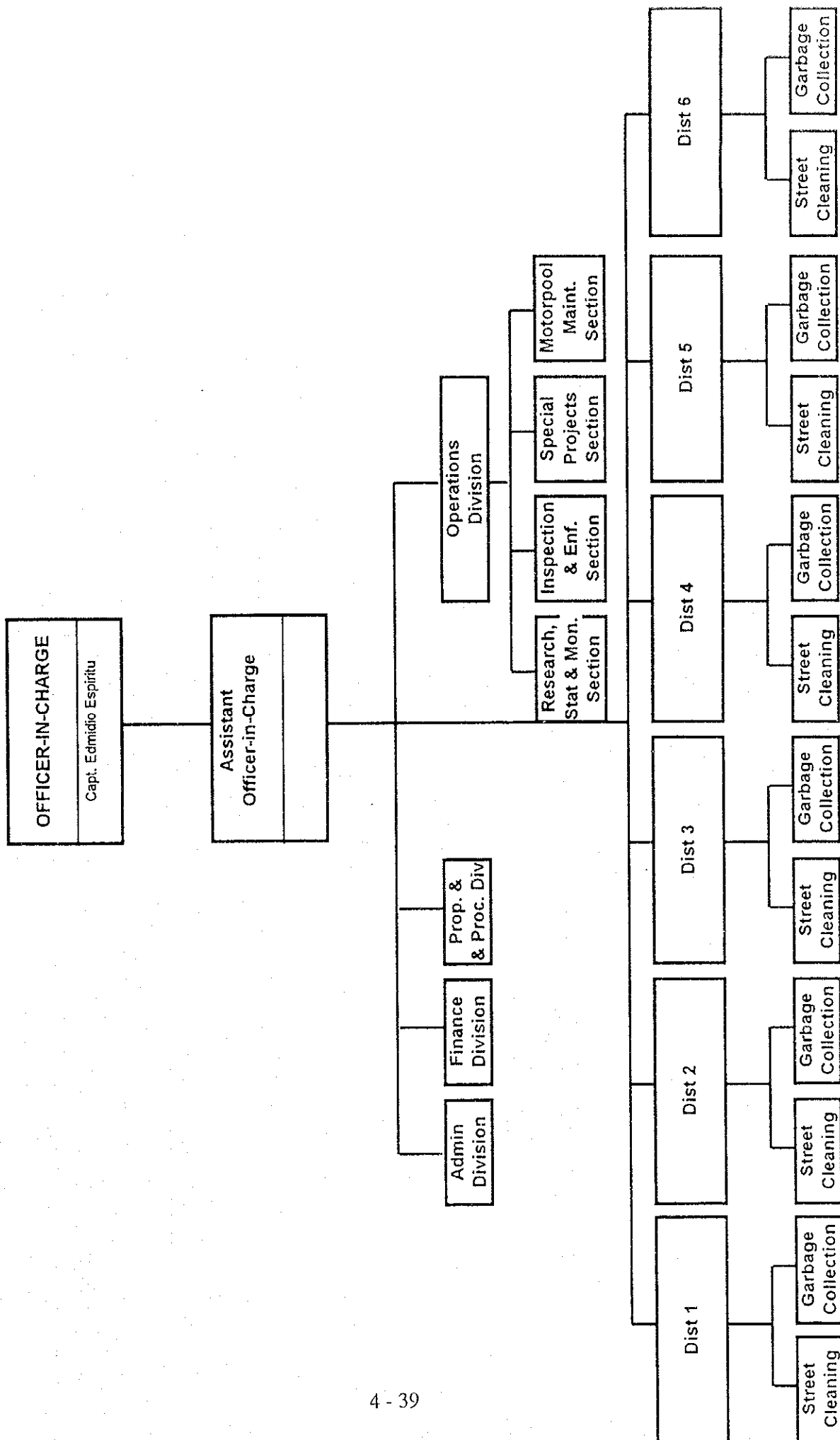
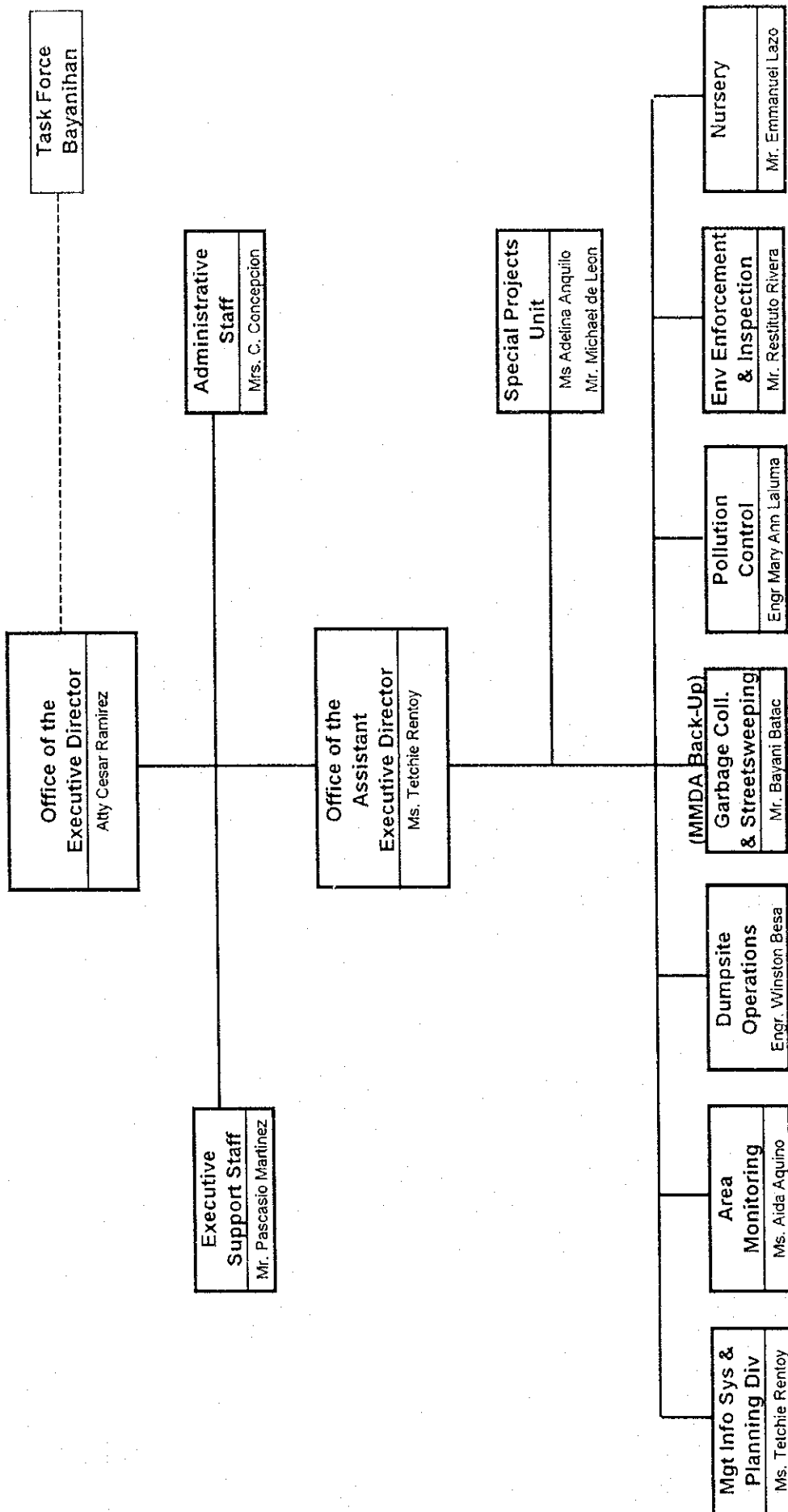


