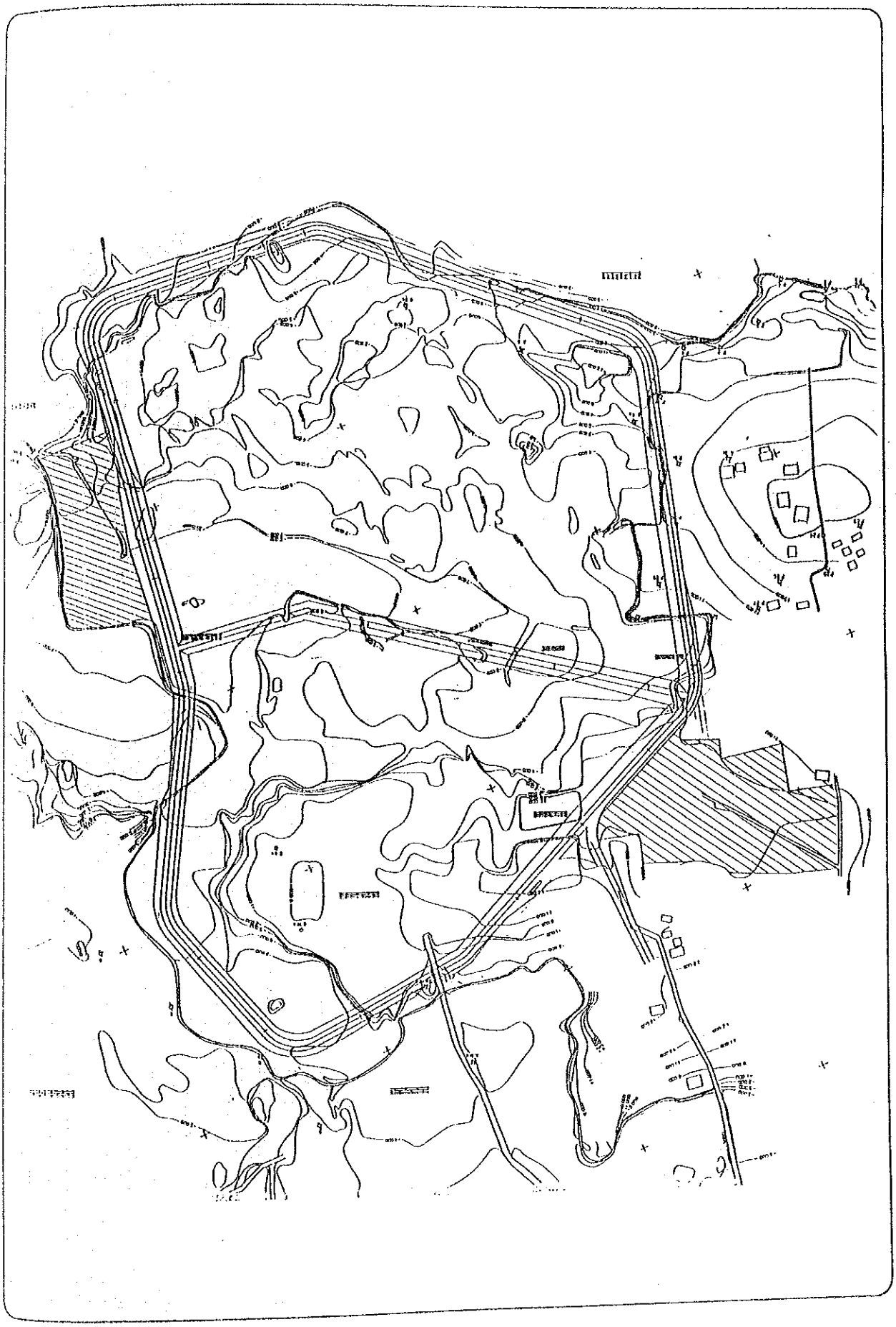
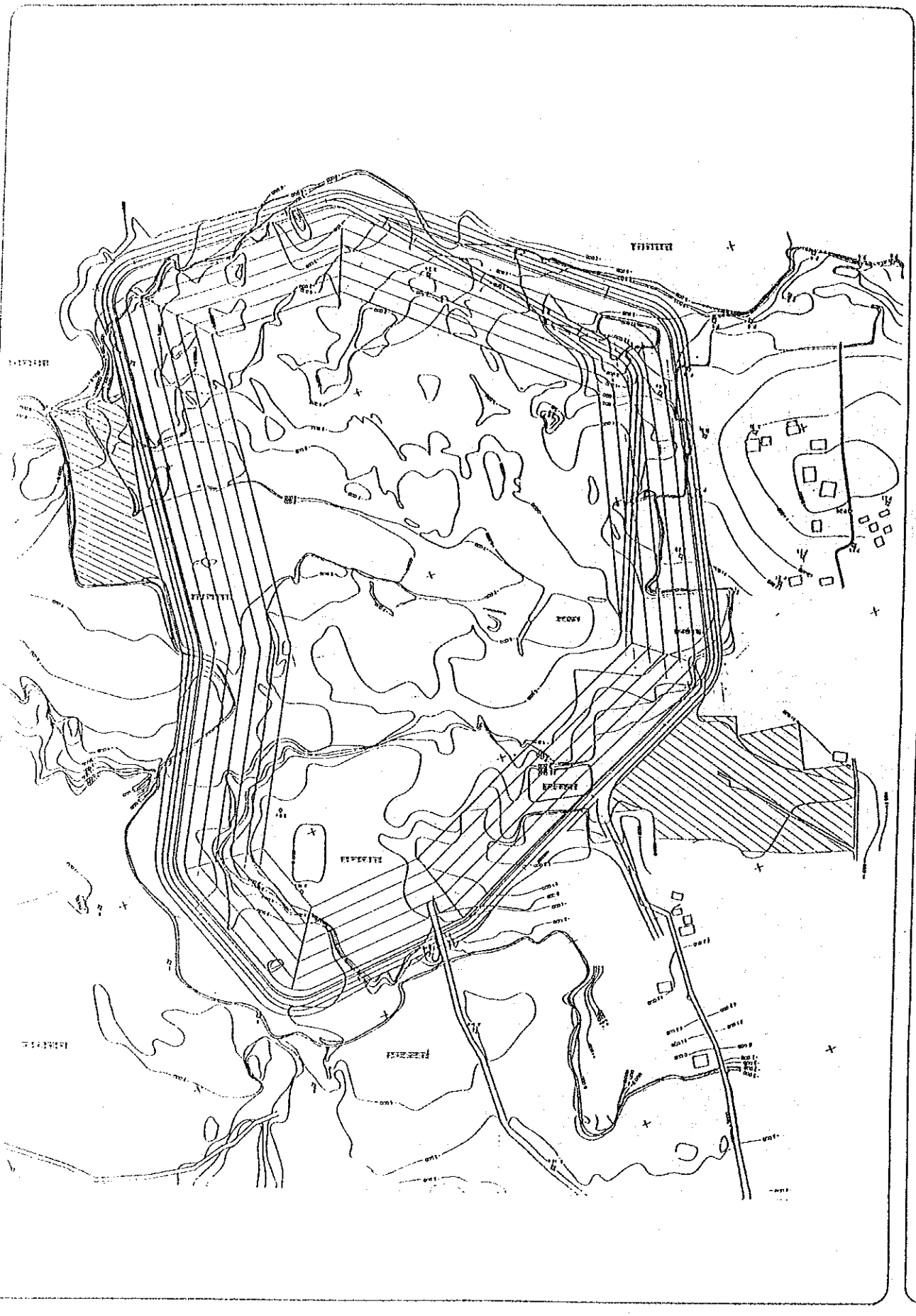


Fig.9-3 Leachate Treatment Plant



STUDY ON SOLID WASTE MANAGEMENT SYSTEM IMPROVEMENT PROJECT IN JAKARTA

Fig. 9-4



STUDY ON SOLID WASTE MANAGEMENT SYSTEM IMPROVEMENT PROJECT IN JAKARTA

Fig. 9-5

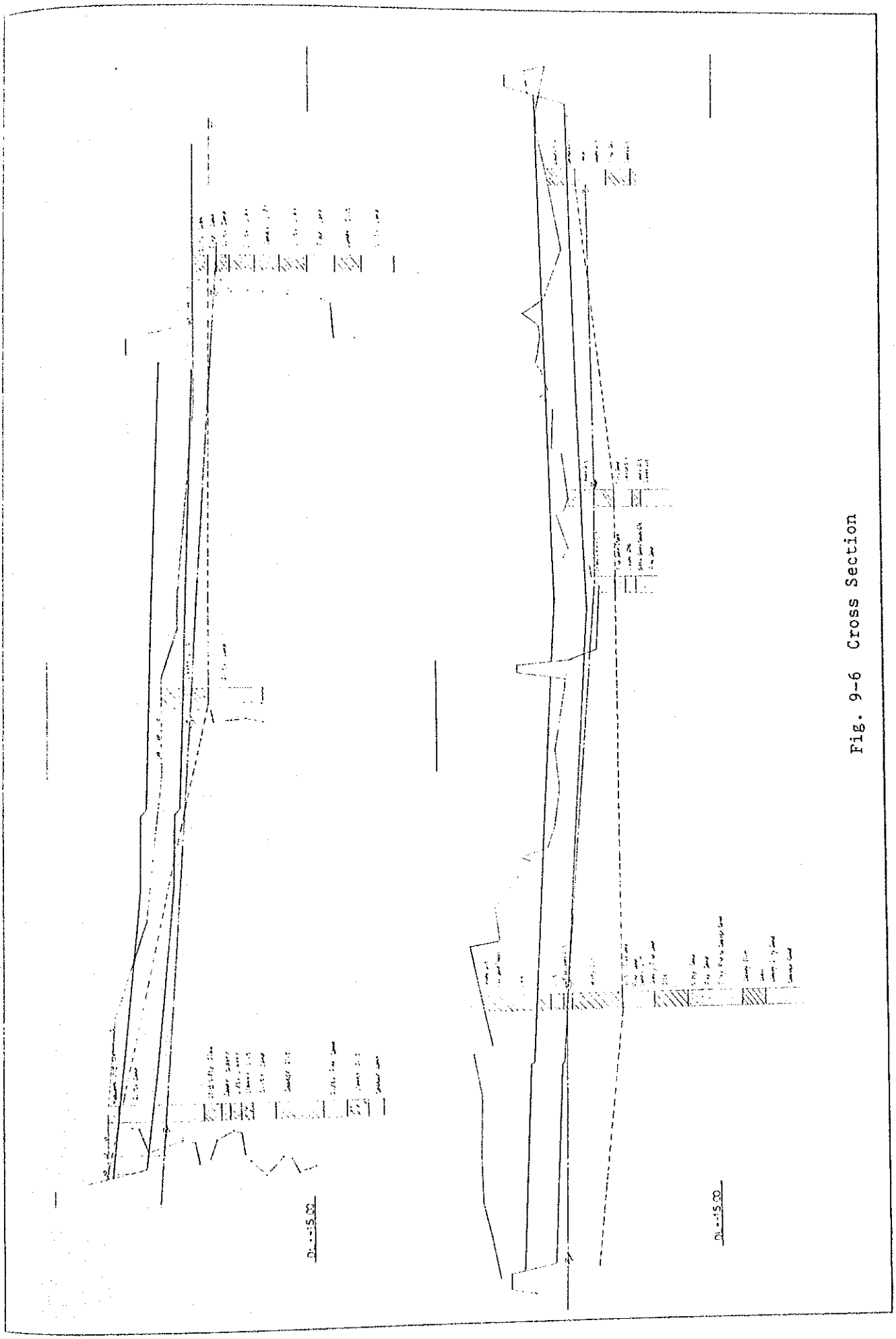


Fig. 9-6 Cross Section

10. Basic Design of Sub-Workshop

10. Basic Design of Sub Workshop

10.1 General

In order to carry out, the maintenance of about 350 vehicles which are deemed necessary for Jakarta Pusat in the future, the sub-workshop will be improved as shown in Table 10-1. It is desirable that a motor pool will be constructed on the same site as the sub-workshop for vehicle control.

10.2 Maintenance Schedule

To insure driving safety and maximum operating economy, periodic inspection and maintenance should be performed according to the maintenance schedule. Standard schedule is shown in Table 10-2.

10.3 Number of Maintenance Bay

1) Condition

a.	Number of vehicle to be done maintenance	350 unit
b.	Working day per month of sub-workshop	25 day
c.	Working hour per day of sub-workshop	7 hour

Number of maintenance bay will be 20 as follows.

$$\frac{\text{Number of maintenance bay (working area)}}{\text{Average time to do maintenance 6 hrs/unit}}$$

$$\frac{350 \text{ (unit)} \times 6 \text{ (hrs)}}{25 \text{ (days)} \times 7 \text{ (hrs)}} = 12 \text{ (bays)} \ldots\ldots\ldots \text{(A)}$$

Number of repair bays

(Frequency rate of trouble occurrence: 0.24)

(Frequency rate of utilization of bay: 1.2 days)

$$\frac{350 \text{ (units)} \times 0.24 \times 1.2}{25 \text{ (days)}} = 4.03 = 5 \text{ (bays)} \quad \ldots\ldots \text{(B)}$$

Number of repair for tire bays 1 (bay) ..... (C)

Number of welding bays 3 (bays) ..... (D)

Total number of bays A + B + C + D = 20 bays

Table 10-1 Improvement in Vehicle Maintenance

	Present standards	Proposed plan
No. of vehicles covered	about 200 vehicles	350 vehicles
Item	* Oil change * Filter change * Element change * Fixing of flat tire * Welding repair * Other light repair	* Oil change (1 mo., 3 mo., 6 mo., 1 yr.) * Filter change * Inspection and adjustment of each part * Fixing of flat tire * Welding * Exchange o tire * Exchange of component assemblies * Light repair (exchange of brake, clutch, etc.) * Car washing * Painting
Workshop	3 bays Warehouse Office Building 16 m x 8 m	Maintenance ..... 12 bays (7) Repair ..... 5 bays (3) Exchange of tire ..... 1 bay (1) Welding repair, etc. .. 2 bays (2) Total ..... 20 bays Warehouse, office, tool room (20 m x 33.5 m) Building (70 m x 33.5 m incl. passageway)
Comments	o Capable of only very simple repair o No. of vehicles which can be repaired at the same time is insufficient compared to the total number of vehicles in possession. o Motor pools are necessary at other places.	o 13 bays are necessary even if the number of vehicles is assumed to be 200. o Facilities capable of adequate repair work will be available. o If motor pools are concentrated in one place, centralized control becomes possible. If the motor pool is close by the workshop, it will also facilitate maintenance. o Operation data become easier to control.

4) Facilities of sub workshop

Sub workshop have following facilities

a. Maintenance Bay

for maintenance	12 bays
for repair	5 bays
for tire repair	1 bay
for welding etc.	3 bays
Total	20 bays

b. Office and Warehouse

c. Fuel Station

d. Others

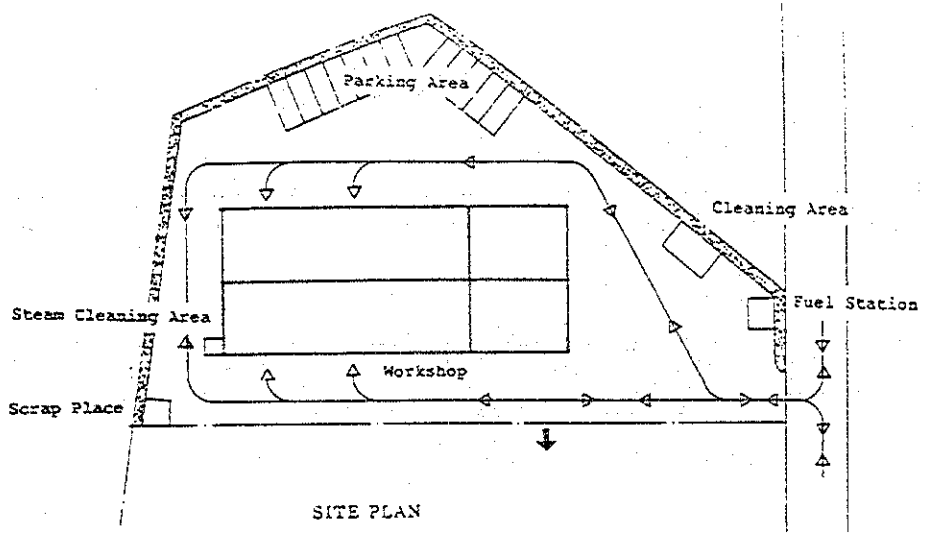
- Cleaning Area
- Parking Area

5) Layout Plan

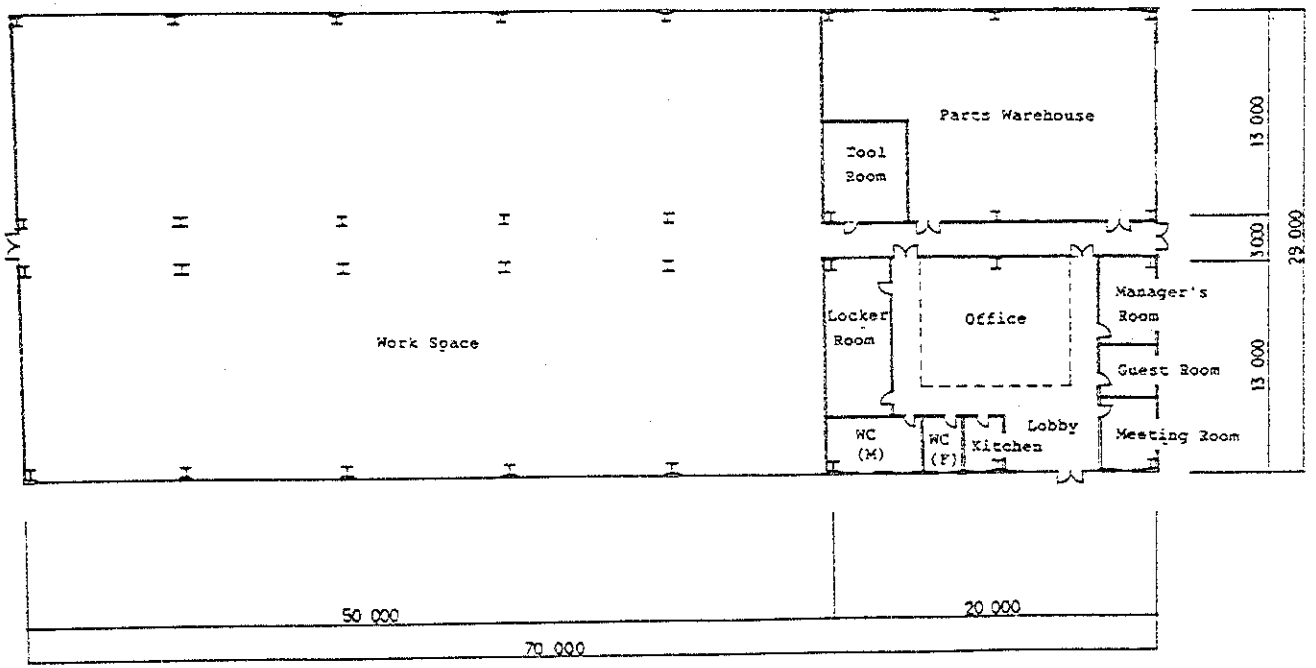
Layout Plan shows in Fig. 10-1 and Fig. 10-2.

6) Equipment and Tools

Equipment and tools show in Table 10-3.



SITE PLAN

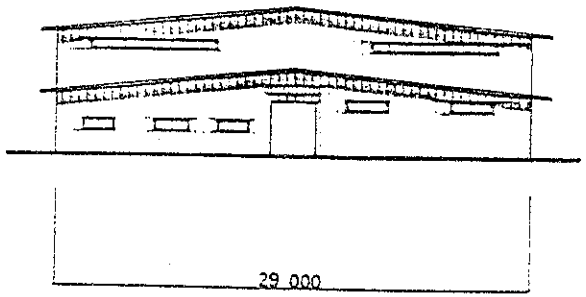


PLAN

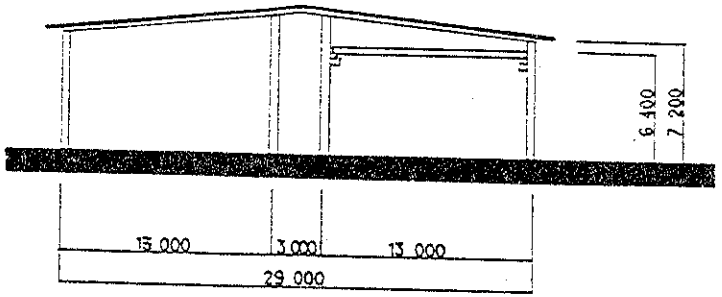
Fig. 10-1

SUB-WORKSHOP
SITE PLAN
PLAN

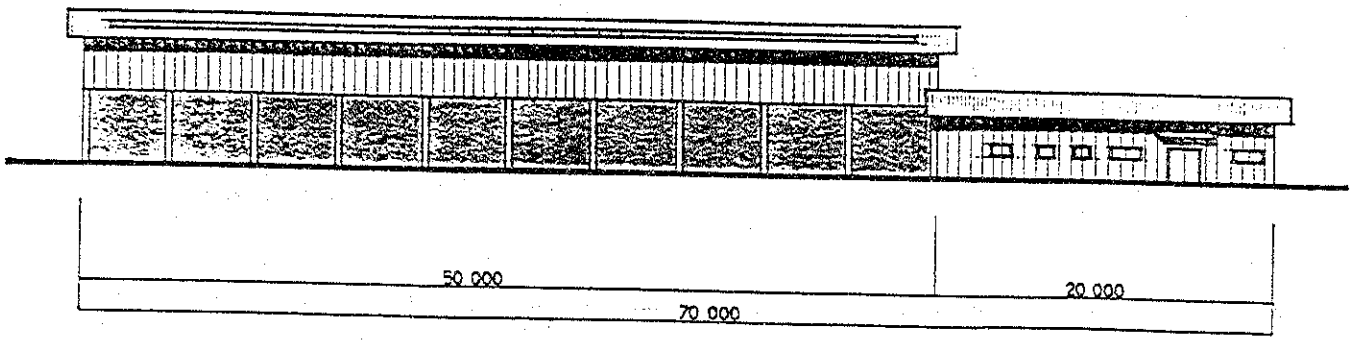
SOLID WASTE MANAGEMENT SYSTEM
IMPROVEMENT PROJECT
IN JAKARTA



ELEVATION



SECTION



ELEVATION

Fig. 10-2

SUB-WORKSHOP

ELEVATION

SECTION

SOLID WASTE MANAGEMENT SYSTEM
IMPROVEMENT PROJECT
IN JAKARTA

Table 10-3 Equipment and Tools

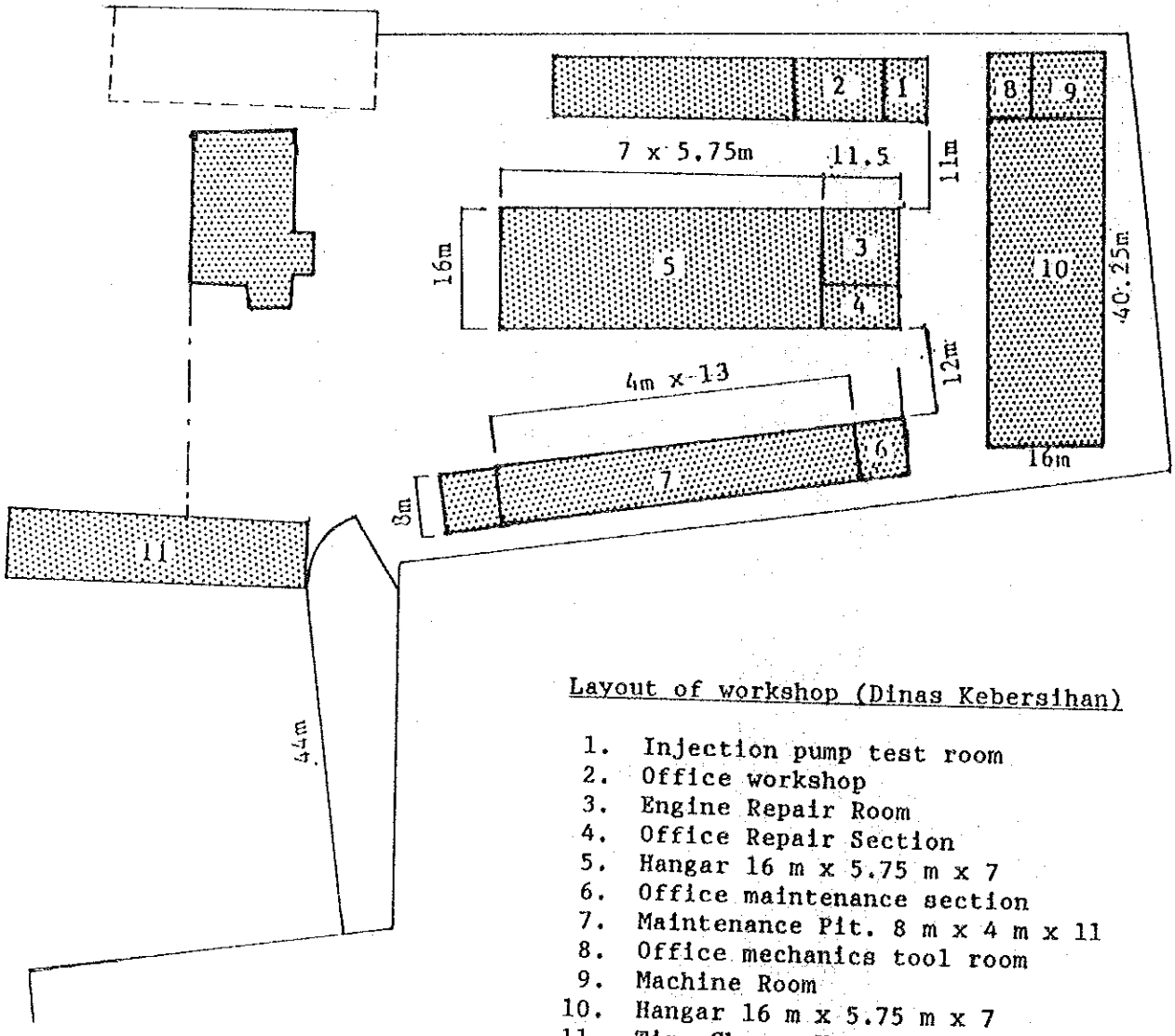
1. Maintenance equipment
2. Electric Component service tools
3. Tire service equipment
4. Cleaning equipment
5. Engine and radiator service equipment
6. Painting equipment
7. Painting tools
8. Air compressor
9. Tools
10. Parts of warehouse
11. Equipment for office
12. Equipment for fuel station

Power source: 1 phase 127 V 50 Hz
3 phase 220 V 50 Hz

7) Outline of main workshop

(1) Existing main workshop

Layout of the workshop is shown in Fig. 10-3.



Layout of workshop (Dinas Kebersihan)

1. Injection pump test room
2. Office workshop
3. Engine Repair Room
4. Office Repair Section
5. Hangar 16 m x 5.75 m x 7
6. Office maintenance section
7. Maintenance Pit. 8 m x 4 m x 11
8. Office mechanics tool room
9. Machine Room
10. Hangar 16 m x 5.75 m x 7
11. Tire Change Hangar

Fig. 10-3 Layout of Workshop

(2) Planning Condition of main workshop

Number of vehicle to be done maintenance and repair 1800 unit

Working day 25 day/month
Working hour 7 hour/month

(3) Number of bays

a. Maintenance bay

Average maintenance hours at the once every two year's maintenance 40 hour/unit

$$\frac{1{,}800 \text{ unit} \times 40 \text{ hour/unit}}{25 \text{ day/month} \times 7 \text{ hour/day} \times 24 \text{ month}} = 17.1 \ldots 18 \text{ bays}$$

b. Repair bay

15% of repair which cannot be done at the sub-workshop will be done at the main workshop.

Frequency rate of trouble occurrence 0.24
Frequency rate of utilization of bay 1.2 day

$$\frac{1{,}800 \text{ unit} \times 0.24 \times 1.2 \text{ day} \times 0.15}{25 \text{ days}} = 3.1 \ldots 4 \text{ bays}$$

c. Other bay

Test and repair bay for component.

Chassis test bay
Painting bay
Welding bay

(4) Standard Plan of Main Workshop

Building for maintenance bay, office and warehouse is needed 90 m x 65 m as shown in Fig. 10-4.

Required site area is as follows:

Ratio of building area to site area 25% - 30%

Building area 90 m x 65 m = 5,850 m^2

Site area 5,850 m^2 / 0.30 = 19,500 m^2

5,850 m^2 / 0.25 = 23,400 m^2

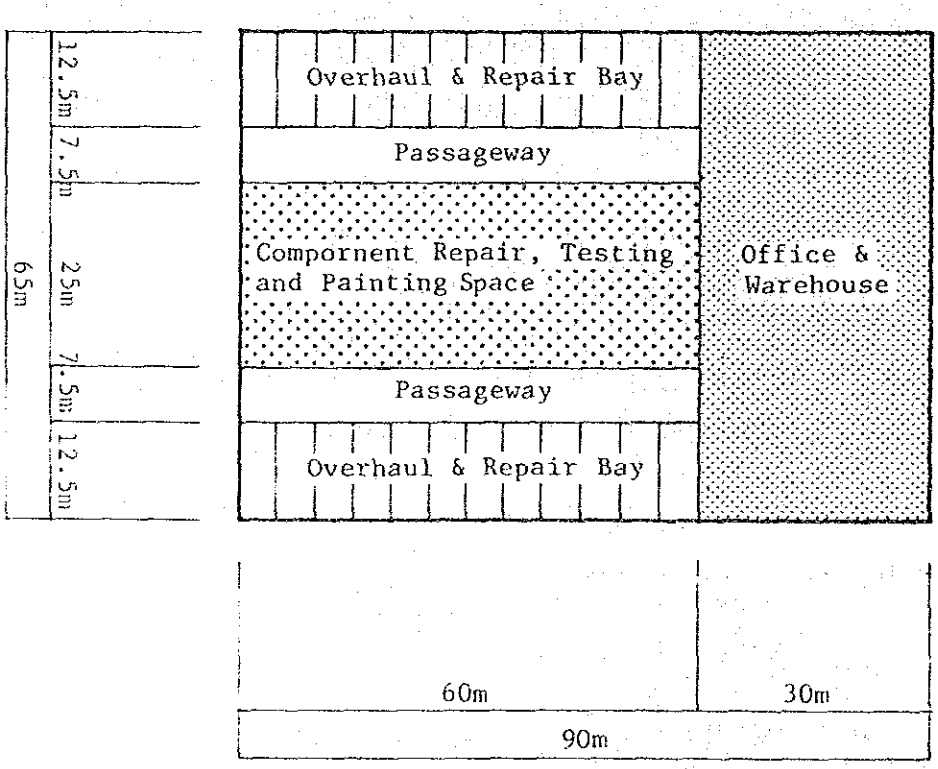


Fig. 10-4 Standard Plan of Main Workshop

11. Study of Fee Collection and Alternative Financing Plans

11. Study of Fee Collection and Alternative Financing Plans

11.1 Principle of Burden for Solid Waste Management

1) Concepts on Principle of Burden

So long as the administration upholds an idea that waste collection is one of indispensable services to urban living and that environmental conditions benefitting to an international city should be maintained, it is only natural for the administration to secure the cost necessary for this service. However, services to urban living are generally liable to become self-propagating. For this reason, it is important to clarify the principle of "the beneficiary should pay the cost" and establish a rational and low cost waste collection and treatment system.

However, this does not mean introduction of solid waste management based solely on fee collection as an inevitable requirement. Experience in Japan shows that importance is attached to the nature of waste collection as public service and that waste is collected as an operation of local governments in most cases. It is also true that its financial burden has grown to such a magnitude that it may restrict the initiation of other projects.

Despite all this, the proposal will be made for solid waste management in Indonesia based on fee collection. As the background of this proposal, the following points could be cited;

(1) The greater majority of waste management has hitherto been performed as part of community activities and residents are accustomed to sharing the cost of this service. However, with changes in utilization of land in Jakarta City and its suburbs in recent years, waste management operation could no longer be handled within the scope of community.

(2) The system for local taxes makes no provision for imposing the burden on tax payers in proportion to their income. The taxation system is also not properly implemented: subjects for taxation are maldistributed and many tax defaulters are left.

(3) There is substantial difference in efficiency of waste collection between the government and private sector, and some express strong dissatisfaction with the existing waste collection service by Dinas Kebersihan.

(4) Economy in Indonesia is by no means in a satisfactory condition. Consequently, financial restriction on waste collection is very strong and DKI wants to gradually reduce their burden of waste management operation.

If the operation under the Conceptual Master Plan is to be implemented in these circumstances, about Rp. 26 billion for running and maintenance costs and about Rp. 24 billion for depreciation will be respectively required by year 2005. The cost of operation will amount to more than Rp. 63 billion if the burden of debt service accompanying investment, etc. is taken into consideration. Of this total, about Rp. 5 billion is the direct cost for street sweeping.

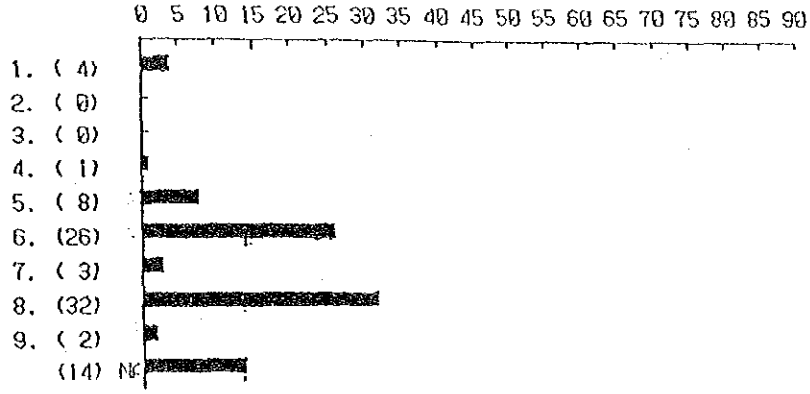
Meanwhile, the financial size of DKI in 2005 is estimated at about Rp. 820 billion, assuming economy will grow at 5% a year in real terms. If everything is to be covered by DKI's budget, the cost of waste management will account for about 7.7% of the total budget. This is approximately double the present share of 4.2% in DKI's budget (including the allocation from Wilayah to Suku Dinas).

According to the opinion survey of residents' willingness to pay for waste collection, people in the high income bracket are prepared to bear more than Rp. 3000 a month, those in the middle income group, about Rp. 1,000 and those in the low income, about Rp. 500.

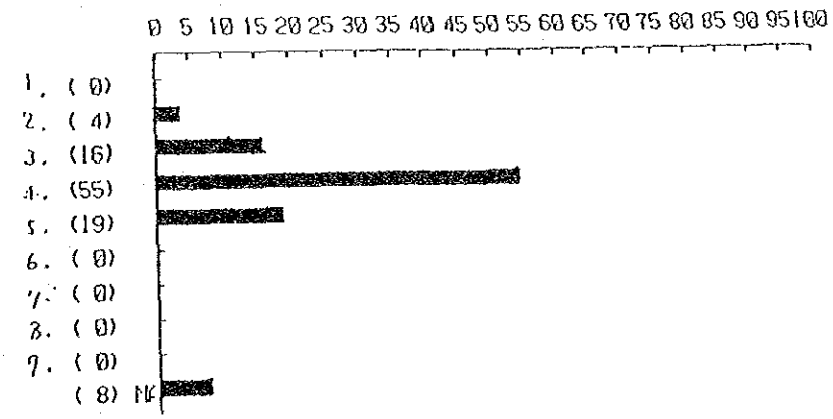
Question: How much charge can you afford for waste collection per month ?

Answer : 1. 0 2. 200- 3. 500- 4. 1,000 5. 2,000-
6. 3,000 - 7. 4,000- 8. 5,000- 9. 10,000

(1) Door to Door Collection area (High Income Households)



(2) Handcart Collection Area (Middle Income Area)



(3) Communal Container Collection Area (Low Income Household)

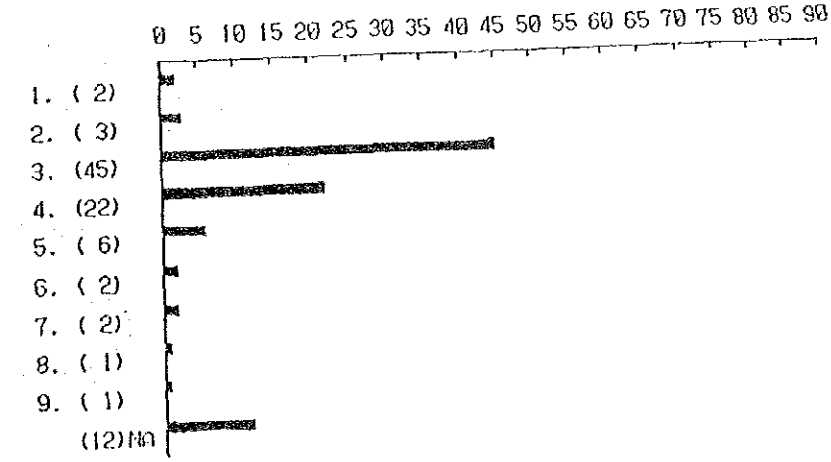


Fig.11-1-1 Result of Interview Survey(Willingness to pay)

Table 11-1-1 Comparison of Public Charges

Share in Household Expenditure

		High Income	Middle Income	Low Income	Total Amount
Household Income and Expenditure	Number of RW	196 (8.9 %)	990 (45.0 %)	1,015 (46.1)	2,201
	Number of Households	126,000 (8.9 %)	639,000 (45.0 %)	655,000 (16.1 %)	1,420,000
	Household Income	Stratum Rp 200,000 ~	Stratum Rp 55,000-200,000	Stratum Rp 0-55,000	-
		Average Rp 391,000 (Rp 410,000)	Average Rp 109,000 (Rp 115,000)	Average Rp 33,000 (Rp 35,000)	( ) is 1985 figure, other is 1980 figure
	Household Expenditure on water	Rp 15,000 (3.7 %)	Rp 4,000 (3.5 %)	Rp 1,000 (2.9 %)	
	Household Expenditure on Elect.	Rp 33,400 (8.1 %)	Rp 6,500 (5.7 %)	Rp 4,200 (12.0 %)	-
	Household Expenditure on Solid Waste	Rp 2,000 (0.5 %)	Rp 500 * (0.4 %)	Rp 100 * (0.3 %)	-
	Household payment to RW	Rp 6,000 (1.51 %)	Rp 1,500 (1.3 %)	Rp 300 (0.9 %)	-
Total charges paid by Households in JKT per year	Total water charges paid by Households	Rp 2.6 x 10^9 (36.1 %)	Rp 3.6 x 10^9 (50.0 %)	Rp1.0 x 10^9 (13.9 %)	Rp 7.2 x 10^9
	Total Elect. charges paid by Households	Rp 42.3 x 10^9 (41.0 %)	Rp 45 x 10^9 (43.7 %)	Rp 15.7 x 10^9 (15.2 %)	Rp 103 x 10^9
	Total Solid Waste cost paid by Households	Rp 3 x 10^9 (39.5 %)	Rp 3.8 x 10^9 (50.0 %)	Rp 0.8 x 10^9 (10.5 %)	Rp 7.6 x 10^9
	Total Revenue of RW	Rp 9.1 x 10^9 (39.6 %)	Rp 11.5 x 10^9 (50.0 %)	Rp 2.4 X 10^9 (10.4 %)	Rp 23 x 10^9

(*) Only including fee paid to RW (Tips paid individually are excluded)

If the limit of residents' burden is set at about 1% of their income, their burden in 2005 will become as follows:

(Unit: Rp.)