DEPARTMENT OF PUBLIC SERVICES
CITY OF MANILA

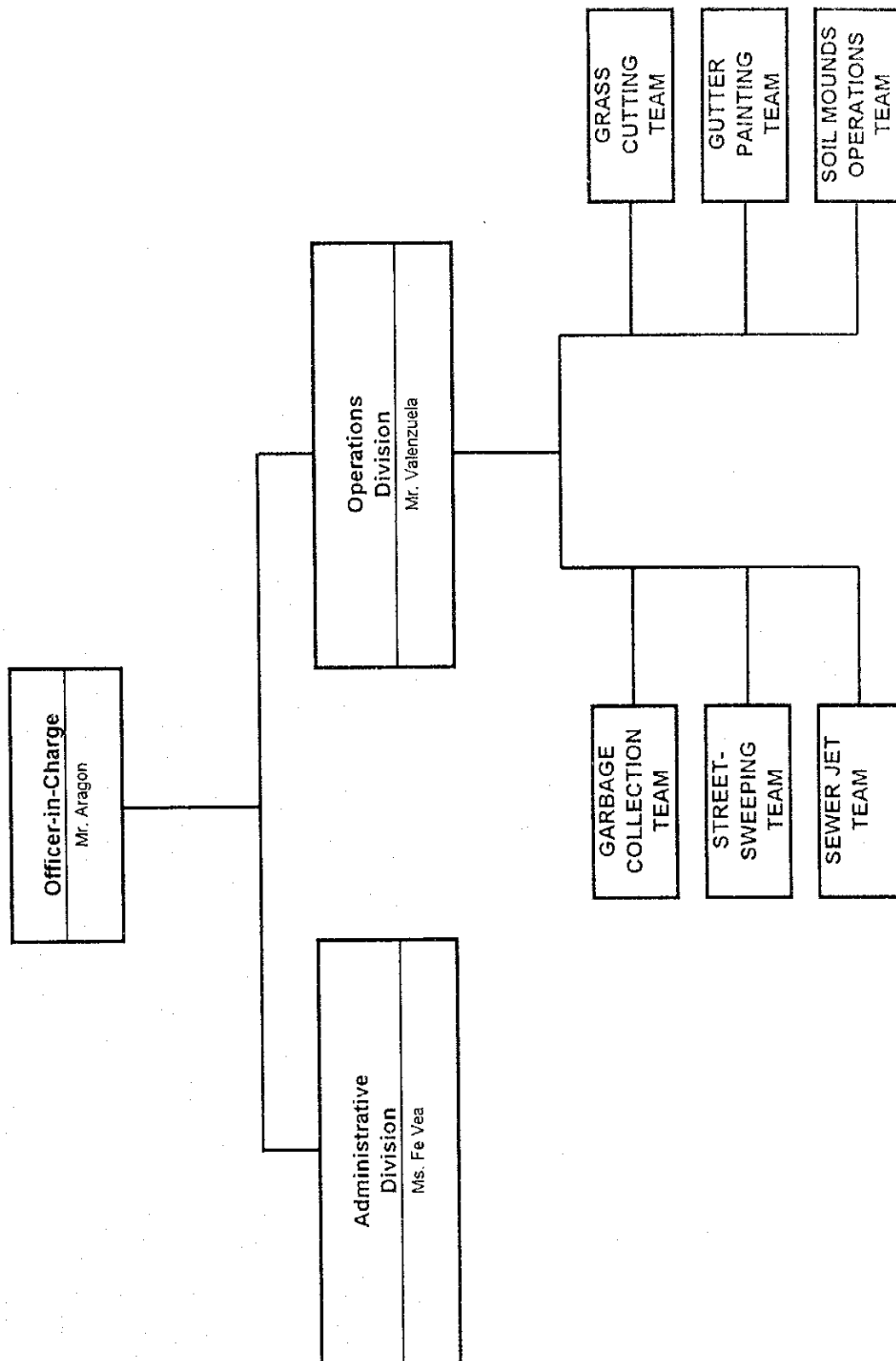
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QUEZON CITY