	Average monthly income	1% of income	Tariff in 2005
High income	391,000	3,910 (4,100)	3,000
Middle income	109,000	1,090 (1,150)	1,050
Low income	33,000	330 (350)	330

Note: The average monthly income is based on the value in 1980. Figures in parentheses indicate the income adjusted to the 1985 value.

In the existing fee system for waste collection, burden of commercial establishments is relatively small compared with households' share. This situation need to be rectified. However, the amount of waste discharged by commercial establishments is not accurately measured.

In the above table, the tariffs are set on the assumption that general waste which is mixed into household waste is about 2.5 times that of domestic waste. Consequently, these tariffs must be reviewed when basic data are compiled in the future.

2) Method for Fee Collection

Methods for fee collection can roughly be divided into direct collection and indirect collection. The method for direct collection refers to collection of waste fees directly from households or commercial establishments by the cleansing authority. The method for indirect collection can be further divided into the method of fee collection by some other organizations under contract and the method of securing a certain amount from some tax as the source of funds for waste collection service.

For these methods, various compromise variations can also be developed. In comparison of these alternatives, we have received comparison tables and valuable comments from our Indonesian counterparts.

[See Reference 1]

We have made comparative study of the following alternatives:

(1) Direct fee collection by Dinas Kebersihan
(2) Collection by PLN
(3) Collection by PDAM
(4) Collection by RT/RW/Kelurahan
(5) Collection by local government treasurer/local government bank

The existing system is a mix of direct collection by Dinas Kebersihan and indirect collection through RT/RW and DISPENDA. However, collection through RT/RW cannot formally be made while the rate of collection by DISPENDA remains at a low level. In contrast, for direct collection, there are examples such as in Utara, of collection from more than half of households that are considered to be the subject for collection. From this fact, no hasty conclusion could be made that direct collection will be absolutely impossible. However, as well be noted from the example in Bandung, collecting fees will increasingly become difficult as the subject for collection is expanded from the middle income bracket to the low income.

On both the present situation and the existence of problems as described above, JICA study team and the Indonesian counterparts reached basic agreement. However, complete accord was not necessarily reached in the method for resolving these problems. This is believed to be due to difference between the two parties in assessment criteria to which importance is attached.

To make comparative study of fee collection systems, the following assessment criteria can be cited:

(1) Fairness in cost sharing
(2) Improvement in collection rate
(3) Reduction in cost of collection
(4) Establishment of clearcut procedure for payment and receipt of fees
(5) Effect on waste collection service in community

As for fairness in cost sharing among these criteria, the view that people with solvency should pay is dominant among general public reflecting in Indonesia, the spirit of Gotong Royong. However, a consent that even part of the cost should be borne by beneficiaries if the service received is the same should also hold true.

Indeed, the dominance of this principle will present no problem at all within the scope of waste collection undertaken by RT/RW.

However, if self-financing becomes an important target for operation, increase in the rate of fee collection as a whole will become imperative and there will be limits to relying on RW/RT for collection of fees.

Consequently, as a principle, this Project calls for efforts to secure as many beneficiaries for fee collection as possible although their share of cost will be differentiated according to their income.

Direct collection by Dinas Kebersihan would be adversely affected if residents' willingness to pay fees were reduced due to the Authority's poor service. As a result, the revenue necessary for operating the Project could not be earned. Thus, direct collection has both an advantage and a disadvantage directly contributing to improvement of service level on the plus side and unstable financial base due to the existence of groups refusing to pay fees on the minus side.

Particularly, the biggest problem in direct collection is that the rate of fee collection will not improve as expected in the absence of effective punitive measures against defaulters. In the present practice to collect fees for door-to-door waste collection service, suspension of waste collection for defaulters as punishment will result in complaints from neighboring residents to Dinas Kebersihan. Because of such complaints, collection of waste for defaulters must be resumed.

The cost of fee collectors is also commonly cited as another problem in direct collection. This cost will amount to Rp. 3.7 billion in 2005 when calculated on a number of preconditions. However, this will be not too heavy a burden when it is compared with the commission of 5% in indirect collection. In this sense, reduction of collection cost will depend on improvement in the rate of collection because the collection cost will otherwise inevitably increase.

For indirect collection, two alternatives can be considered. One is to collect the cost as a tax and the other is to add the cost to public service charges.

Existing local taxes in Jakarta mainly consist of business tax, commodity tax, stamp duty, and the like. In other words no taxation system linked with income exists. (See Table 11.2-1)

Land and building taxes tend to reflect both conditions of location and income level. Thus, these taxes should be studied first if the waste collection fee is to be included in some tax.

However, the taxation system for land and buildings has just been revised and inbalance in tax collection still remains to be corrected. The collected amount in whole Indonesia was Rp. 190 billion in 1986/87, which was under the electricity fee collection in Jakarta. In contrast, collection of public service charges is being accepted as a system although it has a host of its own problems.

The spread of water service is not so extensive and it is said there are many problems in collection of water charges including the handling of common water taps. Electrification is said to be more than 80%, and collection of electric charges through bank has been more or less established as a system. In this sense, it could be said collection of waste service fee by taking advantage of collection of electric charges is the most efficient method to collect this fee from the largest number of beneficiaries.

Table 11.2-1 Characteristics of Regional Tax

	Tax Payer	Dominant cause of liability	Time of Paying	Place of paying	Rate of real collected	Remakrs
1. Vehicle Tax	Owner	to own vehicles	Once/year	Regional treasure	113%	Smoothly collected
2. Changing Name Tax	Nominal person/company	to transfer of the ownership	Once/year	Regional treasure	103	Difficult to collect perfectly
3. Butchering Tax	Butcher	to cut/kill cattle and sell (Pig, Cow, Horse)	Time to kill directly	Butchery		
4. Consumer Tax	Consumer	to consumer at hotels, restaurant etc.	Every month	Regional treasure	117	Tendency to decline
5. Radio Tax	Owner	to receive waves	Every month	Post office	45	Rp. 50/month lower class will not pay.
6. Foreginer Tax	Foreigner	to stay over 3 months	Every month	Regional treasure	86	Tendency to decline
7. Entertainment	Person to have entertainment.		Every month	Regional treasure		Tendency to decline
8. Advertisement Tax	Owner of Company	to advertise	Time to Promote/ advertise	Regional treasure	106	
9. Dog Tax	Owner	to own dogs not to spread disease	Twice /year	Regional treasure	106	Tax amount due depends on species of dog.
10. Alcohol Tax	Drinker	to drink alcohol or other hard drinking	Once/year	Regional treasure	85	
11. Becak & Gerobak Tax	Owner	to deal with Becak and Gerobak	Once/year	Regional treasure	39	
12. Other Tax		to make trouble	Time to make trouble	Regional treasure	126	(Fine tax and Fire Flower/ Craker tax)
13. Property Tax					87	Combining IPEDA, these taxes were change to Building & Land Tax (PBB)
14. Pajak Khusus					80	
15. Rumah Tangga						
16. Gambling Tax						Stopped because of prohibition of gambling

There is no precedent in Indonesia for use of public service charges as a means to collect other fees, except for an example in padding of water charges for such purpose. Thus, long argument is expected to ensue if any such plan for use of electric charges is proposed.

Particular efforts must be made to ensure fairness in collecting the waste service fee if this plan is put into effect, because the amount of waste discharged is not necessarily linked with the consumption of power. Diverting a certain portion of electric charges paid by individual consumers to the funds for waste service may be acceptable in theory. However, this method would not be workable in actual practice in near future. As in the example of Bogor City in adding the waste fee to water charges, efforts must be made to ensure fairness in imposing burden on each beneficiary. For this purpose, data on beneficiaries must properly maintained and continued effort made to analyze the amount of waste discharged by each community or commercial establishment with corroborative evidence.

It is also believed there will be much time before this method can be introduced because different government departments and agencies are involved as competent authorities. In this respect, DKI should aggressively work toward PLN because, as we understand, there is basic agreement between the two. Present waste management operation suffers from lack of confidence even on the part of DKI because of its informal fee collection practice and inconsistent service. DKI must therefore promptly improve this situation prior to their positive work toward PLN.

Although some problems exist as described above, electric charges will provide a source of huge funds for waste service, considering the growth of power consumption in the future. It is thus desirable that the organizational setup and systems be established to make possible indirect collection of waste fees through electric charges in as near a future as possible.

Meanwhile, it is considered impossible to substantially increase collection of waste fees by RT/RW in view of the circumstances under which they are operating as well as their nature. However, regarding this point, understanding by the Indonesian side is roughly divided into two.

On belief that gradual improvement should be possible, an attempt is being made to improve RT/RW's performance in fee collection. Thus, it may probably be necessary to evaluate RT/RW's performance in a fixed period of time.

Based on results of the foregoing comparison, the Master Plan recommends collection of waste service fees by adding them to electric charges, with improvement in the rate of collection under case (2) as the priority assessment criterion.

11.2 Financial Plan in the Master Plan

1) Financial Demand

The financial demand in the continued existing system and the Conceptual Master Plan is as shown in Table 11.2-1. The following assumption were made to calculate the investment amount for each year.

(1) Collection System

- The number of collection vehicles to be procured will be decided in view of the generated solid waste amount in each Wilayah and the composition of the collection system in force.

- In regard to the continuation of the existing system, the number of collection vehicle trips will be reduced by one a day due to the longer distance to the new final disposal sites. The year of this reduction corresponds to the stages considered in the Master Plan, i.e. 1992 for Pusat, 1995 for Utara and Seletan and 1998 for Barat and Timur.

- The life expectancy of the collection vehicles will be 7 years while that for depots and containers, etc. will be 4 years.

- The investment plan given in Table 11.2-2 was prepared based on the above.

- In comparison, 1 - 3.5 trips are assumed in the Conceptual Master Plan to reflect the introduction of the transfer station.

- In Phase I-A, the number of procured collection vehicles will correspond to the generated solid waste amount in 1995. Additional vehicles corresponding to the waste amount in 2005 will be procured in 1998.

- In Phase I-B, the number of procured collection vehicles will correspond to the generated solid waste amount in 2000. Additional vehicles corresponding to the waste amount in 2005 will be procured in 2001.

- In Phase II, collection vehicles corresponding to the waste amount in 2005 will be procured from the very beginning.

- The financial plan given in Table 11.2-3 was prepared based on the above. After 2006, the renewal of facilities and equipment will be conducted very 7 years.

Table 11.2-1 Comparison between the Existing System and the Proposed One Investment

Investment

	Phase I-a 1989-1992	Phase I-b 1993-1995	Phase II 1996-2000	Phase III 2001-2005	Sub Total	2006-2014	Total
Existing System	66.3	70.6	133.2	206.1	476.2	204.1	680.3
Proposed System	81.8	85.2	117.8	170.8	455.6	197.1	652.7

Annual cost

	1990	1995	2000	2005	2010	Total (1989-2014)
Existing System	20.0	47.4	67.3	76.5	77.2	1,557.5
Depreciation	6.1	17.4	25.3	26.8	26.2	
O. & M. Cost	13.9	25.0	31.9	35.1	35.1	
Interest	0.0	5.0	10.1	14.6	15.9	
Proposed System	20.0	46.3	55.8	63.0	63.6	1,342.9

Table 11.2-2 Investment Plan (Existing System)

Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Collection																											
Pusat Vehicle			20.3							26.3							26.3							26.3			
Depo etc.			0.6				0.6				0.8				0.8				0.8					0.8			
Utara Selatan																											
Vehicle						46.1							52.8							52.8							
Depo etc.		0.6				1.8				1.8				2				2				2				2	
Barat Timur																											
Vehicle		23.7							65.6							65.6							65.6				
Depo etc.	1.1				1.1				3.2				3.2				3.2				3.2				3.2		
Total																											
Vehicle		23.7	20.3			46.1			65.6	26.3			52.8			65.6	26.3			52.8			65.6	26.3			471.4
Depo etc.	1.1	0.6	0.6		1.1	1.8	0.6		3.2	1.8	0.8		3.2	2	0.8		3.2	2	0.8		3.2	2	0.8		3.2	2	34.8

Table S11.2-3 Investment & Cost of Collection System (Proposed System)

Unit: Rp. million

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Investment (Rp. billion)																	
Phase 1-a			10.6				0.7			13.8	0.9				0.9		13.8
			0.7														
Phase 1-b						26.8							30.4				
						3.1				3.1				3.5			
Phase II									25							25	
									3.2				3.2				3.2
Replacement of Existing System	1	23.7 0.6			1.1												
Total	1	24.3	11.3	0	1.1	29.9	0.7	0	28.2	16.9	0.9	0	33.6	3.5	0.9	25	17

(2) Final Disposal System

- Final disposal sites will be constructed in Bekasi and Tangerang.

- In principle, a final disposal site of the same size as that of Bekasi or Tangerang will be constructed in accordance with its requirement. In 2008, the total capacity of the final disposal sites will be capable of disposing of the solid waste generated up to 2014.

- As the heavy machinery will be mobile, it will be renewed every 7 years.

- Based on the above, the investment plan shown in Table 11.2-4 was prepared.

- In the continued existing system, the same construction work as that in the Conceptual Master Plan will be carried out. The reason for this is that the provision of sanitary landfill disposal is the minimum level required for solid waste management in Jakarta.

Table S11.2-4 Investment Plan (Proposed System)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Final Disposal																											
Bekasi																											
Land Acquisition		3							3				3				3										
Civil Work		3.9	3.9						2.9	2.9			2.9	2.9			3.9	3.9									
Machinery			2.9							1.4				1.4				2.9									
Equipment			4.7							9.8							9.8							9.8			
Tangerung																											
Land Acquisition					3						3				3				3								
Civil Work					4.4	4.4					3.4	3.4			3.4	3.4			4.4	4.4							
Machinery						2.9						1.4				1.4				2.9							
Equipment						3.4							6.9							6.9							
Total																											
Land Acquisition		3			3				3		3		3		3		3		3								24
Civil Work		3.9	3.9		4.4	4.4			2.9	2.9	3.4	3.4	2.9	2.9	3.4	4.8	3.9	6.8	4.4	7.3							65.6
Machinery			2.9			3.4				1.4		1.4		1.4													10.5
Equipment			4.7			3.4				9.8			6.9				9.8			6.9				9.8		51.3

(3) Transfer Station System

- Two large and four small transfer stations will be constructed.

- The two large transfer stations will be located at Sunter and Shrenseng.

- While the expansion of the Shrenseng transfer station may be required in 2000, it is assumed that the increased waste will be dealt with by increased collection vehicles.

- The investment plan shown in Table S11.2.5 was prepared based on the above.

Table S11.2-5 Investment Plan (Proposed System)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Transfer Station																											
Large																											
Land Acquisition	1.2				1.2																						
Civil Work			3			3												7.6			7.6		5.1			5.1	
Machinery			12.7			14.2																					
Equipment			4.9			5.3				4.9		0.7	5.3				4.9		0.7	5.3				4.9		0.7	
Small																											
Land Acquisition					0.7			4.1		0.5		0.5	0.9														
Civil Work						1.5			9		1		1	2													
Machinery												1.4															
Equipment						1.8			9.7		0.8		2.6	1.5		9.7		0.8		2.6	1.5		9.7		0.8		
Total																											
Land Acquisition	1.2	3		1.9				4.1		0.5	1	0.5	2.5														14.7
Civil Work			12.7			4.5			9					2													28.2
Machinery			2.9			14.2						1.4						7.6			7.6		5.1			5.1	43.9
Equipment			4.7			7.1			9.7	4.9	0.8	0.7	7.9	1.5		9.7	4.9	0.8	0.7	7.9	1.5		9.7	4.9	0.8	0.7	78.9

(4) Street Sweeping System

- Mechanical sweepers will be procured in accordance with the stages given in the Conceptual Master Plan.

- Mechanical sweepers will be renewed every 7 years.

(5) Workshops

- A workshop will be constructed in each Wilayah in accordance with the stages given in the Conceptual Master Plan.

- The construction of the main workshop will be carried out during Phase III.

Based on the above, the investment plan shown in Table S11.2-6 was prepared. The annual expenses for each sub-system were calculated based on the preconditions given in Table 11.2-7 and the resulting transition of the assumed annual expenses is shown in Table 11.2-8.

In regard to the annual expenses for the collection system, the items given in Table 11.2-7 were used.