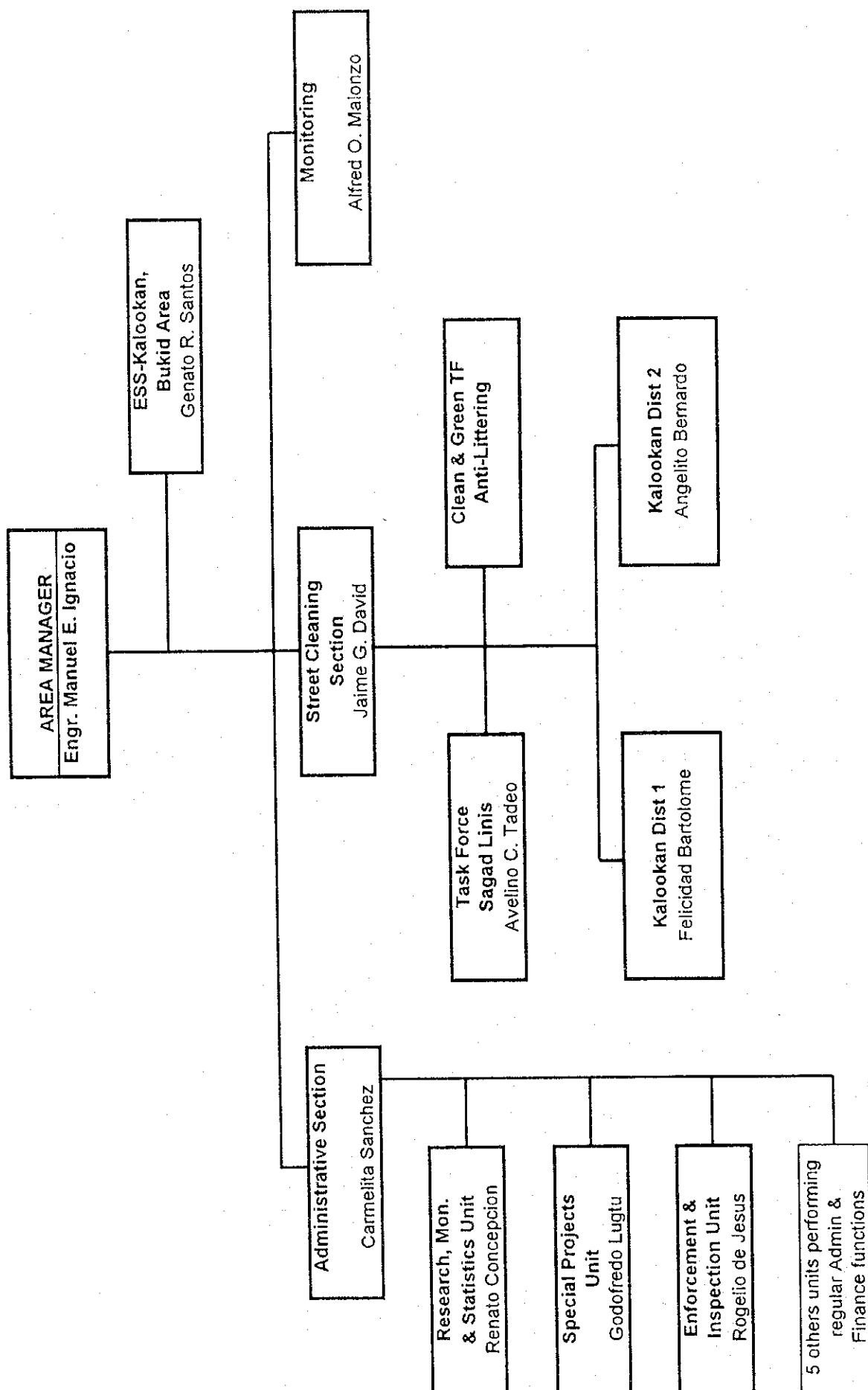
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QUEZON CITY



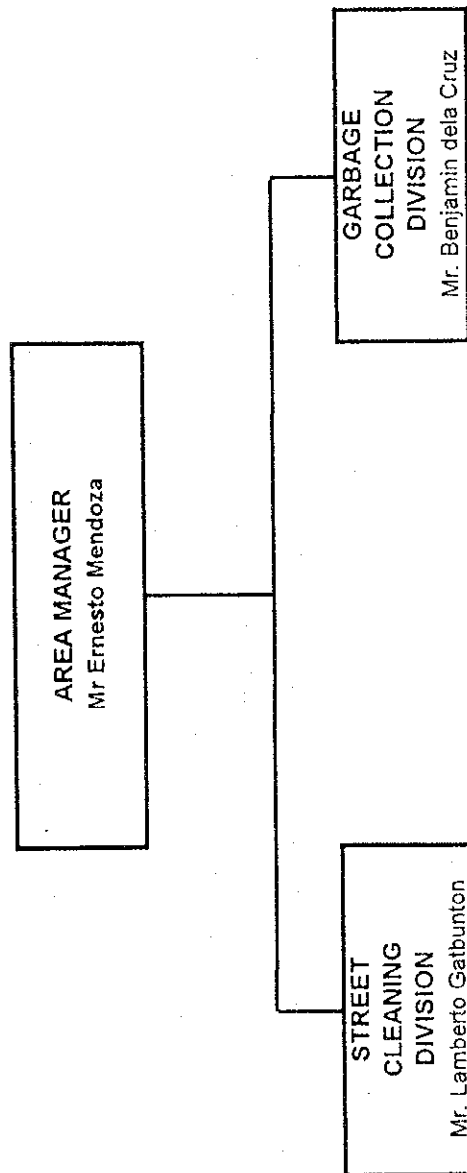
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ENVIRONMENTAL SANITATION SERVICES
KALOOKAN CITY