Table S11.2-6 (a) Investment Plan (Existing System)

Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Collection																										
Vehicle		23.7	20.3			46.1			65.6	26.3			52.8			65.6	26.3			52.8			65.6	26.3		
Depo. etc.	1.1	0.6	0.6		1.1	1.8	0.6		3.2	1.8	0.8		3.2	2	0.8		3.2	2	0.8		3.2	2	0.8		3.2	2
Final Disposal																										
Land		3			3				3		3		3		3		3		3							
Civil Work		3.9	6.8		4.4	7.3			2.9	4.3	3.4	4.8	2.9	4.3	3.4	4.8	3.9	6.8	4.4	7.3						
Heavy Equipment (Renual)			4.7			3.4				9.8			6.9				9.8			6.9				9.8		
Street Sweeping																										
Mechanical Sweeper (Renual)			1.6			2.9			2.7	1.6			2.9			2.7	1.6			2.9			2.7	1.6		
Total	1.1	31.2	34	0	8.5	61.5	0.6	0	77.4	43.8	7.2	4.8	71.7	6.3	7.2	73.1	47.8	8.8	8.2	69.9	3.2	2	69.1	37.7	3.2	2

Table S11.2-6 (b) Investment Plan (Proposed System)

Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Collection																										
Vehicle (Renual)		23.7	10.6			26.8			25	13.8			30.4			25	13.8			30.4			25	13.8		
Depo etc. (Renual)	1	0.6	0.7		1.1	3.1	0.7		3.2	3.1	0.9		3.2	3.5	0.9		3.2	3.5	0.9		3.2	3.5	0.9		3.2	3.5
Transfer Station																										
Land		1.2	3		1.9	4.5		4.1	9	0.5	1	0.5	1.9													
Equipment (Renual)			12.7			14.2			0.3					2				7.6			7.6		5.1			5.1
Vehicle (Renual)			4.9			7.1			9.7	4.9	0.8	0.7	0.8 7.1	1.5		9.7	4.9	0.8	0.7	7.9	1.5		9.7	4.9	0.8	0.7
Final Disposal																										
Land		3			3				3		3		3		3		3		3							
Civil Work		3.9	6.8		4.4	7.3			2.9	4.3	3.4	4.8	2.9	4.3	3.4	4.8	3.9	6.8	4.4	7.3						
Heavy Equipment (Renual)			4.7			3.4				9.8			6.9				9.8			6.9				9.8		
Street Sweeping																										
Mechanical Sweeper (Renual)			1.6			2.9			2.7	1.6			2.9			2.7	1.6			2.9			2.7	1.6		
Work Shop																										
Construction			1			1.9			1.9				2.2													
Tool (Renual)			2.4			2.9			2.9				3.2 2.4			2.9			2.9				5.6			2.9
Total	1	32.4	48.4	0	10.4	74.1	0.7	4.1	60.6	38	9.1	6	66.9	11.3	7.3	45.1	40.2	18.7	11.9	55.4	12.3	3.5	49	30.1	4	12.2

Table S11.2-7 Estimate of Factors Affecting the O. M. Costs

1. Depreciation	Durable years	Reusable value
Construction	25 years	10%
Mechanical equipment	14 years	10%
Construction & facility of F/D	Usable years of F/D	
Mechanical tools	10 years	10%
Heavy equipment	7 years	10%
Vehicles	7 years	10%
Depot & containers	4 years	10%

2. Personnel Costs (including special incentives & overtime allowance)

Managers & technical staff	Rp. 140,000/month	Rp. 1,680,000/year
Drivers	Rp. 140,000/month	Rp. 1,680,000/year
Crew & street sweepers	Rp. 80,000/month	Rp. 960,000/year
Fee collectors	Rp. 80,000/month	Rp. 960,000/year
Handcart collectors	Rp. 60,000/month	Rp. 720,000/year

3. Maintenance Cost

40% of purchase cost/durable years

4. Fuel Cost

Rp. 200/l

Table S11.2-8 Trends of Cost (Proposed System) Unit : Rp. million

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2104	Total
Collection																											
Depreciation	6074	6074	6808	8088	8088	8088	8749	8749	8749	9016	9468	9468	9468	9990	9990	9990	9990	9990	9990	9990	9990	9990	9990	9990	9990	9990	236757
Maintenance	2629	2629	2944	3527	3527	3527	3723	3723	3723	3791	3982	3982	3982	4201	4201	4201	4201	4201	4201	4201	4201	4201	4201	4201	4201	4201	100302
Fuel & Others	1167	1208	1249	1539	1584	1628	1487	1537	1587	1446	1492	1538	1585	1632	1678	1725	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	41802
Personnel Cost	3267	3381	3495	4337	4462	4588	3820	3949	4078	3222	3323	3425	3527	3629	3729	3831	3933	3933	3933	3933	3933	3933	3933	3933	3933	3933	99393
Transfer Station																											
Depreciation				1610	1610	1610	3654	3654	3654	5245	5245	5387	5480	5617	5891	5891	5891	5891	5891	5891	5891	5891	5891	5891	5891	5891	113458
Maintenance				715	715	715	1623	1623	1623	2330	2330	2393	2434	2495	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	2617	50490
Fuel & Others				110	110	110	338	338	338	922	922	971	987	1033	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	1126	19691
Personnel Cost				46	46	46	210	210	210	918	918	983	1018	1080	1206	1206	1206	1206	1206	1206	1206	1206	1206	1206	1206	1206	20157
Final Disposal																											
Depreciation				2132	2132	2132	4512	4512	4512	4512	5483	5483	6040	6040	6040	6040	6040	6040	5534	5534	5427	5427	5427	5427	5427	5427	115280
Maintenance				590	590	590	1070	1070	1070	1070	1218	1218	1367	1367	1367	1367	1367	1367	1367	1367	1367	1367	1367	1367	1367	1367	27624
Fuel & Others				425	432	440	1391	1448	1502	1537	1603	1666	1734	1799	1865	1947	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	37919
Personnel Cost				209	209	209	375	375	375	375	411	411	447	447	447	447	447	447	447	447	447	447	447	447	447	447	9207
Street Sweeping																											
Depreciation				206	206	206	579	579	579	926	926	926	926	926	926	926	926	926	926	926	926	926	926	926	926	926	18097
Maintenance				55	55	55	142	142	142	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	251	4858
Fuel & Others				50	77	103	130	143	157	170	184	197	204	210	217	223	230	230	230	230	230	230	230	230	230	230	4365
Personnel Cost	2666	2804	2942	3080	3217	3355	3493	3305	3117	2928	2740	2552	2634	2716	2798	2880	2962	2962	2962	2962	2962	2962	2962	2962	2962	2962	76647
Work Shop																											
Depreciation				126	126	126	387	387	387	648	648	648	648	936	936	936	936	936	936	936	936	936	936	936	936	936	16299
Fee Collection																											
Personnel Cost	589	760	930	1101	1272	1442	1613	1748	1884	2019	2155	2290	2332	2373	2415	2456	2498	2498	2498	2498	2498	2498	2498	2498	2498	2498	52359
Staff Cost																											
Personnel Cost	3254	3168	3066	2972	2878	2784	2690	2499	2309	2118	1928	1737	1661	1585	1509	1433	1357	1357	1357	1357	1357	1357	1357	1357	1357	1357	51153
Total	19646	20016	21434	30918	31336	31754	39986	39991	39996	43444	45227	45526	46725	48327	49209	49493	49763	49763	49257	49257	49150	49150	49150	49150	49150	49150	1095968
Depreciation	6074	6074	6808	12162	12162	12162	17881	17881	17881	20347	21770	21912	22562	23509	23783	23783	23783	23783	23277	23277	23170	23170	23170	23170	23170	23170	499881
Maintenance	2629	2629	2944	4887	4887	4887	6558	6558	6558	7442	7781	7844	8034	8314	8436	8436	8436	8436	8436	8436	8436	8436	8436	8436	8436	8436	183184
Fuel & Others	1167	1208	1249	2124	2209	2281	3346	3466	3584	4075	4201	4372	4510	4674	4886	5021	5141	5141	5141	5141	5141	5141	5141	5141	5141	5141	103777
Personnel Cost	9776	10105	10433	11745	12084	12424	12201	12086	11973	11580	11475	11398	11619	11830	12104	12253	12403	12403	12403	12403	12403	12403	12403	12403	12403	12403	309116
O.M.Cost	19572	19942	14626	18756	19174	19592	22105	22110	22115	23097	23457	23614	24163	24818	25426	25710	25980	25980	25980	25980	25980	25980	25980	25980	25980	25980	596077

Table S11.2-9 (a)

Trends of Cost (Existing System)

Unit : million

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Pusat	3133	3156	3179	6104	6143	6183	6222	6291	6359	6429	7661	7729	7798	7866	7936	8004	8073
Depreciation	1381	1381	1381	2724	2724	2724	2724	2724	2724	2724	3534	3534	3534	3534	3534	3534	3534
Maintenance	602	602	602	1185	1185	1185	1185	1185	1185	1185	1538	1538	1538	1538	1538	1538	1538
Fuel & Others	295	301	307	561	571	581	591	609	626	644	662	679	697	714	732	749	767
Personnel Cost	855	872	889	1634	1663	1693	1722	1773	1824	1876	1927	1978	2029	2080	2132	2183	2234
Utara	1771	1788	1805	1822	1841	1857	4871	4920	4971	5021	5071	5121	5658	5709	5759	5809	5859
Depreciation	848	848	848	848	848	848	2373	2373	2373	2373	2373	2373	2715	2715	2715	2715	2715
Maintenance	365	365	365	365	365	365	1016	1016	1016	1016	1016	1016	1163	1163	1163	1163	1163
Fuel & Others	147	152	156	161	166	170	389	402	416	429	442	455	467	481	494	507	520
Personnel Cost	411	423	436	448	462	474	1093	1129	1166	1203	1240	1277	1313	1350	1387	1424	1461
Barat	2850	2887	3489	3525	3559	3595	3631	3675	3720	8896	8982	9067	9153	9238	9324	9409	9495
Depreciation	1377	1377	1774	1774	1774	1774	1774	1774	1774	4586	4586	4586	4586	4586	4586	4586	4586
Maintenance	586	586	755	755	755	755	755	755	755	1941	1941	1941	1941	1941	1941	1941	1941
Fuel & Others	242	252	262	272	281	291	301	313	325	638	661	684	707	730	753	776	799
Personnel Cost	645	672	698	724	749	775	801	833	866	1731	1794	1856	1919	1981	2044	2106	2169
Selatan	2777	2815	2855	2894	2933	2972	8322	8416	8511	8606	8700	8795	9717	9812	9907	10001	10096
Depreciation	1314	1314	1314	1314	1314	1314	3904	3904	3904	3904	3904	3904	4482	4482	4482	4482	4482
Maintenance	573	573	573	573	573	573	1697	1697	1697	1697	1697	1697	1948	1948	1948	1948	1948
Fuel & Others	237	247	258	268	279	289	717	742	767	792	817	842	866	891	916	941	966
Personnel Cost	653	681	710	739	767	796	2004	2073	2143	2213	2282	2352	2421	2491	2561	2630	2700
Timur	2606	2646	3168	3209	3248	3287	3326	3372	3418	9514	9620	9726	9832	9937	10043	10149	10255
Depreciation	1154	1154	1491	1491	1491	1491	1491	1491	1491	4505	4505	4505	4505	4505	4505	4505	4505
Maintenance	503	503	649	649	649	649	649	649	649	1957	1957	1957	1957	1957	1957	1957	1957
Fuel & Others	246	256	266	277	287	297	307	319	331	786	813	841	868	895	922	950	977
Personnel Cost	703	733	762	792	821	850	879	913	947	2266	2345	2423	2502	2580	2659	2737	2816
Total	13137	13292	14496	17554	17724	17894	26372	26674	26979	38466	40034	40438	42158	42562	42969	43372	43778
Depreciation	6074	6074	6808	8151	8151	8151	12266	12266	12266	18092	18902	18902	19822	19822	19822	19822	19822
Maintenance	2629	2629	2944	3527	3527	3527	5302	5302	5302	7796	8149	8149	8547	8547	8547	8547	8547
Fuel & Others	1167	1208	1249	1539	1584	1628	2305	2385	2465	3289	3395	3501	3605	3711	3817	3923	4029
Personnel Cost	3267	3381	3495	4337	4462	4588	6499	6721	6946	9289	9588	9886	10184	10482	10783	11080	11380
O.M.Cost	7063	7218	7688	9403	9573	9743	14106	14408	14713	20374	21132	21536	22335	22740	23147	23550	23956

Table S11.2-9 (b)

Cost of Collection System (Proposed System)

Unit : Rp. million

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Annual Cost(Rp.million)																	
Phase I-a																	
Depreciation				1518	1518	1518	1518	1518	1518	1518	1970	1970	1970	1970	1970	1970	1970
Maintenance				644	644	644	644	644	644	644	835	835	835	835	835	835	835
Fuel & Others				252	257	261	266	274	282	290	298	305	313	321	329	337	345
Personnel Cost				790	804	819	833	858	883	907	932	957	982	1007	1031	1056	1081
Phase I-b																	
Depreciation							3867	3867	3867	3867	3867	3867	3867	4389	4389	4389	4389
Maintenance							1626	1626	1626	1626	1626	1626	1626	1845	1845	1845	1845
Fuel & Others							597	616	634	653	671	690	709	728	746	765	784
Personnel Cost							1246	1285	1324	1363	1402	1441	1480	1519	1558	1597	1636
Phase II																	
Depreciation										3631	3631	3631	3631	3631	3631	3631	3631
Maintenance										1521	1521	1521	1521	1521	1521	1521	1521
Fuel & Others										503	523	543	563	583	603	623	643
Personnel Cost										952	989	1027	1065	1103	1140	1178	1216
Existing System																	
Depreciation	6074	6074	6808	6570	6570	6570	3364	3364	3364								
Maintenance	2629	2629	2944	2883	2883	2883	1453	1453	1453								
Fuel & Others	1167	1208	1249	1287	1327	1367	624	647	671								
Personnel Cost	3267	3381	3495	3547	3658	3769	1741	1806	1871								
Total	13137	13292	14496	17491	17661	17831	17779	17958	18137	17475	18265	18413	18562	19452	19598	19747	19896
Depreciation	6074	6074	6808	8088	8088	8088	8749	8749	8749	9016	9468	9468	9468	9990	9990	9990	9990
Maintenance	2629	2629	2944	3527	3527	3527	3723	3723	3723	3791	3982	3982	3982	4201	4201	4201	4201
Fuel & Others	1167	1208	1249	1539	1584	1628	1487	1537	1587	1446	1492	1538	1585	1632	1678	1725	1772
Personnel Cost	3267	3381	3495	4337	4462	4588	3820	3949	4078	3222	3323	3425	3527	3629	3729	3831	3933
O.M.Cost	7063	7218	7688	9403	9573	9743	9030	9209	9388	8459	8797	8945	9094	9462	9608	9757	9906

2) Preparation of Alternative Financial Plans

The following factors play decisive roles in the successful preparation of a financial plan for the Master Plan.

1. Investment Amount
2. Fee Collection Rate
3. Loan Conditions

(1) Alternative Investment Amounts

Based on the investment plan (Table 11.2-6) and the transition of annual expenses, the money flows for the continued existing system and the proposed system were calculated to present alternative investment amounts.

The sensitivity analysis was then conducted to examine the possible increase or decrease of the investment amount for each alternative.

- With regard to the fee collection rate, the case where a 90% collection rate is reached in 1999 was used.

- The loan conditions employed were as follows.

Foreign Loan	- Repayment Period	:	25 years
	Grace Period	:	7 years
	Interest Rate	:	4%
Local Loan	- Repayment Period	:	20 years
	Grace Period	:	5 years
	Interest Rate	:	5%

The calculation results are given in Table 11.2-9.

(2) Alternative Fee Collection Rates

Three alternatives for the fee collection rate in 1999, representing 90%, 80% and 70% levels respectively, were drafted and compared.

- In regard to the investment amount, the investment plan in the proposed system was applied.

- The loan conditions described in (1) above were applied.

The results are given in Table 11.2-10.

Table S11.2-10 Comparison of Alternatives (Investment) Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Case 1 : Local Loan : Repayment Period = 20 years. Grace Period = 5 years																										
Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	1.5	1.9	3.5	3.5	3.5	7.2	9.4	9.7	9.7	13.9	14.3	14.4	17.1	18.9	18.9	19.3	22.3	21.2
a- interest = 5%																										
Balance	-3.8	-3.1	-4.5	-10.9	-9.1	-7.5	-16.3	-11.3	-4.2	-3.2	0.4	14.4	11.1	8.6	11.2	14.3	15.4	14.3	15.0	15.6	14.1	14.8	15.9	14.9	14.8	16.1
Total Debt	-2	22	63	62	64	129	127	120	162	178	160	125	153	127	95	97	93	68	37	48	18	-20	-15	-28	-66	-98
DSR (%)			0.5	1.2	1.2	1.2	2.4	2.6	2.8	4.1	4.8	4.5	4.3	6.3	6.5	6.1	6.1									
b- interest = 9%																										
Balance	-3.8	-3.1	-4.8	-11.8	-10.0	-8.6	-18.4	-13.4	-6.4	-7.4	-5.0	9.0	5.7	1.0	3.6	6.9	6.8	4.7	5.4	6.3	3.4	4.4	6.4	4.3	4.0	6.2
Total Debt	-2	22	64	63	66	132	132	128	172	192	179	149	183	165	140	149	154	139	117	138	119	91	105	103	76	54
DSR (%)			0.6	1.6	1.5	1.6	3.2	3.3	3.5	5.4	6.4	6.0	5.7	8.2	8.3	7.8	8.0									
c- interest = 11%																										
Balance	-3.8	-3.1	-5.0	-12.2	-10.4	-9.2	-19.5	-14.4	-7.3	-9.5	-7.7	6.3	3.0	-2.9	-0.3	3.2	2.5	-0.1	0.6	1.6	-2.0	-0.7	1.6	-1.0	-1.4	1.2
Total Debt	-2	22	64	64	67	133	135	132	177	199	189	162	198	184	162	175	184	174	157	183	169	146	166	169	147	130
DSR (%)			0.7	1.8	1.7	1.8	3.5	3.7	3.8	6.0	7.1	6.8	6.4	9.2	9.2	8.6	8.9									
Case 2 : Local Loan : Repayment Period = 10 years. Grace Period = 1 years																										
Repayment	0.0	0.0	0.9	2.5	2.5	3.1	5.8	5.8	5.8	12.0	15.7	15.2	13.7	20.6	20.7	18.2	22.7	26.6	22.0	19.1	24.2	24.9	18.0	22.2	24.7	20.3
a- interest = 5%																										
Balance	-3.8	-3.1	-4.5	-10.8	-8.9	-7.2	-15.9	-10.6	-3.3	-2.1	2.1	16.7	13.9	12.0	15.8	20.3	21.3	20.4	20.5	21.3	22.4	21.0	22.1	23.5	22.4	22.5
Total Debt	-2	22	63	62	64	128	126	119	160	175	155	117	143	113	77	74	65	35	-3	2	-35	-80	-83	-103	-149	-189
DSR (%)			0.9	2.2	2.1	2.2	4.1	3.8	3.9	6.8	7.8	7.1	6.2	8.8	8.2	7.0	7.8									
b- interest = 9%																										
Balance	-3.8	-3.1	-4.8	-11.6	-9.6	-8.1	-17.6	-12.1	-4.6	-5.3	-2.0	13.0	10.8	7.0	10.8	26.3	17.6	15.8	15.4	16.8	18.4	15.8	17.5	20.0	17.9	17.8
Total Debt	-2	22	64	63	66	131	130	125	167	185	169	135	164	140	107	108	104	79	46	55	23	-18	-17	-33	-74	-110
DSR (%)			1.0	2.6	2.4	2.5	4.7	4.3	4.3	7.8	9.0	8.1	7.0	10.1	9.3	7.8	8.8									
c- interest = 11%																										
Balance	-3.8	-3.1	-5.0	-12.1	-10.2	-8.5	-18.5	-12.9	-5.2	-7.0	-4.1	11.2	9.3	4.5	8.8	24.3	15.7	13.5	12.9	14.5	16.5	13.2	15.3	18.2	15.6	15.5
Total Debt	-2	22	64	64	67	132	133	128	172	191	178	146	176	154	124	127	125	102	71	82	53	15	17	3	-35	-70
DSR (%)			1.1	2.8	2.5	2.7	5.0	4.6	4.5	8.3	9.6	8.6	7.4	10.7	9.8	8.3	9.3									

(3) Alternative Loan Conditions

In the case of the loan conditions, the following two alternatives were introduced for the local loan for comparative examination.

Case 1 - Repayment Period : 20 years, Grace Period : 5 years
Case 2 - Repayment Period : 10 years, Grace Period : 1 year

In each case, the money flow calculated using three different interest rates.

a. - 5%
b. - 9%
c. - 11%

The results are given in Table 11.2-11.