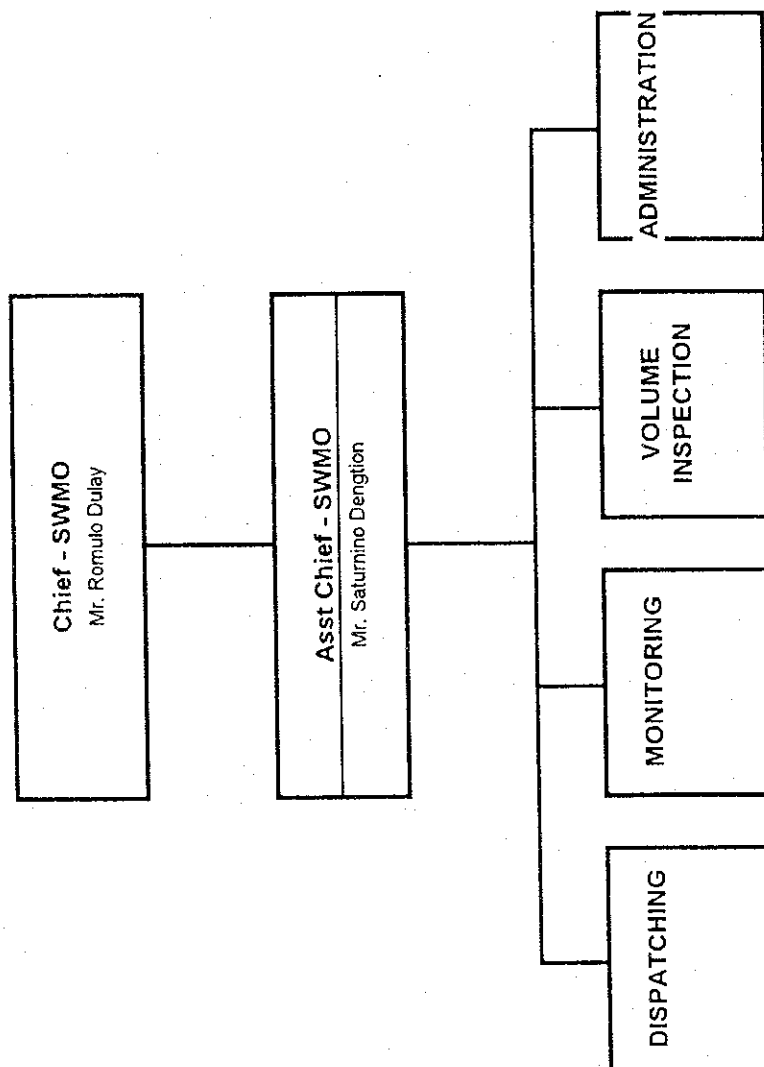
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**SOLID WASTE MANAGEMENT OFFICE
NAVOTAS**



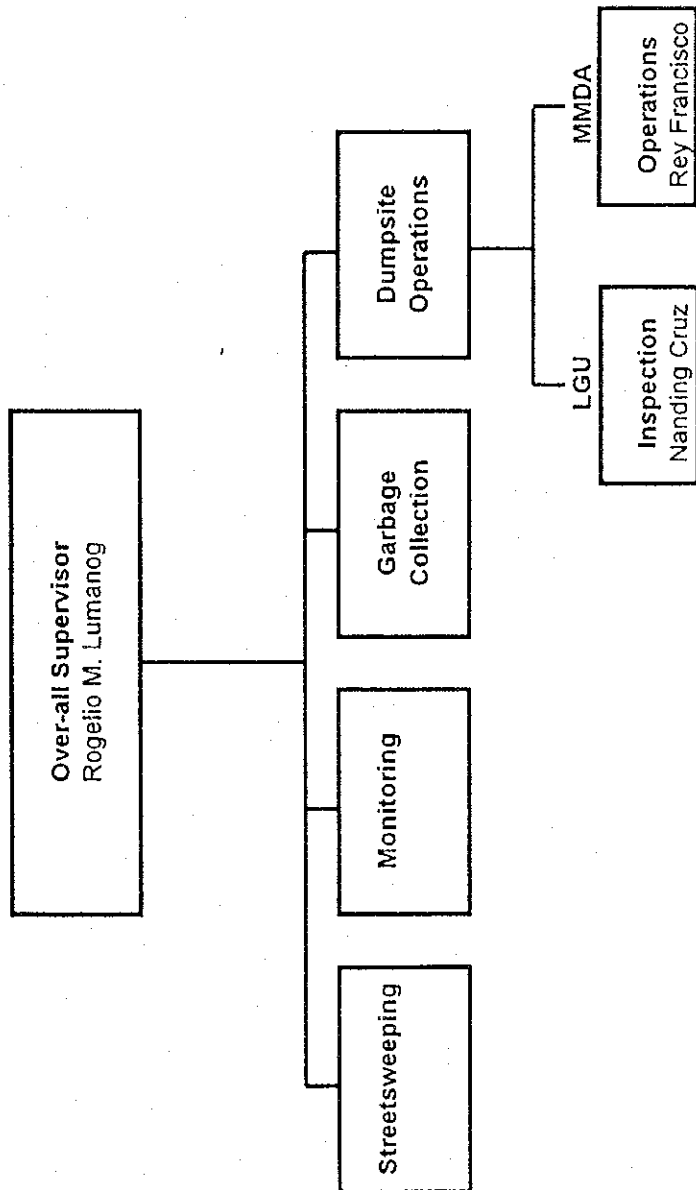
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SOLID WASTE MANAGEMENT OFFICE
VALENZUELA