Table S11.2-11 Comparison of Alternatives (Revenue) Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Case 1 : 90% of Potential																										
Revenue	15.9	16.9	18.0	23.1	25.4	27.6	30.0	35.1	42.1	49.1	56.1	70.2	67.8	69.8	73.0	75.8	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.4
Balance	-3.8	-3.1	-4.5	-10.9	-9.1	-7.5	-16.3	-11.3	-4.2	-3.2	0.4	14.4	11.1	8.6	11.2	14.3	15.4	14.3	15.0	15.6	14.1	14.8	15.9	14.9	14.8	16.1
Total Debt	-2	22	63	62	64	129	127	120	162	178	160	125	153	127	95	97	93	68	37	48	18	-20	-15	-28	-66	-98
Case 2 : 80% of Potential																										
Revenue	15.9	16.9	18.0	23.1	25.4	27.6	30.0	33.8	39.5	45.3	51.0	63.4	60.9	62.6	65.5	67.9	70.2	70.2	70.2	70.2	70.2	70.2	70.2	70.2	70.2	70.2
Balance	-3.8	-3.1	-4.5	-10.9	-9.1	-7.5	-16.3	-12.6	-6.8	-7.0	-4.7	7.6	4.2	1.4	3.7	6.4	7.2	6.1	6.8	7.4	5.9	6.6	7.7	6.7	6.6	7.9
Total Debt	-2	22	63	62	64	129	127	122	166	186	173	144	180	161	136	146	150	134	110	130	108	79	92	87	57	33
Case 3 : 70% of Potential																										
Revenue	15.9	16.9	18.0	23.1	25.4	27.6	30.0	32.4	37.0	41.4	45.8	56.8	54.7	56.1	58.8	60.9	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
Balance	-3.8	-3.1	-4.5	-10.9	-9.1	-7.5	-16.3	-14.0	-9.3	-10.9	-9.9	1.0	-2.0	-5.1	-3.0	-0.6	-1.0	-2.1	-1.4	-0.8	-2.3	-1.6	-0.5	-1.5	-1.6	-0.3
Total Debt	-1	25	68	69	74	141	143	140	186	207	194	166	201	182	157	166	170	153	130	149	127	97	110	104	74	50

Table S11.2-12 Comparison of Alternatives (Loan Condition) Unit: Rp. billion

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Case 1 : Existing System																										
Investment	1.1	31.2	34.0	0.0	8.5	61.5	0.6	0.0	77.4	43.8	7.2	4.8	71.7	6.3	7.2	73.1	47.8	8.8	3.2	64.9	0.0	0.0	64.1	32.7	0.0	0.0
a- with Budget from DKI for Investment																										
Balance	-3.8	-3.1	-4.4	-8.7	-5.8	-4.2	-17.4	-12.4	-5.4	-13.6	-11.0	2.9	-1.7	-3.4	-0.4	2.5	1.9	0.4	1.6	2.3	0.1	1.2	2.5	0.5	0.2	1.6
Total Debt	-2	21	48	45	44	94	94	89	149	178	160	138	179	157	133	172	186	163	138	174	148	120	156	162	135	108
DSR (%)			1.1	2.4	2.4	2.5	5.5	6.0	7.0	12.0	15.1	14.9	16.7	24.6	26.7	26.3	29.0									
b- without Budget from DKI for Investment																										
Balance	-3.8	-3.1	-4.7	-9.2	-6.3	-5.0	-18.4	-13.4	-6.4	-14.8	-12.4	1.3	-3.5	-8.1	-8.0	-10.2	-9.2	-2.8	-3.0	-3.2	4.0	5.2	3.6	6.1	10.6	7.7
Total Debt	-1	27	59	57	61	117	119	115	181	216	210	189	237	222	205	251	272	256	230	283	263	240	283	287	276	253
DSR (%)			1.4	2.9	2.9	3.4	6.9	7.8	8.7	14.2	17.8	17.9	19.8	28.3	30.9	30.9	34.1									
Case 2 : Proposed System																										
Investment	1.0	32.4	48.4	0.0	10.4	74.1	0.7	4.1	60.6	38.0	9.1	6.0	66.9	11.3	7.3	45.1	40.2	18.7	11.9	55.4	12.3	3.5	49.0	33.1	4.0	12.2
a- with Budget from DKI for Investment																										
Local Loan																										
Balance	-3.8	-3.1	-4.5	-10.9	-9.1	-7.5	-16.3	-11.3	-4.2	-3.2	0.4	14.4	11.1	8.6	11.2	14.3	15.4	14.3	15.0	15.6	14.1	14.8	15.9	14.9	14.8	16.1
Total Debt	-2	22	63	62	64	120	127	120	162	178	160	125	153	127	95	97	93	68	37	48	18	-20	-15	-28	-66	-98
DSR (%)			0.5	1.2	1.2	1.2	2.4	2.6	2.8	4.1	4.8	4.5	4.3	6.3	6.5	6.1	6.1									
b- without Budget from DKI for Investment																										
Local Loan																										
Balance	-3.8	-3.1	-4.7	-11.4	-9.6	-8.3	-17.3	-12.3	-5.4	-4.6	-1.1	12.3	9.1	6.5	8.9	11.9	12.8	11.7	12.3	12.8	11.3	12.0	13.2	12.1	12.0	13.3
Total Debt	-1	28	74	74	81	152	152	150	198	221	209	181	216	197	172	181	185	168	144	164	142	110	122	117	86	62
DSR (%)			0.6	1.4	1.4	1.5	2.9	3.2	3.4	4.8	5.6	5.4	5.2	7.3	7.6	7.3	7.3									

11.3 Financial Assessment in Feasibility Study

This section will study and assess the possibility of the Project's attaining self-financing capability by year 2005 through Improvement in fee collection.

As criteria for assessment of prospects for this self-financing capability, the following three points should be met:

a. The balance of revenue and expenditure should be improved in favor of revenue by about 2000.
b. The operation should be capable of paying debt service for both foreign and domestic loans every year.
c. DKI's burden should be gradually be reduced. At the same time, the total debt in 2005 should be reduced as much as possible, or eventually to less than half of the original total debt level.

However, prospects for attaining self-financing capability may greatly vary depending on the following conditions:

a. Revenue
b. Loan conditions
c. Other conditions

There are numerous possible combinations of these conditions, making the judgement of the calculation results extremely difficult. The present examination is, therefore, based on Table 11.3-1.

Firstly, the comparison between the proposed system and the continued existing system is made. The cash flow for the case where the improvement of the collection is made but the transfer station is not introduced was also calculated.

According to the calculation results given in Table 11.3-2, the case involving only the collection improvement is slightly superior to the other cases in terms of the financial evaluation. However, the difference in the respective total balances is not large enough for the merits of the transfer station to be disregarded, i.e. its relatively high economic evaluation result among the facilities related to solid waste management and the achievement of stable solid waste collection. Therefore, the following analysis is based solely on the proposed system.

Table11.3-1 Study Cases for Financial Evaluation

Case / Condition			
Projects contents	A:Existing System	**B:Proposed System**	C:Improved System
Revenue			
Basic Fees	1:100% of potential	**2:90% of potential**	3:Gradual improvement
Start Time of Surcharge on Electricity Fee	1:1992	**2:1993**	3:1995
Tipping Fees	**1:100%**	2:No Fee from other Wilayah	3:No fee from Bekasi / 4:Discountsd fee from Bekasi
Loan conditions			
Repayment period			
Local loan	**1:20 years**	2:18 years	3:16 years / 4: 14years / 5:12 years / 6:10 years
Grace period	**5 years**	4 years	3 years / 2 years / 1 years / 1 years
Interst			
Local loan	1: 0%	**2: 5%**	3: 9% / 4:11% / 5:18%
Other factors			
Implementation Programs	**1:Proposed Program**	2:No Investment from DKI	3:Divide the first stage
Personnel Cost	**1:Constant relatively**	2:Rapid increase	3:20% highre than asumes
Fee Collection cost	**1:Proposed commission rate**	2:20% higher than assumes	

Table 11.3-2 Comparison of Alternatives (Investment)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case A : Existing System																		
Investment	0.0	8.2	34.8	0.0	0.0	0.0	1.6	0.0	5.0	36.7	2.0	0.0	0.0	0.0	2.0	0.0	0.0	90.3
Balance	0.0	0.0	-0.4	-3.0	-2.8	-2.7	-2.6	-1.9	-1.7	-1.7	-4.9	-1.8	-2.0	-1.7	-1.3	-0.9	-0.5	-30.0
Total Debt	0.0	8	38	36	34	31	30	26	28	61	61	56	52	47	44	38	32	
DSR (%)	0.0	0.0	0.2	0.7	0.6	0.6	0.7	0.8	0.9	1.3	1.7	1.6	1.5	1.5	2.0	1.9	1.9	1.8
Case B : Proposed System																		
Investment	0.0	20.0	44.5	0.0	0.0	0.0	1.3	0.0	5.0	30.4	1.6	0.0	0.0	0.0	1.6	0.0	0.0	104.4
Balance	0.0	0.0	-0.9	-3.7	-3.4	-3.2	-3.1	-2.2	-1.9	-1.8	-4.0	-0.7	-0.7	-0.2	0.3	0.8	1.4	-23.4
Total Debt	0	20	60	58	55	52	50	46	46	72	71	64	58	51	46	38	29	
DSR (%)	0.0	0.0	0.4	1.0	1.0	1.0	1.1	1.2	1.4	1.9	2.2	2.1	1.9	1.9	2.3	2.1	2.0	
Case C : Improved System																		
Investment	0.0	8.2	38.4	0.0	0.0	0.0	1.8	0.0	5.0	41.0	2.2	0.0	0.0	0.0	2.2	0.0	0.0	99.0
Balance	0.0	0.0	-0.4	-2.3	-2.1	-1.9	-1.8	-0.9	-0.7	-0.6	-5.1	-1.9	-2.0	-1.6	-1.1	-0.6	-0.1	-23.0
Total Debt	0	8	42	39	35	31	28	24	23	59	59	53	47	41	36	29	21	
DSR(%)	0.0	0.0	0.2	0.7	0.7	0.6	0.7	0.9	0.9	1.4	1.9	1.8	1.7	1.7	2.2	2.1	2.0	

1) Alternatives for revenue

Collected fees will be, as a rule, applied to funds for operation of the Project. However, the budget from DKI will be used for public services such as road sweeping.

Fees will basically be collected by adding them to electric charges. They will be charged according to tariffs shown in the Master Plan. As potentials, revenues as shown in Table 11.3-3 can be earned as population in Jakarta Pusat increases and real income rises.

When calculating potentials, the spread of electrification and water supply service was taken into consideration and the following rates were multiplied according to income level:

Households	
High	95%
Middle	80%
Low	50%
Commercial	90%

However, there are many uncertain factors including the time for introduction of this indirect collection system and the rate of collectible fees. Therefore, the following cases are studied for the purpose of financial analysis:

(1) Collection through electric charges will be started from 1992, with 30% of the potentials as the collection rate. This rate will gradually be increased until it reaches 90% by 1999. (Case 1)

(2) Collection through electric charges will be put into effect with the commencement of the Project in 1992. The collection rate will be set at 90% of the potentials also from the beginning. (Case 2)

(3) The start of collection through electric charges will be changed to, for example, 1995. In this case, the basic rate will not be collected until the indirect collection system is introduced. (Case 3, Case 4)

There is much uncertainty about the amount of waste discharged from commercial establishments that is mixed into household waste, due to lack of basic data. Anyway, no particular alternative plans have been made for this type waste because the cost involved is relatively small.

The results are shown in Table 11.3-4. The best case is apparently that the surcharge on the electricity bill be introduced in 1992. However, the transition from the present fee collection system to the new system by 1992 will be rather difficult. As a result, the second best case where the new fee collection system is introduced in 1993 is examined.

Special fees for door-to-door service (including establishments that discharge amount waste), or tipping fees for direct delivery of waste to a transfer station or a final disposal site will basically be collected through electric charges on a contract base.

The difference in the time for start of collection will be studied when the above alternatives for collection of basic rates are reviewed. In this section, therefore, assuming fees will be collected 100%, starting with the commencement of operation, the following cases will be examined:

(1) No fee collection from Bekasi will be made. (Case 1)
(2) From other Wilayah and Bekasi of potentials will be collected as the tipping fee. (Case 2)
(3) As the tipping fee, 100% of potentials will be collected from other Wilayah and 50%, from Bekasi (Case 3)

To profitability of the above three is not good respectively as shown in Table 11.3-5.

From DKI, a budget equivalent to the amount currently appropriated for waste management operation in Jakarta Pusat should initially be allocated. This budget should gradually be reduced.

1992 - 1995	Rp. 2.2 billion
1996 - 2000	Rp. 1.1 billion
2001 -	Rp. 0.6 billion (to be used for street sweeping)

Table 11.3-3 Conditions for Fee Collection

	1992	1995	200	2005
Assumed				
No. of Household	303,100	310,000	323,130	336,260
High income	60,868	74,900	115,075	155,250
(Door-to-door Service)	(24,589)	(25,128)	(26,191)	(27,257)
Middle income	156,495	167,700	154,753	141,770
Low income	85,736	67,400	53,320	39,240
No. of Companies	7,500	7,936	8,610	9,284
Solid waste (ton/day)				
from Large Dischargers	288	315	382	450
direct to T/S from Pusat	186	200	245	290
direct to T/S : other than Pusat	491	420	210	0
direct to F/D	238	340	610	880
Potential (Rp.million)				
Basic Fees				
Household Collection				
High income (95%)	1,387	1,709	3,935	5,311
Middle income (80%)	1,052	1,127	1,560	1,428
Low income (50%)	154	121	106	78
Company Collection (90%)	486	514	837	902
Special Fees				
Households (Door-to-door Servic by Dinas Kebersihan)	590	603	943	981
Large Dischargers	2,088	2,300	4,183	4,896
Tipping Fees				
direct to T/S from Pusat	679	730	1,341	1,588
direct to T/S : other than Pusat	1,792	1,533	1,150	0
direct to F/D	434	621	1,670	2,409
Total	8,682	9,258	15,725	17,595

Table 11.3-4 Cpmparison of Altenatives (Basic Fee)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case 1 : Gradual Improvement on Basic Fee																		
Basic Fee	0.0	0.0	0.0	0.9	1.1	1.4	1.7	2.4	3.0	3.7	4.5	5.8	6.0	6.3	6.5	6.7	6.9	56.9
Balance	0.0	0.0	-0.9	-5.7	-5.4	-5.1	-4.8	-4.0	-3.3	-2.8	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-39.9
Total Debt	0	20	60	60	59	58	57	55	57	84	83	77	72	66	61	53	46	
Case 2 : Surcharge Electric Fee on 1992 : 90% of Potential																		
Basic Fee	0.0	0.0	0.0	2.8	2.9	3.0	3.1	3.9	4.1	4.3	4.5	5.8	6.0	6.3	6.5	6.7	6.9	66.8
Balance	0.0	0.0	-0.8	-4.0	-3.7	-3.6	-3.4	-2.6	-2.3	-2.2	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-30.4
Total Debt	0	20	60	58	55	53	51	47	48	75	74	68	62	56	51	44	36	
Case 3 : Surcharge Electric Fee on 1993 : 90% of Potential																		
Basic Fee	0.0	0.0	0.0	0.0	2.9	3.0	3.1	3.9	4.1	4.3	4.5	5.8	6.0	6.3	6.5	6.7	6.9	66.8
Balance	0.0	0.0	-0.8	-6.6	-3.8	-3.6	-3.4	-2.6	-2.3	-2.2	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-30.4
Total Debt	0	20	60	61	58	55	54	50	51	77	76	71	65	59	54	47	39	
Case 4 : Surcharge Electric Fee on 1995 : 90% of Potential																		
Basic Fee	0.0	0.0	0.0	0.0	0.0	0.0	3.1	3.9	4.1	4.3	4.5	5.8	6.0	6.3	6.5	6.7	6.9	66.8
Balance	0.0	0.0	-0.8	-6.6	-6.6	-6.6	-3.6	-2.6	-2.3	-2.2	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-30.4
Total Debt	0	20	60	61	61	61	60	56	57	83	82	77	71	65	60	53	45	

Table 11.3-5 Cpmparison of Altenatives (Tipping Fee)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case 1 : No Tipping Fee from other Wilayah																		
Tipping Fee	0.0	0.0	0.0	1.1	1.2	1.3	1.4	1.8	1.9	2.1	2.3	3.0	3.2	3.4	3.6	3.8	4.0	34.0
Balance	0.0	0.0	-0.9	-8.3	-5.7	-5.4	-5.0	-4.2	-3.7	-3.4	-5.5	-2.4	-2.2	-1.6	-0.1	-0.9	0.7	-48.7
Total Debt	0	20	60	62	62	61	61	59	61	89	89	84	79	74	69	62	55	
Case 2 : No Tipping Fee from Bekasi																		
Tipping Fee	0.0	0.0	0.0	2.5	2.4	2.3	2.3	2.6	2.4	2.3	2.1	2.3	2.3	2.1	1.9	1.8	1.6	31.0
Balance	0.0	0.0	-0.8	-7.0	-4.4	-4.1	-4.0	-3.4	-3.2	-3.3	-5.6	-3.1	-3.1	-2.8	-2.4	-2.1	-1.6	-51.0
Total Debt	0	20	60	61	59	57	56	53	55	82	82	78	75	70	67	62	57	
Case 3 : Discounted Tipping Fee from Bekasi																		
Tipping Fee	0.0	0.0	0.0	2.7	2.6	2.6	2.6	3.0	2.9	2.8	2.7	3.3	3.2	3.1	3.0	2.9	2.8	40.4
Balance	0.0	0.0	-0.8	-6.8	-4.1	-3.8	-3.7	-3.0	-2.8	-2.7	-5.1	-2.1	-2.2	-1.8	-1.4	-1.0	-0.5	-42.0
Total Debt	0	20	60	61	59	56	55	52	53	80	79	75	70	65	61	54	48	

The amount of fee collected will be calculated as shown in Fig. 11.3-1 corresponding to the amount of waste collected.

2) Alternatives of investment funds and loan conditions

Both foreign and domestic loans will basically be used as the source of funds for initial investment.

The results are shown in Table 11.3-6 and 11.3-7. It can be seen from these results that the shorter the period is, the quicker the decrease of the total debt or the smaller the total balance. However, there is little difference between Case 5 and Case 6.

The profitability apparently declines in accordance with the rise of the interest rate. In particular, the total debt will remain at almost the original level when the interest rate exceeds 10%.