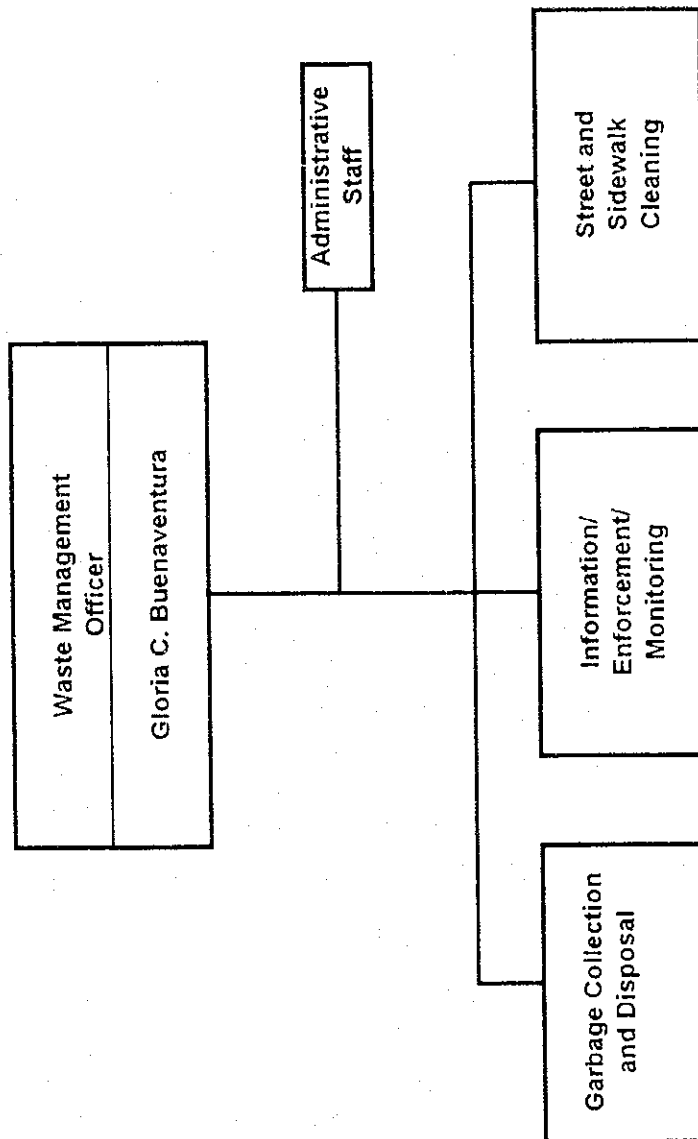
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CLEAN AND GREEN
MALABON



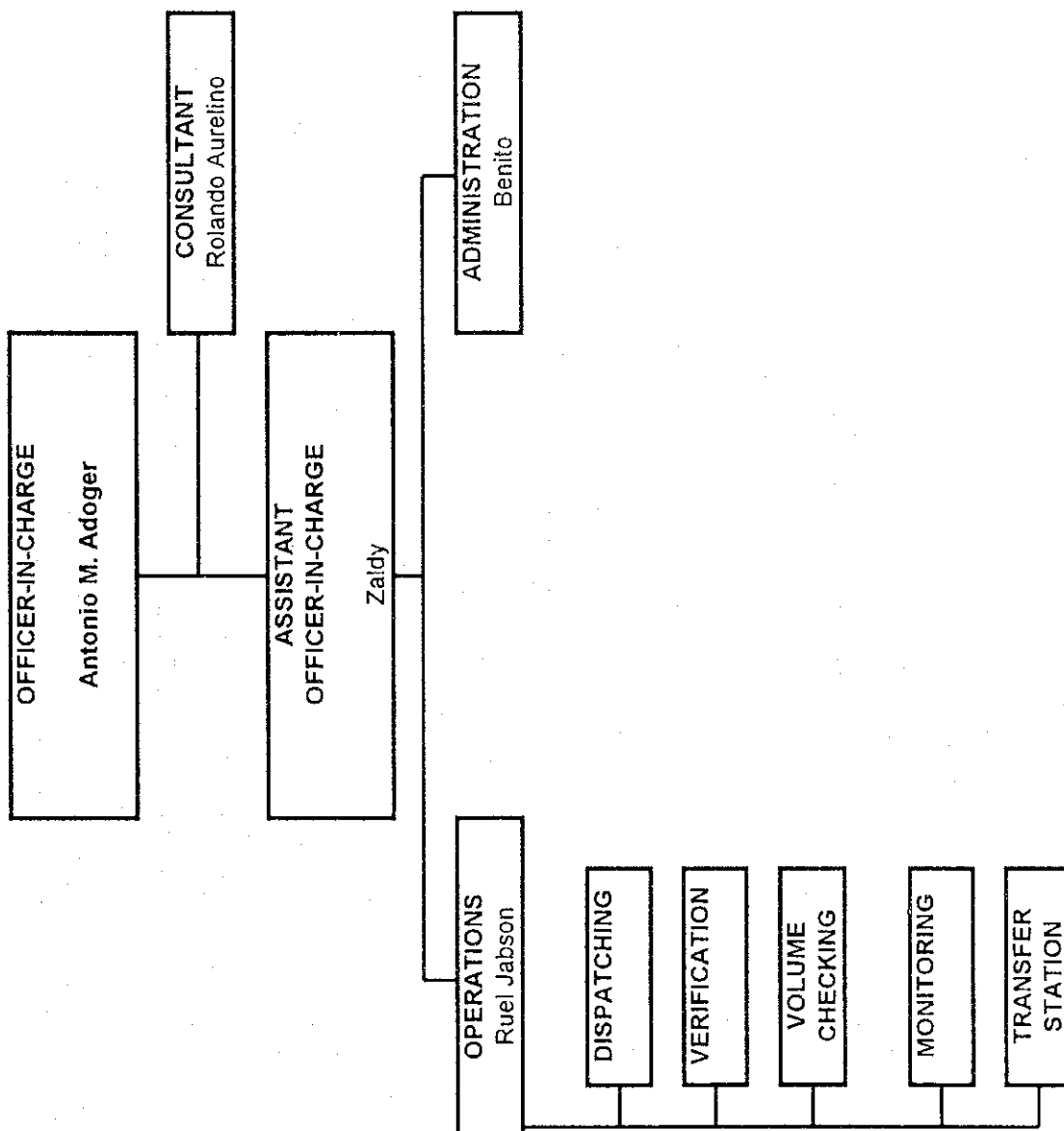
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WASTE MANAGEMENT OFFICE
MARIKINA CITY