For loans, the following conditions will basically be considered;

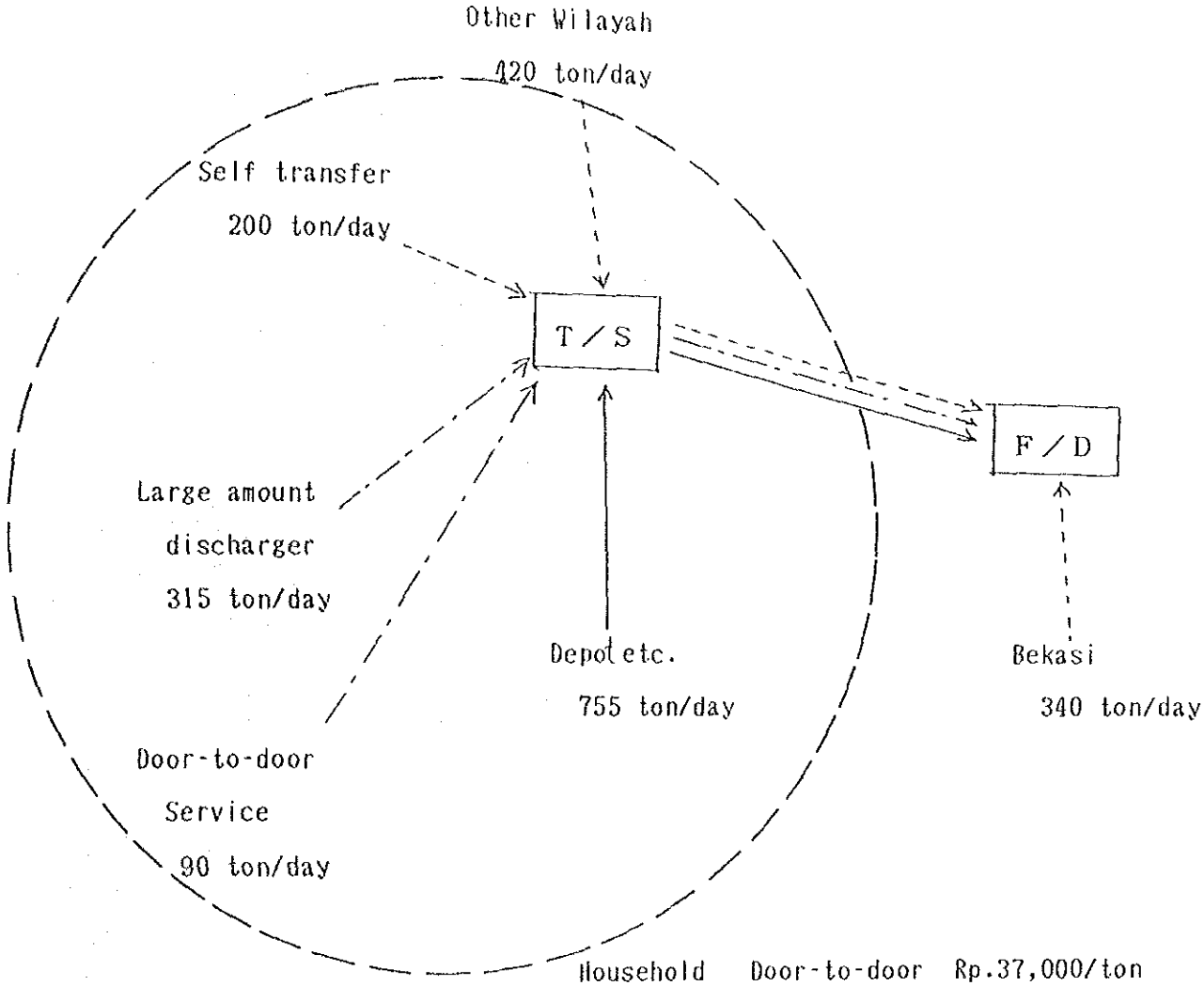
	Repayment	Market interest	Real interest
Foreign loans	25 years with grace period of 7 years	8%	4%
Domestic loans			
RDI	20 years with grace period of 5 years	10%	5%
BPD	Short-term borrowings (to be repaid in following year)	18%	12%

3) Other Conditions

With regard to other conditions, the financial burden at the time of the Project implementation and the division of Phase I and resulting expenditures are examined.

The results are shown in Table 11.3-8 . The division of Phase I will endanger the possibility of earning tipping fees on the waste from other Wilayahs, slightly reducing the profitability.

Fig. 3.3-1 Fee Collected and Amount of Waste



Household	Door-to-door	Rp.37,000/ton
Basic Service		Rp.11,000/ton
Large discharger		Rp.20,000/ton
T / S		Rp.10,000/ton
F / D		Rp. 5,000/ton

Table 11.3-6 Comparison of Alternatives (Loan Condition : Repayment Period)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case 1 : Local Loan : Repayment Period = 20 years, Grace Period = 5 years																		
Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.1	1.8	3.5	3.5	3.6	3.6	3.9	5.9	6.0	6.0	37.1
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.6	-3.4	-2.6	-2.3	-2.2	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-33.2
Total Debt	0	20	60	61	58	55	54	50	51	77	76	71	65	59	54	47	39	
DSR (%)			0.4	1.0	1.0	0.9	1.1	1.2	1.4	1.9	2.2	2.1	1.9	1.9	2.3	2.1	2.0	
Case 2 : Local Loan : Repayment Period = 18 years, Grace Period = 4 years																		
Repayment	0.0	0.0	0.0	0.0	0.0	0.6	1.2	1.2	1.2	1.8	3.7	3.7	4.0	6.2	6.3	6.3	6.3	42.4
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.6	-3.4	-2.6	-2.2	-2.1	-4.4	-1.2	-1.3	-0.8	-0.2	0.3	0.9	-31.9
Total Debt	0	20	60	61	58	55	54	50	51	77	76	70	65	58	53	46	38	
DSR (%)			0.4	1.0	1.0	1.1	1.3	1.2	1.4	1.9	2.2	2.1	2.0	2.4	2.3	2.1	2.0	
Case 3 : Local Loan : Repayment Period = 16 years, Grace Period = 3 years																		
Repayment	0.0	0.0	0.0	0.0	0.6	1.3	1.3	1.3	1.3	2.0	3.8	4.1	6.5	6.6	6.6	6.6	6.6	48.6
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.5	-3.3	-2.5	-2.1	-2.1	-4.3	-1.2	-1.2	-0.6	0.1	0.6	1.2	-30.2
Total Debt	0	20	60	61	58	55	54	50	51	77	76	70	64	58	52	44	36	
DSR (%)			0.4	1.0	1.0	1.4	1.3	1.2	1.4	1.9	2.2	2.2	2.7	2.5	2.3	2.1	2.0	
Case 4 : Local Loan : Repayment Period = 14 years, Grace Period = 2 years																		
Repayment	0.0	0.0	0.0	0.7	1.4	1.4	1.4	1.4	1.5	2.1	4.3	6.8	7.0	7.0	7.0	6.3	5.7	53.8
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.6	-3.2	-2.4	-2.1	-2.0	-4.2	-1.0	-0.9	-0.3	0.4	0.9	1.5	-28.2
Total Debt	0	20	60	61	58	56	54	50	51	77	75	69	63	56	51	43	34	
DSR (%)			0.4	1.0	1.0	1.4	1.3	1.3	1.4	1.9	2.4	2.9	2.7	2.5	2.3	2.0	1.8	
Case 5 : Local Loan : Repayment Period = 12 years, Grace Period = 1 years																		
Repayment	0.0	0.0	0.8	1.5	1.5	1.5	1.5	1.6	1.6	2.7	7.2	7.4	7.4	6.8	5.9	6.0	6.0	59.3
Balance	0.0	0.0	-0.9	-6.7	-4.0	-3.7	-3.3	-2.3	-2.0	-1.9	-4.1	-0.7	-0.6	0.1	0.7	1.2	1.8	-26.4
Total Debt	0	20	60	61	58	56	54	50	51	77	75	69	63	56	49	41	32	
DSR (%)			0.4	1.0	1.0	1.4	1.4	1.3	1.5	2.1	3.2	3.0	2.8	2.4	2.0	1.9	1.7	
Case 6 : Local Loan : Repayment Period = 10 years, Grace Period = 1 years																		
Repayment	0.0	0.0	0.8	1.5	1.5	1.5	1.5	1.6	1.6	2.7	7.2	7.4	7.4	6.8	5.9	6.0	6.0	59.3
Balance	0.0	0.0	-0.9	-6.7	-4.0	-3.7	-3.3	-2.3	-2.0	-1.9	-4.1	-0.7	-0.6	0.1	0.7	1.2	1.8	-26.4
Total Debt	0	20	60	61	58	56	54	50	51	77	75	69	63	56	49	41	32	
DSR (%)			0.4	1.0	0.9	1.5	1.4	1.4	1.5	2.2	3.4	3.0	2.5	2.3	2.1	2.0	1.8	

Table 11.3-7 Comparison of Alternatives (Loan Condition : Interest)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case 1 : Local Loan : Interest = 0%																		
Interest	0.0	0.0	0.5	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	21.7
Balance	0.0	0.0	-0.5	-5.7	-2.9	-2.7	-2.6	-1.7	-1.5	-1.2	-2.0	1.2	1.1	1.5	1.9	2.3	2.7	-10.3
Total Debt	0	20	60	59	56	52	50	45	46	71	67	59	51	43	35	26	16	
DSR (%)			0.2	0.7	0.7	0.6	0.8	0.9	1.1	1.6	1.5	1.4	1.3	1.3	1.7	1.6	1.5	
Case 2 : Local Loan : Interest = 5%																		
Interest	0.0	0.0	0.9	2.7	2.7	2.5	2.5	2.6	2.5	2.7	4.1	4.0	3.8	3.7	3.5	3.3	3.0	44.6
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.6	-3.4	-2.6	-2.3	-2.2	-4.5	-1.3	-1.4	-0.9	-0.4	0.1	0.7	-33.2
Total Debt	0	20	60	61	58	55	54	50	51	77	76	71	65	59	54	47	39	
DSR (%)			0.4	1.0	1.0	0.9	1.1	1.2	1.4	1.9	2.2	2.1	1.9	1.9	2.3	2.1	2.0	
Case 3 : Local Loan : Interest = 9%																		
Interest	0.0	0.0	1.2	3.4	3.5	3.3	3.2	3.3	3.2	3.5	6.0	6.0	5.8	5.6	5.4	5.1	4.7	63.0
Balance	0.0	0.0	-1.2	-7.3	-4.6	-4.3	-4.1	-3.3	-2.9	-3.0	-6.5	-3.3	-3.3	-2.8	-2.3	-1.7	-1.0	-51.6
Total Debt	0	20	61	62	60	58	57	54	56	83	84	80	76	72	69	64	57	
DSR (%)			0.5	1.3	1.2	1.2	1.3	1.5	1.6	2.1	2.8	2.6	2.5	2.4	2.7	2.5	2.3	
Case 4 : Local Loan : Interest = 11%																		
Interest	0.0	0.0	1.4	3.7	3.9	3.7	3.5	3.6	3.5	3.9	7.0	7.0	6.9	6.8	6.6	6.6	6.3	74.4
Balance	0.0	0.0	-1.4	-7.7	-5.0	-4.7	-4.4	-3.6	-3.3	-3.4	-7.4	-4.3	-4.4	-4.0	-3.5	-3.2	-2.6	-63.0
Total Debt	0	20	61	62	61	59	59	56	58	86	88	85	82	79	77	73	69	
DSR (%)			0.6	1.4	1.4	1.3	1.4	1.6	1.7	2.2	3.0	2.9	2.7	2.6	2.9	2.7	2.5	
Case 5 : Local Loan : Interest = 18%																		
Interest	0.0	0.0	2.0	4.9	5.2	5.3	5.2	5.4	5.2	6.0	11.5	12.5	12.9	13.5	14.0	14.7	15.2	133.4
Balance	0.0	0.0	-2.0	-8.9	-6.4	-6.3	-6.1	-5.4	-5.0	-5.5	-11.9	-9.8	-10.4	-10.7	-10.9	-11.3	-11.5	-122.1
Total Debt	0	20	61	64	64	64	65	64	68	98	104	107	110	114	119	123	128	
DSR (%)			0.8	1.5	1.4	1.3	1.5	1.6	1.7	2.4	4.2	4.0	3.7	3.6	3.8	3.6	3.3	

Table 11.3-8 Comparison of Alternatives (Loan Condition : Other Factors)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Case 1 : Devide the first stage of Implementation Program																		
Investment	0.0	17.4	40.2	0.0	3.1	4.8	1.3	0.0	5.2	30.3	1.6	0.0	0.0	0.0	1.6	0.0	0.0	105.4
Balance	0.0	0.0	-0.8	-7.1	-4.4	-4.2	-3.4	-2.7	-2.4	-2.3	-4.6	-1.4	-1.5	-1.0	-0.5	-0.0	0.6	-35.6
Total Debt	0	17	53	55	57	60	59	55	56	82	81	76	70	64	59	52	45	
DSR (%)			0.3	0.9	0.9	0.9	1.1	1.2	1.3	1.8	2.1	2.1	2.0	1.9	2.3	2.1	2.0	
Case 2 : Personnel Cost : Rapid increase 2% relatively																		
Personnel Cost	0.00	0.00	0.00	1.67	1.71	1.74	1.78	1.81	1.85	1.89	2.23	2.28	2.32	2.37	2.42	2.47	2.52	29.1
Balance	0.0	0.0	-0.9	-6.6	-3.9	-3.6	-3.5	-2.8	-2.5	-2.4	-4.8	-1.7	-1.7	-1.3	-0.9	-0.4	0.1	-36.9
Total Debt	0	20	60	61	58	56	54	50	52	78	77	72	67	61	57	50	43	
Case 3 : Personnel Cost : 20% higher than assumes																		
Personnel Cost	0.00	0.00	0.00	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.33	2.33	2.33	2.33	2.33	2.33	2.33	30.4
Balance	0.0	0.0	-0.9	-7.0	-4.2	-3.9	-3.7	-2.9	-2.6	-2.6	-4.9	-1.7	-1.8	-1.3	-0.8	-0.3	0.3	-38.3
Total Debt	0	20	60	61	59	57	55	52	53	80	79	74	69	63	58	52	44	
Case 4 : Fee Collection Cost : 20% higher than assumes																		
Fee Collection Cost	0.00	0.00	0.00	0.34	0.51	0.52	0.54	0.66	0.68	0.69	0.71	0.91	0.93	0.95	0.97	0.99	1.01	10.4
Balance	0.0	0.0	-0.9	-6.7	-4.0	-3.6	-3.5	-2.7	-2.4	-2.3	-4.6	-1.5	-1.5	-1.1	-0.6	-0.1	0.5	-35.0
Total Debt	0	20	60	61	58	56	54	51	52	78	77	72	66	60	55	48	41	

Although the increases expenses will also have an adverse effect on the profitability, the damage will be less than that caused by a decreased income.

4) Other sensitivity analyses

In addition to the study of the alternatives as above, sensitivity analyses were made of the amount of investment in operation, revenue from fees, and interest. Results are given in Figs.

From these results, it is obvious that reduction in the amount of investment in operation and increase in efficiency of fee collection are a key to the Project's success.

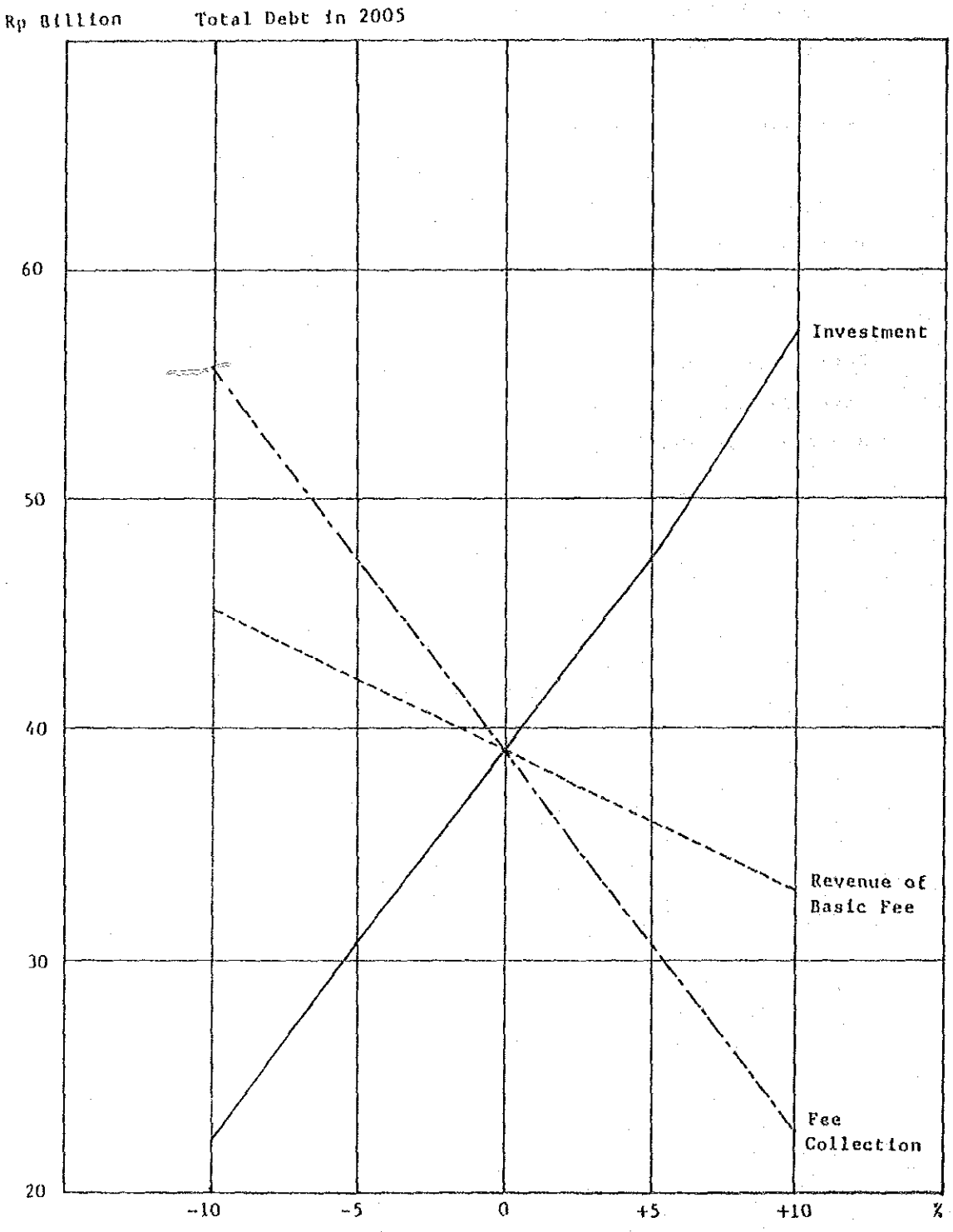


Fig. 11.3-2 Sensitivity Analysis

REFERENCE

11. Reference 1

Selection of Fee Collection System

By Dr.Fajar
Retribution Section
DKI Jakarta

For 1986/1987 Dinas Kebersihan has been targetted Rp. 400,000,000 for solid waste fee. The fee amount is charged on solid waste collection service to shops, households, industry, RT/RW.

According to estimation, the solid waste fee can be achieved 75% only. In Fig. 1-1-7 of JICA-Interim Report (II), there is informal-money flow.

According to this report, the first weakness is about the leakage in the sector of household fee collected through RT/RW. On the other hand most of services have been given by Dinas Kebersihan to this sector.

Furthermore, revenue from industry, shops and others need reinforcement (effectiveness).

In connection with the weakness as abovementioned, it indicates a necessity of creating a system which exterminates the "informal-money flow" and can increase the revenue from this sector.

For achieving the objective, we give a view of some systems intensifying the solid waste fee collection.

Some Solid Waste Fee Collection Systems
Specially for Household with Advantages & Disadvantages

	Collection System	Advantages	Disadvantages
I	Through PLN (Electricity Corporation) The Fee Collection is connected with the bill of electricity-fee, so each customer who will pay electricity-bill must also pay the the cleansing fee at the same bill.	1. As we know, almost all of citizens have been using electricity, so this system will be more effective. 2. Facilitating the charge of tariff in base on area classification/category. 3. Generally, the citizens do not care about the amount of electricity-fee which they pay, except the fee is strikingly increasing, in view that the cleansing fee tariff for household is relatively small, around Rp. 3000 to Rp. 250 per month, so the collection of cleansing fee by connecting with the electricity tariff of each household which is using electric power is very effective because the increasing (additional) amount is not so influential. 4. It is less possible for the customer to neglect payment because they are afraid of electricity current to be cut.	1. Consequence of service shall be really enjoyed by the citizen individually. 2. Planning, implementation and supervision are quite requested. What have been programmed and what really happen in the practice shall be evaluated as a routine supervision function. Demand of community shall become an indicator, because the dissatisfaction of service will be claimed by them as they have a right after having made payment. 3. In order to achieve adequate service, the increase of budget is needed (Personnel & equipment maintenance). 4. A good and comprehensive administration process between Dinas Kebersihan, PLN, Kas Daeral (Treasurer) is necessary in order to intensify implementation of fee collection and supervision. 5. Since the citizens have already paid this fee to the Government, thus RT/RW which have been previously as fee-collectors will limit/ decrease their active participation, perhaps they will not collect the garbage from households by RT/RW handcarts. 6. Possibly, if such payment-function system is implemented, PLN will rather suffer a loss because some of the customers (consumers) will not pay electricity-bill (even they are willing to pay their electricity fee) because they refuse to pay cleansing fee. Is this case acceptable by PLN?

	Collection System	Advantages	Disadvantages
II	Through RT/RW Kelurahan Cleansing fee for household is implemented by RT/RW and then deposit the collected money to Local Government Treasurer/or Local Government-Bank	1. There is a joint (mutual) supervision on environment cleansing between Dinas Kebersihan and RT/RW, because in this case, RT/RW are officially involved directly in fee collection. So, environment-cleansing will be realized soon because the direct involvement of RT/RW is one of supporting factors in managing environment cleanliness. 2. There will be a fairness in the fee collection because selection of charging tariff to each household is done by the RT/RW for which the RT/RW have known more about condition/ affordability of their citizen. 3. By involving directly the RT/RW in fee collection has a positive effect because there will be an employment vacancy in their area as a result of concrete service given to the community. This vacancy will be available for handcart-workers and sweepers. These workers can not be replaced by the workers of Dinas Kebersihan because it needs a big expenditure and a long time.	1. Difference of tariff for the citizen may be different from official tariff and usually it is combined with collection of security-fee and other RT/RW activities, so it will be more variable. Determination of this tariff may be mostly decided by mutual negotiation of RT/RW or citizen members. 2. It is necessary to think about incentive of RT/RW because they are directly making income for Government. 3. Personnels of RT/RW are generally consisting of government officials, thus, their time is limited only in the afternoon/evening, except on Sunday/holidays, so, direct deposit by RT/RW to Local Treasurer/Local Gov. Bank will have a hindrance. 4. Process and procedure which shall be clear and officially issued by Government decision about the involvement of RT/RW in the implementation of this fee collection, up to the duty and responsibility of fee collection, deposit to the Government and the control of environment cleansing. 5. It needs guidance activities for creating a community who understand a responsibility relating to environment cleanliness.

Collection System	Advantages	Disadvantages
		6. Lurah (Chief and Staff of Kelurahan) are in charge of the success of fee collection, RT/RW are the partners of Lurah in carrying out government administration in their local area, so they are closer to Lurah than to Dinas Kebersihan or other institutions. 7. Since the RT/RW are not the staff of Government, thus for the success of this fee collection, it must be firstly negotiated, so there shall not be any command/ instruction officially. 8. Implementation of fee collection by RT/RW is only limited to residential area (household), and they can not get fee-payers in the shopping/commercial centres.

	Collection System	Advantages	Disadvantages
III	Through Local-Government Treasurer/ Local Government Bank (Kas Daeral/BPD) Each fee-payer is obliged to pay directly to Local Gov. Treasurer/Local Gov. Bank.	1. For this system, there shall be a payment place which is not far from the place of the payers in order to make the citizen easy for paying their fee due to theshort-distance. 2. Local Gov. Treasurer is a Local Government division which is in charge of being as a Treasurer for receiving/collecting fee as a Local-Government revenue. BPD is a Local Government Bank which is operating in banking business under the property of Local Government Payment of fee from the citizen to Local Treasurer/Local Gov. Bank is a kind of citizen's self-confidence to the Government (psychologically). 3. It has a positive effect in creating a discipline, high consciousness, and responsibility (tax-minded). 4. To eliminate the citizen's opinion, that the fee income will be misused (corrupted) by the collector/ executive.	1. For the success of fee-income, number of Local-Gov. Treasurer/local Gov. Bank shall be increased up to the level of Kelurahan because if the number is not sufficient, this system will be less successful. 2. Due to the need of many payment-places (fee payment point), so there must be more recruitment of personnels in proportion to the necessity. 3. High discipline and consciousness of the citizen is absolutely needed because the citizens are obliged to pay their fee to the Local Treasurer/Local Bank, not visited by collectors. 4. Up to now, good payers are smaller than bad-payers, it means the discipline and responsibility of the citizen in paying their fee as their obligation is still very low, thus, the fee-payment can be only received by the Government if the fee-payers are visited by collector. For making a tax-minded condition, a correct guidance shall be really conducted. 5. Discipline can not be created if there is no any sumction (penalty), which is a kind of citizen's burden.

	Collection System	Advantages	Disadvantages
IV	Through PDAM (City Water Corporation) Collection of Cleansing-Fee is connected with City-Water Bill. Each City Water Consumer (Customer) who pays city water fee must also pay cleansing-fee at the same bill.	1. Considering the status of PDAM and organizational structure of DKI-Jakarta Government and comparing to the structure/status of PLN (Electricity Corporation), the PDAM is directly under the Governor of DKI Jakarta but PLN is under another Department (Ministry). So, if the fee payment is connected with City Water fee, it will be better if it is compared to connecting with PLN in view of administration process, because the completion of administration with city water will be more simplified (sooner). 2. Other advantages are almost the same as PLN system.	1. Based on our unofficial observation, number of PLN consumers is bigger than PDAM (but we still have no accurate data), it means that there is only a small part of cleansing fee payers which can be handled if we use PDAM as a fee collection system, so it is not in proportion to the area of service given by Dinas Kebersihan to the citizen. 2. Like the PLN system, the service shall be really enjoyed by the citizen individually.

	Collection System	Advantages	Disadvantages
V	Through Dinas Kebersihan Collection of Cleansing Fee is directly done by Dinas Kebersihan personnels.	1. In view of the principle of fee itself, collection of fee should be done by the service-given (not other side) because: a. If the fee payer is not satisfied in the service given by the collector, the fee pay will directly claim the service-giver. b. Dinas Kebersihan as a service-giver will directly calculate the amount of fee to be collected in base on volume of service having been given. c. Dinas Kebersihan can directly give sunction (penalty) to the citizens who do not pay their fee, because Dinas must know who do not pay cleansing fee. 2. Complaints/claims which are directly derived from the citizen to Dinas-Kebersihan will give a positive motivation.	1. The less successful running of this system is due to the internal matter itself, i.e., weakness of control. So that, a target being based on logical consideration is absolutely needed. This target shall be a measurement of progress or failure. 2. The failure of achieving the target is not only caused by the internal factor but also by external one which is still not supporting, such as citizen-consciousness still being unadequate and other factors which are purposely/unpurposely disturbing because they think that they are suffering a loss (strong individual/unofficial collectors, etc.) 3. There must be a good administration and accurate management which will make the control as easy as possible.

By comparing the advantages and disadvantages of the above systems and based on considerations of service coverage and service quality, condition and affordability of citizen, participation of citizen and possibility of facilities procurement and fee payment point.

Based on the above considerations, the system which is considered the best one is mixed system, namely by paying attention to the fee, citizen participation, distance of payment-point and facilitating a control.

The mixed system is a combination of the system through Dinas Kebersihan and the system through RT/RW.

Through Dinas Kebersihan and RT/RW Mixed System

This fee collection system is based on the system of service given and also distinguished between direct and indirect service.

"Direct Service" is a service given to the citizen which is directly handled by personnels and facilities of Dinas Kebersihan. In this case, the citizen seems to be passive.

"Indirect Service" is a service given to the citizen where the citizen members are active, bring their garbage to the places which have been appointed (Depot, LPS, Handcart, Galvanized, Compactor and other kinds).

Based on the distinction of systems as above mentioned, thus, distinction of fee collection shall be made as follows:

For Direct Service : Collection of fee is directly handled by Dinas Kebersihan.

For Indirect Service: Collection of fee is handled by RT/RW personnel. This service is mostly given to residential areas.

Dinas Kebersihan only collect fee of lincense-issue, night soil clean-up and usage of disposal site, and Suku-Dinas Kebersihan collects solid waste fee directly from industry, office, shop, etc. and collects/receive fee-system from Seksi Kebersihan (Kecamatan), where the Seksi Kebersihan directly receive the fee from fee-payers (RT/RW, households which are directly served).

Advantages and Disadvantages of this Mixed System

A. Advantages:

1. Dinas Kebersihan and RT/RW have double duties, namely: Control of service quality and control of fee quantity achieved.

2. Creating a good coordination/communication network between the government and the citizen. In this case, Dinas Kebersihan represents the government but RT/RW represents the citizen.

3. RT/RW will also support the success of environment cleansing-control because the RT/RW must be also responsible for what the citizens have already given (fee). Due to this citizen's active participation, it is expected that a clean and sanitary environment will be immediately achieved.

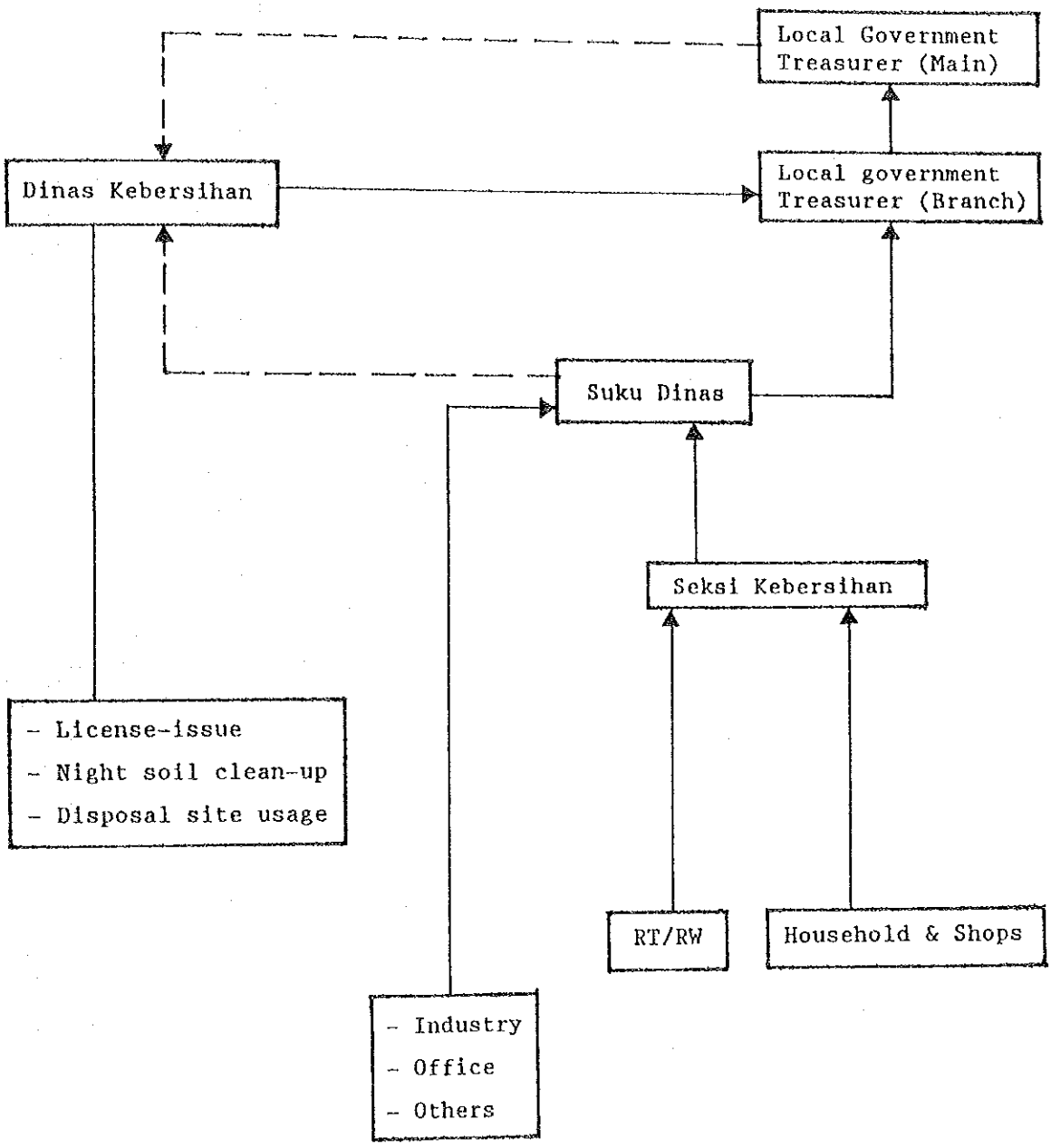
Another factor which shall be taken into consideration in determining a fee collection is about socio-economic condition of Jakarta inhabitants.

Jakarta shall not be compared with Bogor, Bandung/Padang. Jakarta has a multi-rational inhabitants and high living cost, being very different from other cities in Indonesia.

Income per capita in Jakarta is also the highest among the other cities in Indonesia, but the income is not enjoyed by most of Jakarta citizen. Most of the citizens are only facing the high cost life, it means that the high income is concentrated in a small part of citizen only.

This is necessary to be explained because factor of living demand can not be postponed, so all members of community are always trying to earn their living cost which is urgently needed.

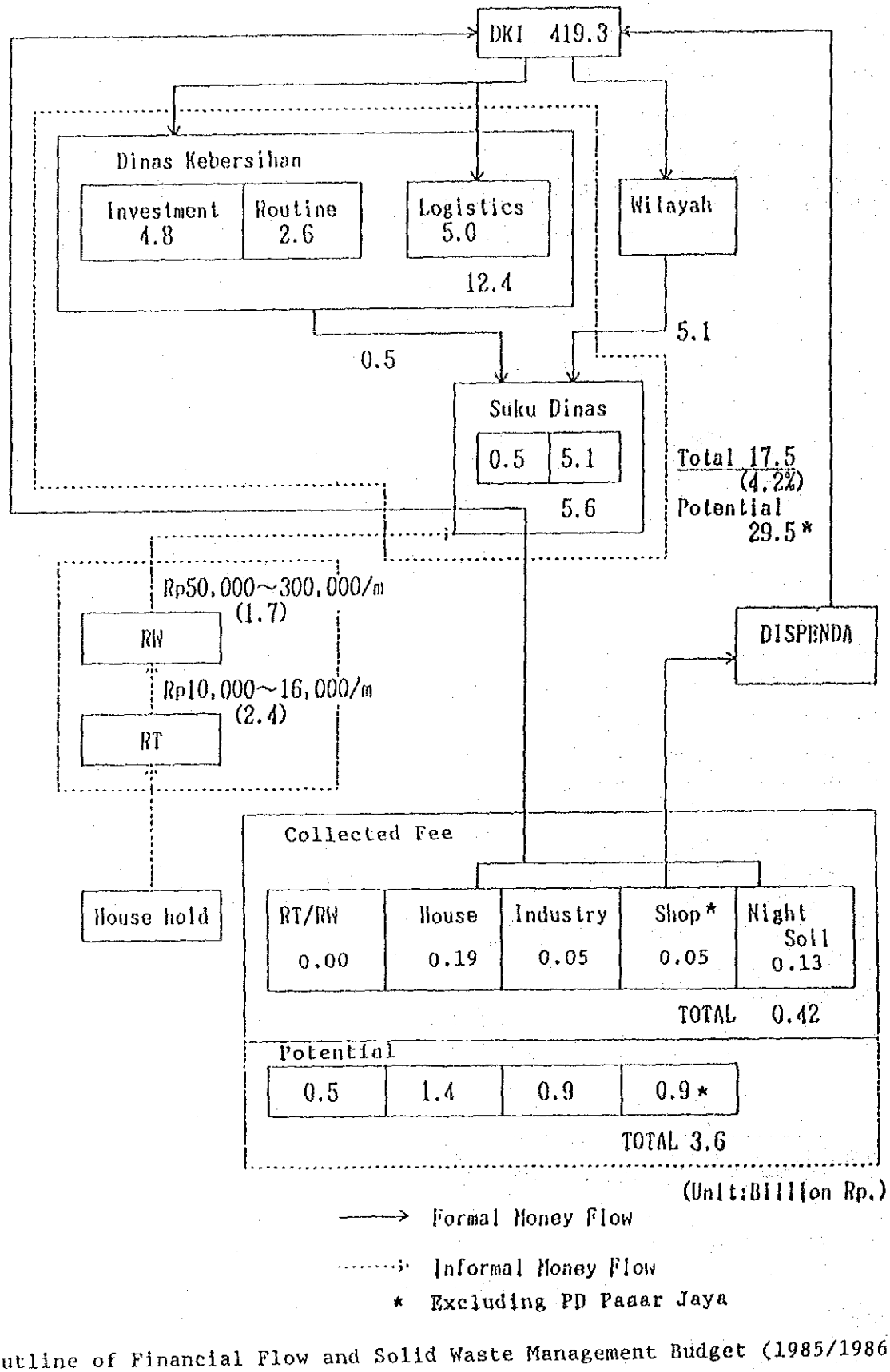
Again, referring to "Interim Report (II)" of JICA, about the leakage in informal money flow and also about the misusage (manipulation) done by executive-personnels and so on, have relationship with what have been previously explained. In connection with the above mentioned, thus, improvement of welfare is a factor which shall be taken into consideration, such as having to prepare an adequate incentive for the workers/cleansing operational personnels and the fee collectors.