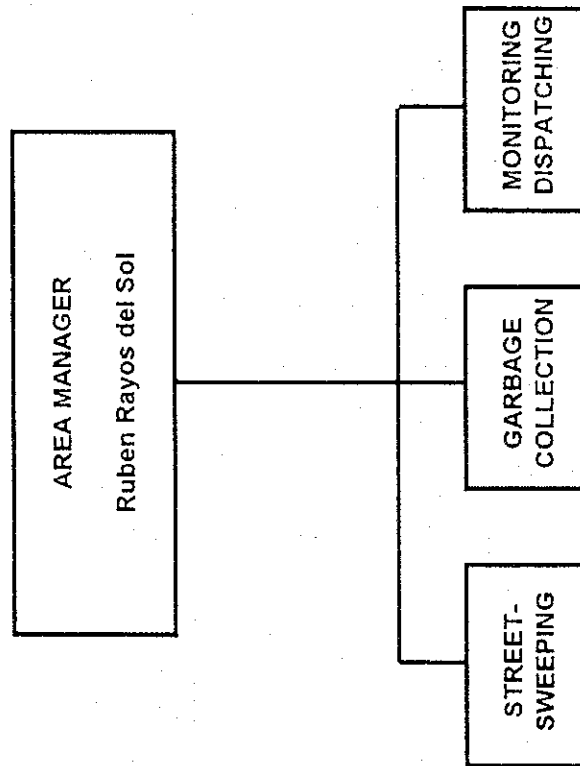
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ENVIRONMENTAL SANITATION CENTER
PASIG CITY



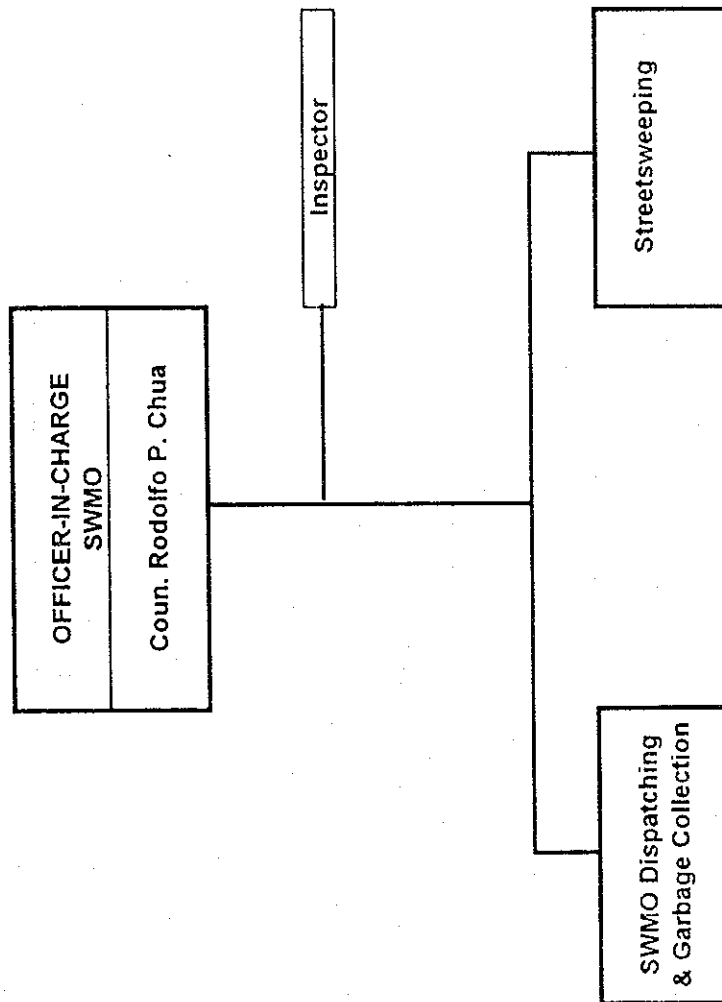
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**ENVIRONMENTAL SANITATION CENTER
PATEROS**