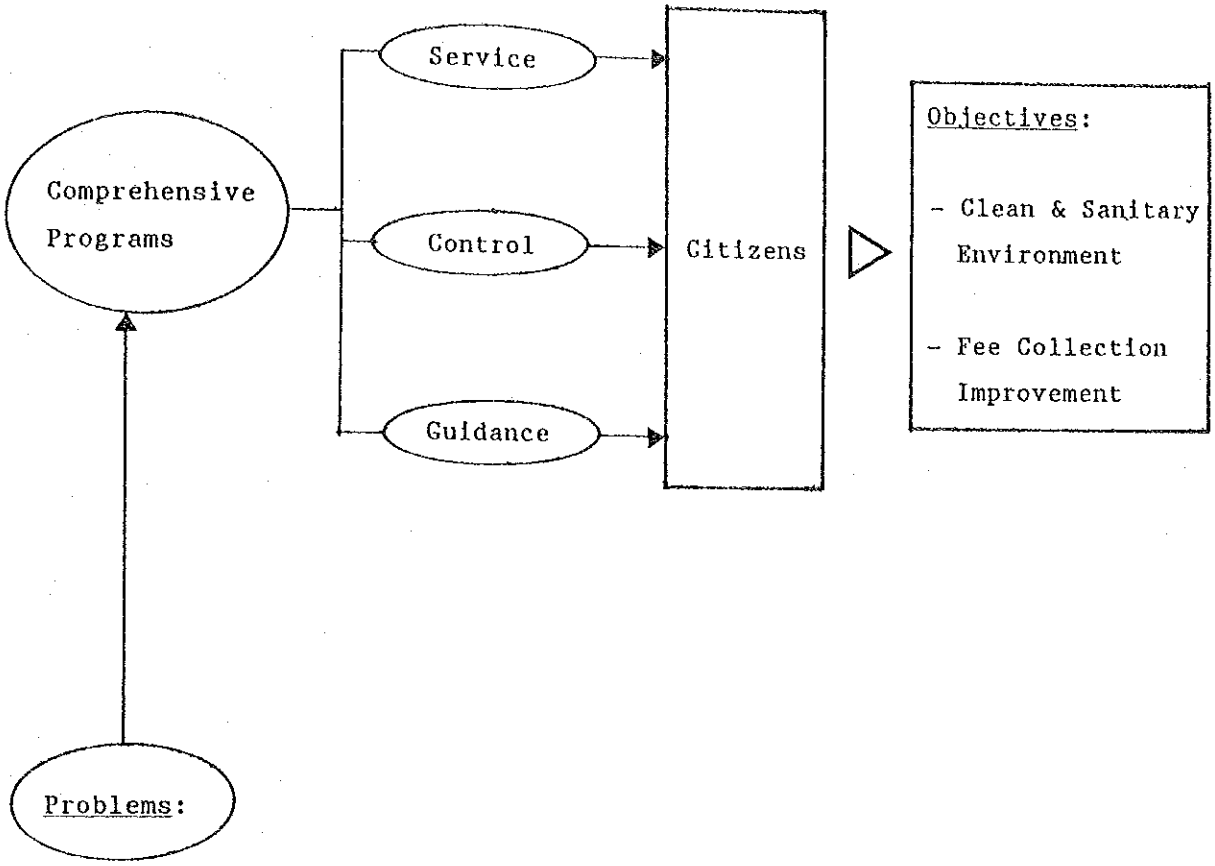
———— : Line of Fee Flow

— — — — : Line of Information

Mechanism/Process of Collecting Fee



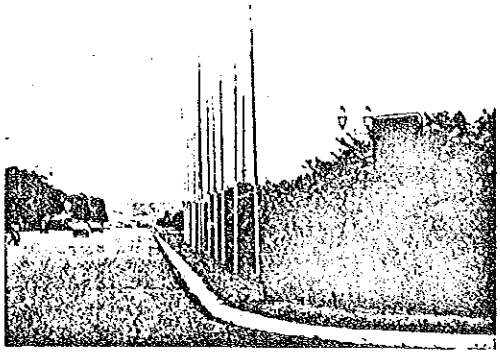
Outline of Financial Flow and Solid Waste Management Budget (1985/1986)



Relationship of Functions for Improving Fee and Creating a Clean and Sanitary Environment

P A M P H L E T

KEBERSIHAN ADALAH CERMIN BUDAYA BANGSA



Agustus 1986

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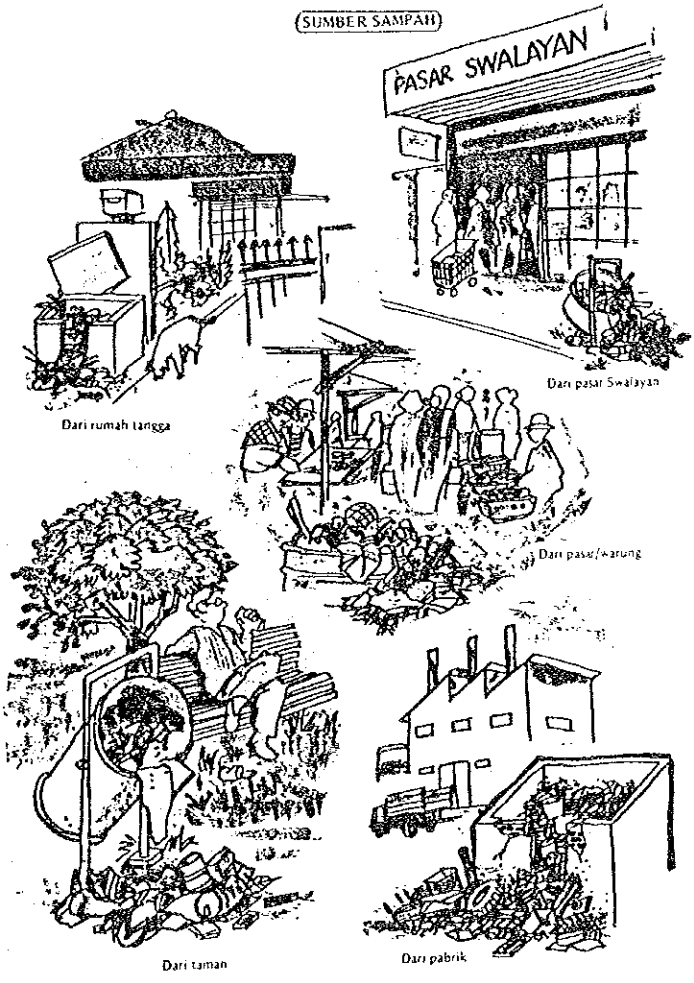
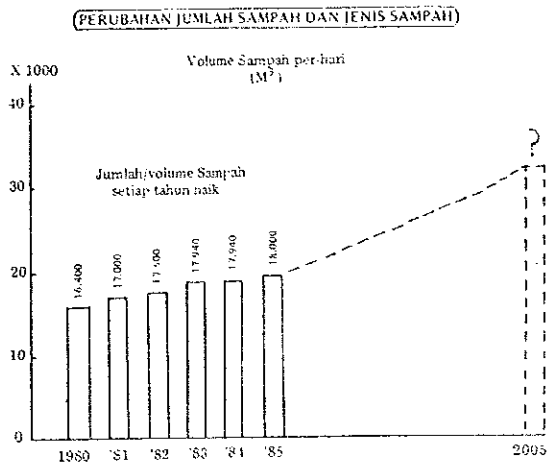
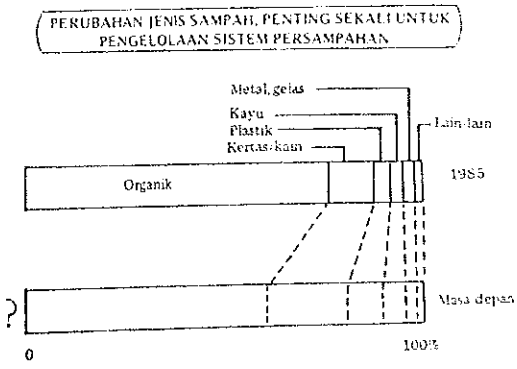
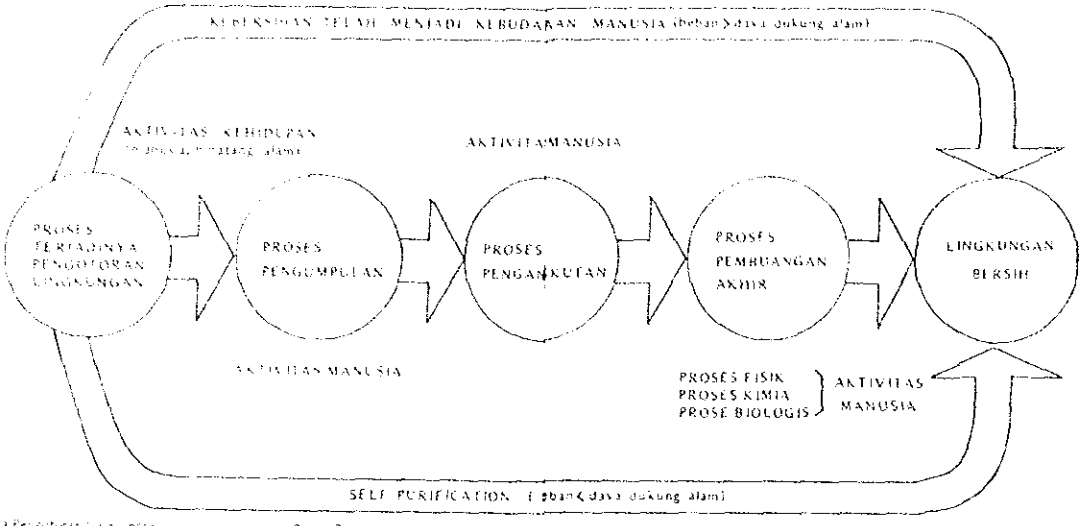






(POLA PENANGGULANGAN KEBERSIHAN LINGKUNGAN)

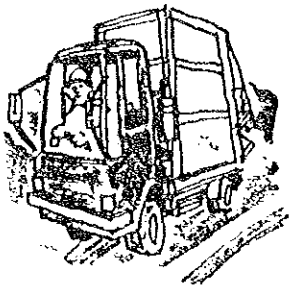
Sistem Penanggulangan Lingkungan



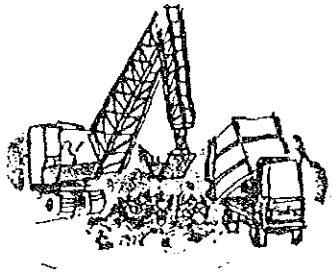
Proses Terjadinya Pengotoran Lingkungan

Proses Pengumpulan

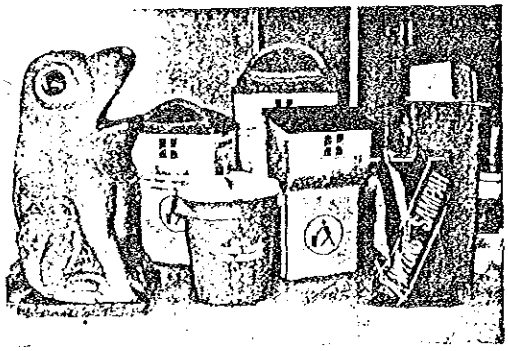
Proses Pengangkutan



Proses Pembuangan Akhir

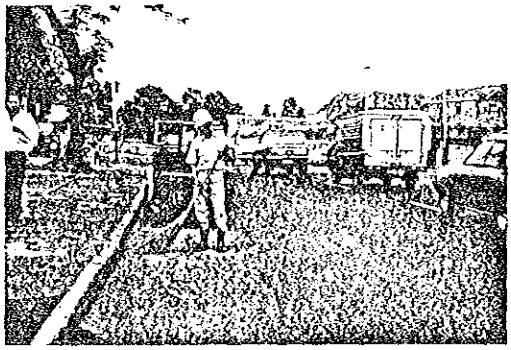


(TEMPAT PENYIMPANAN DAN PEMBUANGAN SAMPAH)

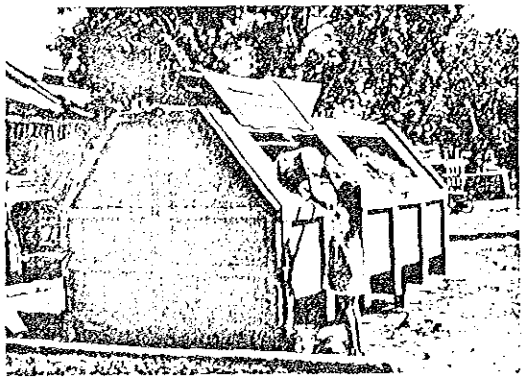


Macam-macam tempat sampah

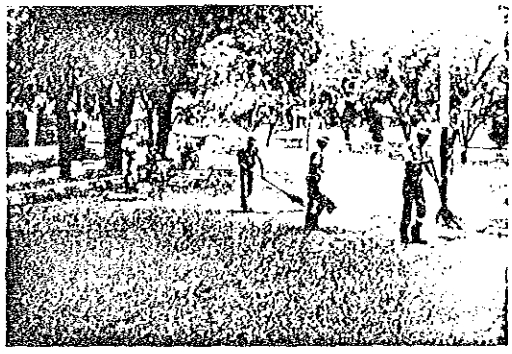
(PEKERJAAN PEMBERSIHAN SAMPAH)



Petugas pembersihan jalan berseragam

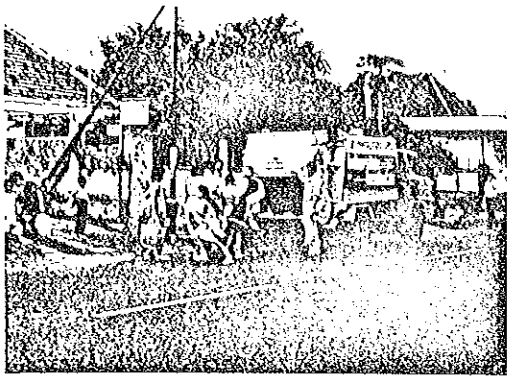


Macam-macam tempat sampah



Kelompok petugas pembersihan jalan

(PENGUMPULAN SAMPAH)

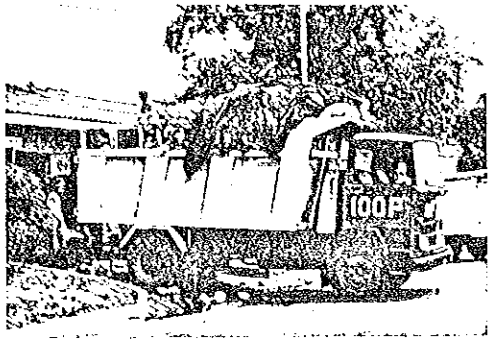


Pengumpulan sampah dari rumah tangga

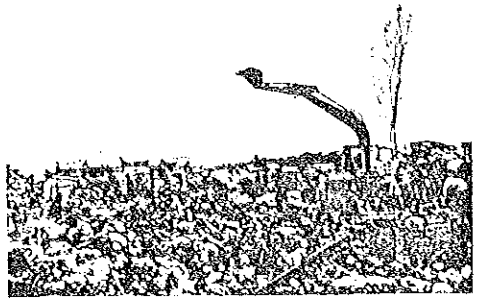
(PEMINDAHAN SAMPAH)

Pemindahan sampah dari gerobak ke truk pengangkut sampah

(LOKASI PEMBUANGAN SAMPAH)



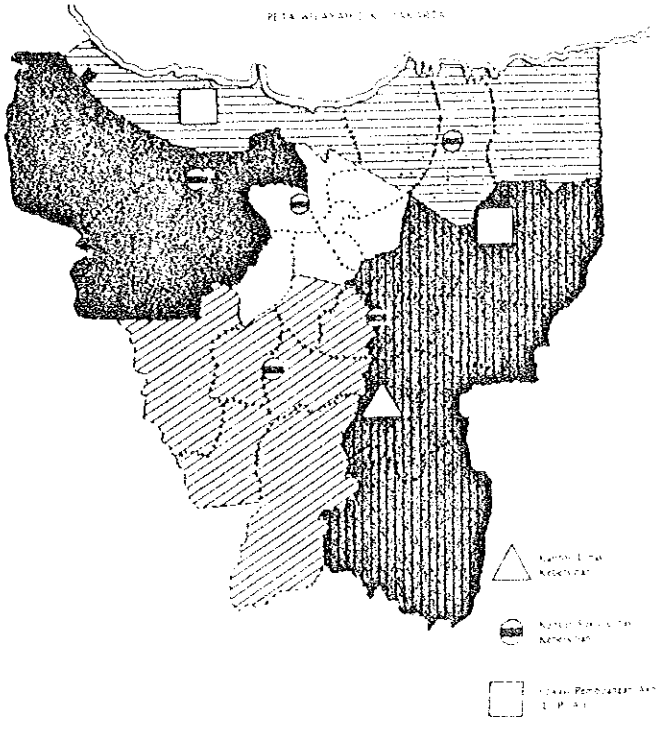
Pengumpulan sampah dari kantung plastik



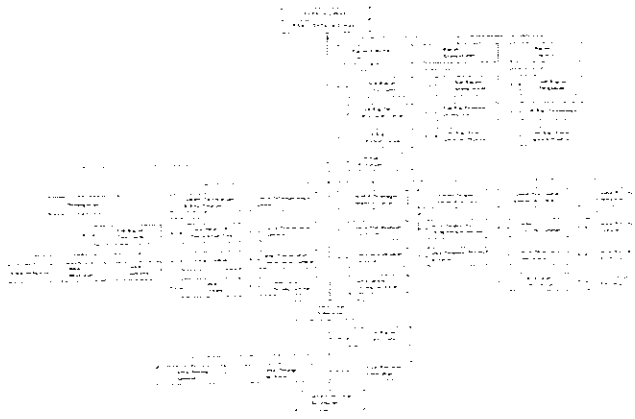
Petugas pengangkut sampah di lokasi pembuangan akhir

LOKASI FASILITAS DAN KANTOR DINAS KEBERSIHAN WILAYAH DKI JAKARTA

PETA WILAYAH DKI JAKARTA



STRUKTUR ORGANISASI DINAS KEBERSIHAN DKI JAKARTA

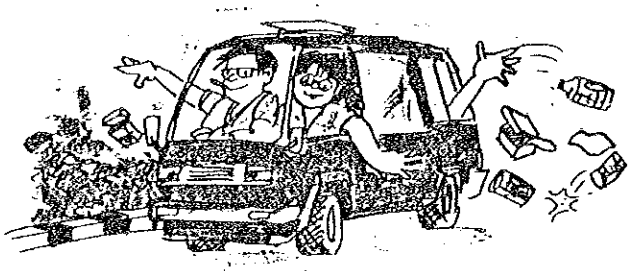


Pertanyaan Pertanyaan Mengenai Pengumpulan

	Kantor	
Informasi Umum		
Pengangkutan Sampah		
Saran dan Pengaduan		

KERJASAMA DENGAN WARGA KOTA

Ketekunan dan kerja keras petugas Dinas Kebersihan setiap hari dibantu dengan peralatan modern.
Tidak akan dapat mencapai lingkungan yang bersih dan sehat tanpa kerja sama warga kota.
Persoalan sampah akan terus meningkat demikian juga biaya pengelolaan dimasa datang.
Hanya dengan kesadaran dan partisipasi wargalah yang akan menyelesaikan persoalan ini.



Jangan membuang sampah ke jalan

Kita jaga kebersihan lingkungan

Masukkan sampah di tempat sampah

SISTEM PENGENDALIAN SAMPAH

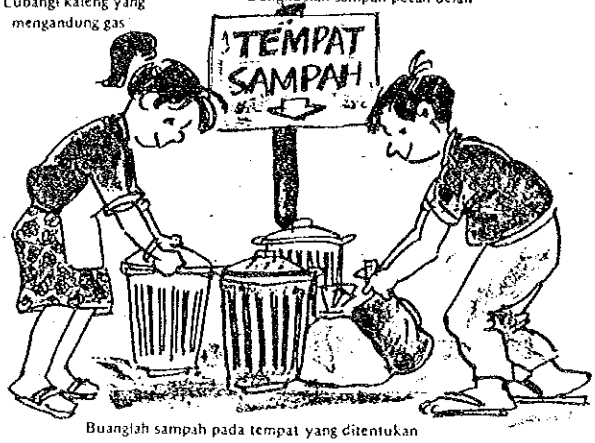
Marilah kita bersama-sama sadari dan jaga akan kebersihan kota.

Buanglah air dari sampah dapur

Tempatkan sampah dalam pembungkus

Lubangi kaleng yang mengandung gas

Bungkuslah sampah pecah-belah



Buanglah sampah pada tempat yang ditentukan

JICA (Japan International Co-operation Agency) Studi Tim melaksanakan kerjasama dengan Direktorat Jendral Cipta Karya (DPU) dan Dinas Kebersihan DKI untuk menyusun program pengelolaan sistem persampah-an DKI pada masa yang akan datang.
Untuk itu kami sedang mengumpulkan data-data yang diperlukan untuk program ini, dan pada tanggal 14 Agustus 1986 s/d tanggal 6 September 1986 dilaksanakan Pilot Studi serta percobaan pengangkutan sampah.
Untuk itu kami mohon bantuan dari warga DKI.