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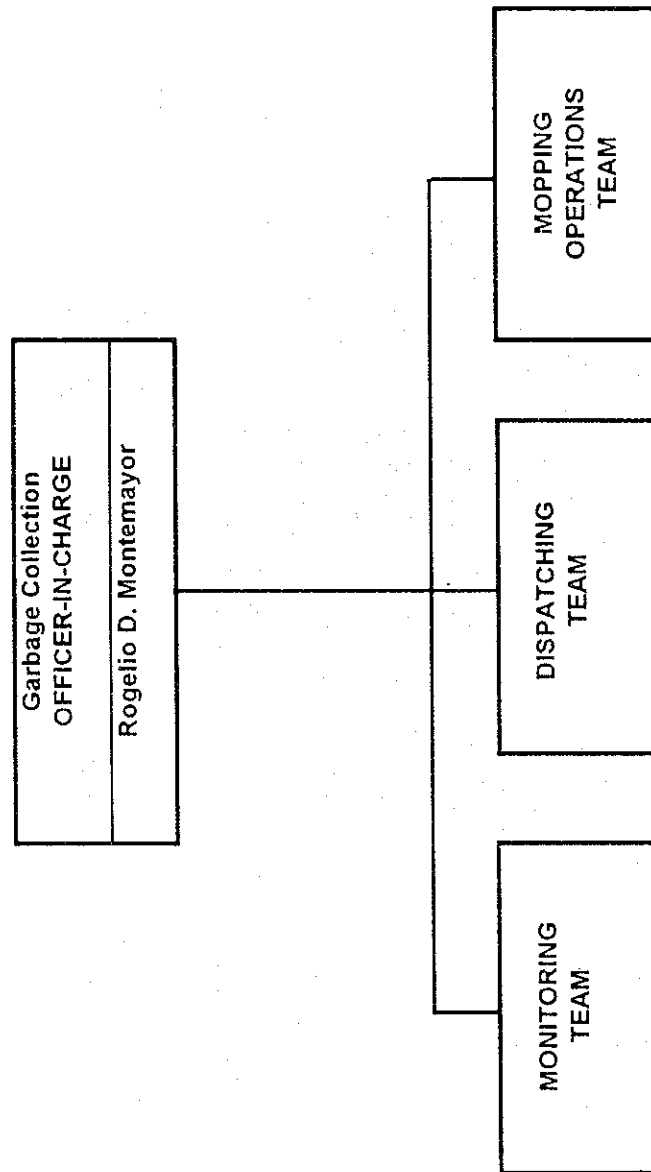
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SAN JUAN**



ORGANIZATION:

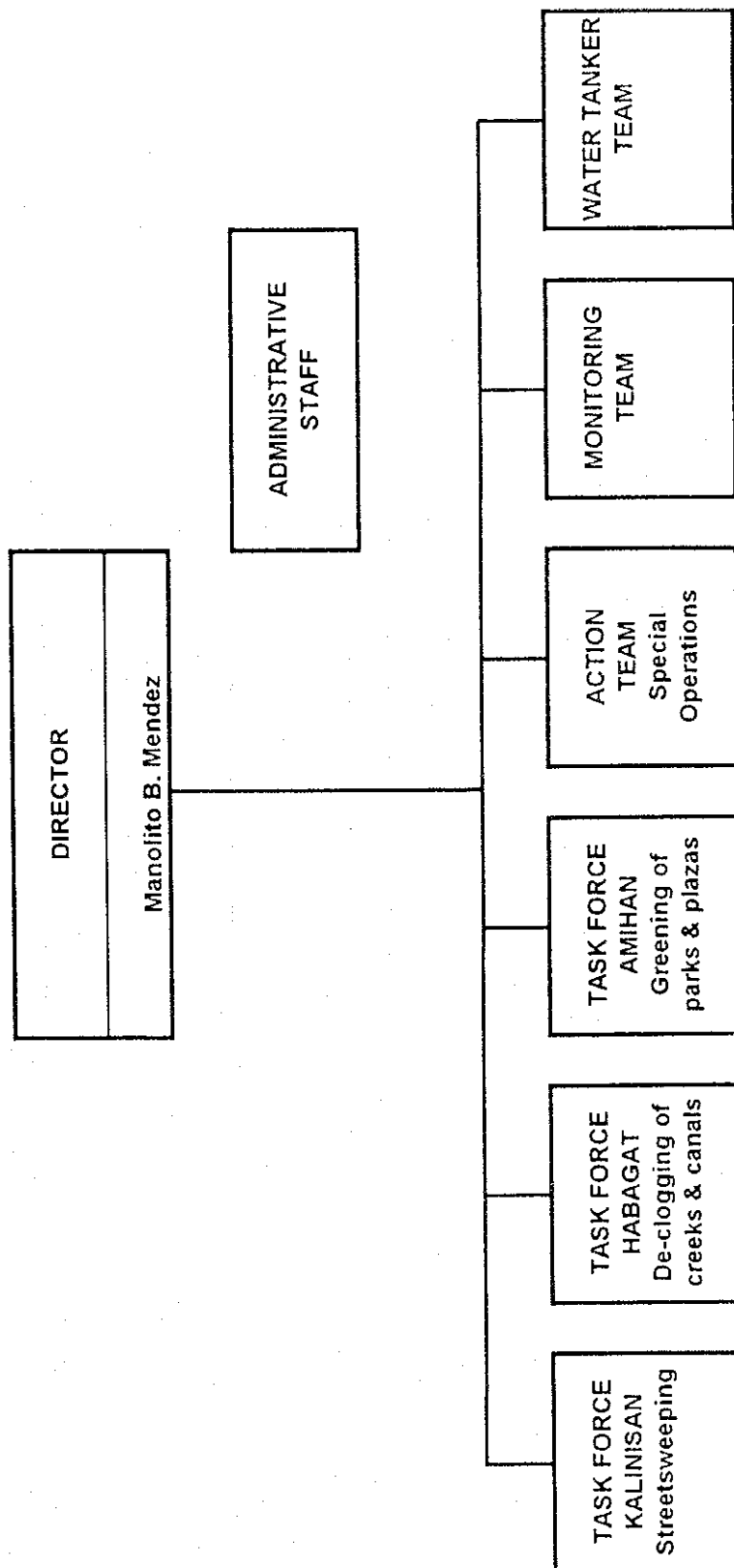
ENVIRONMENTAL SANITATION CENTER
GARBAGE COLLECTION OFFICE

Municipal Government of TAGUIG



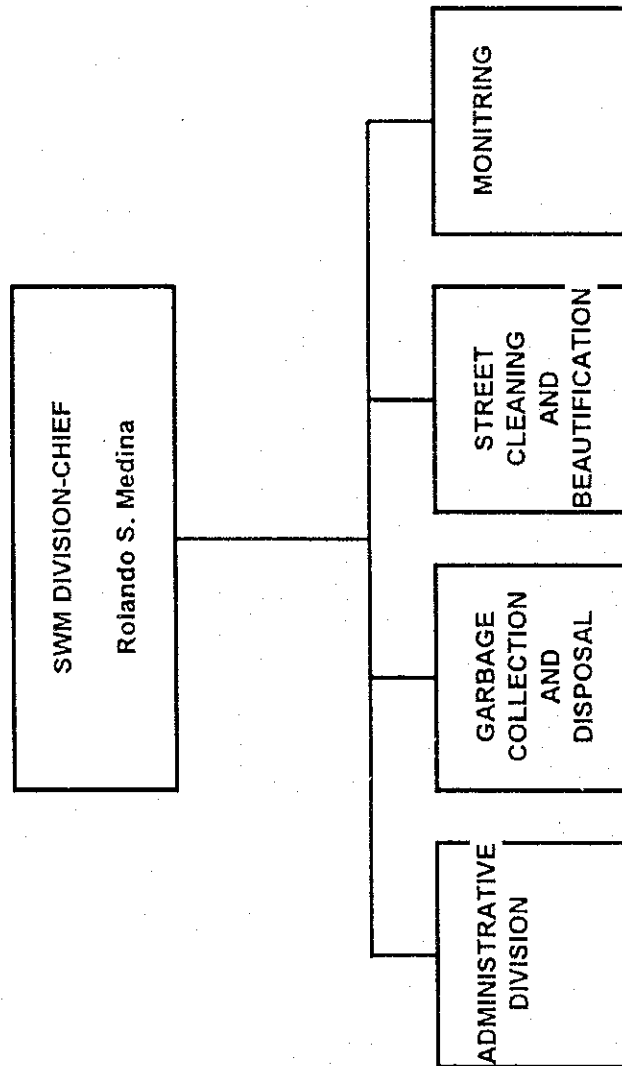
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CLEAN AND GREEN DEPARTMENT

Municipal Government of TAGUIG



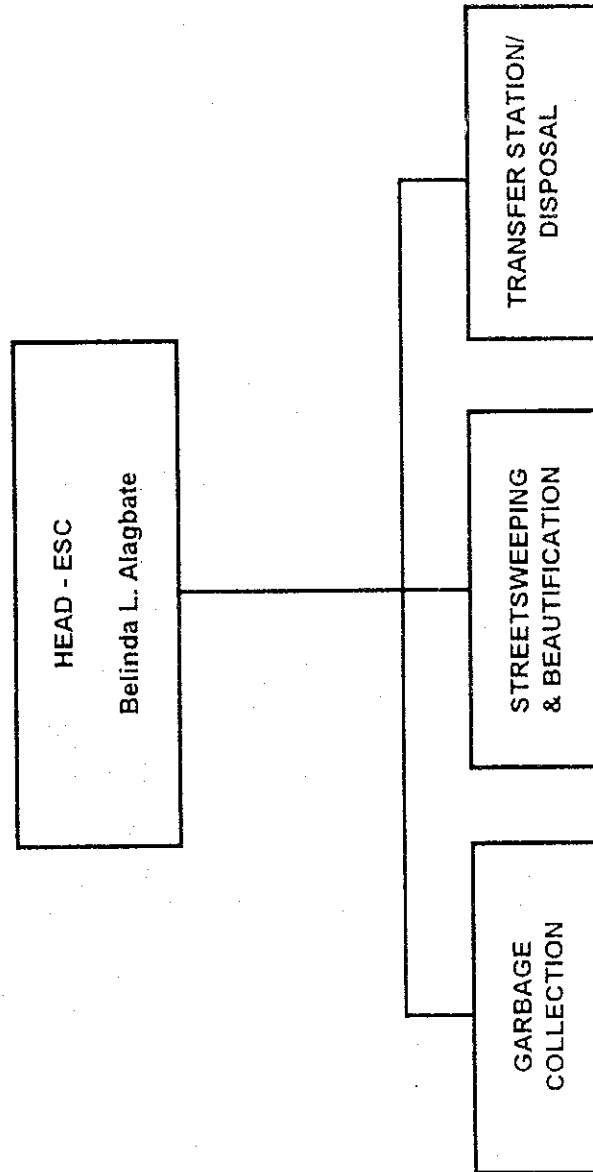
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SOLID WASTE MANAGEMENT DIVISION
MAKATI CITY



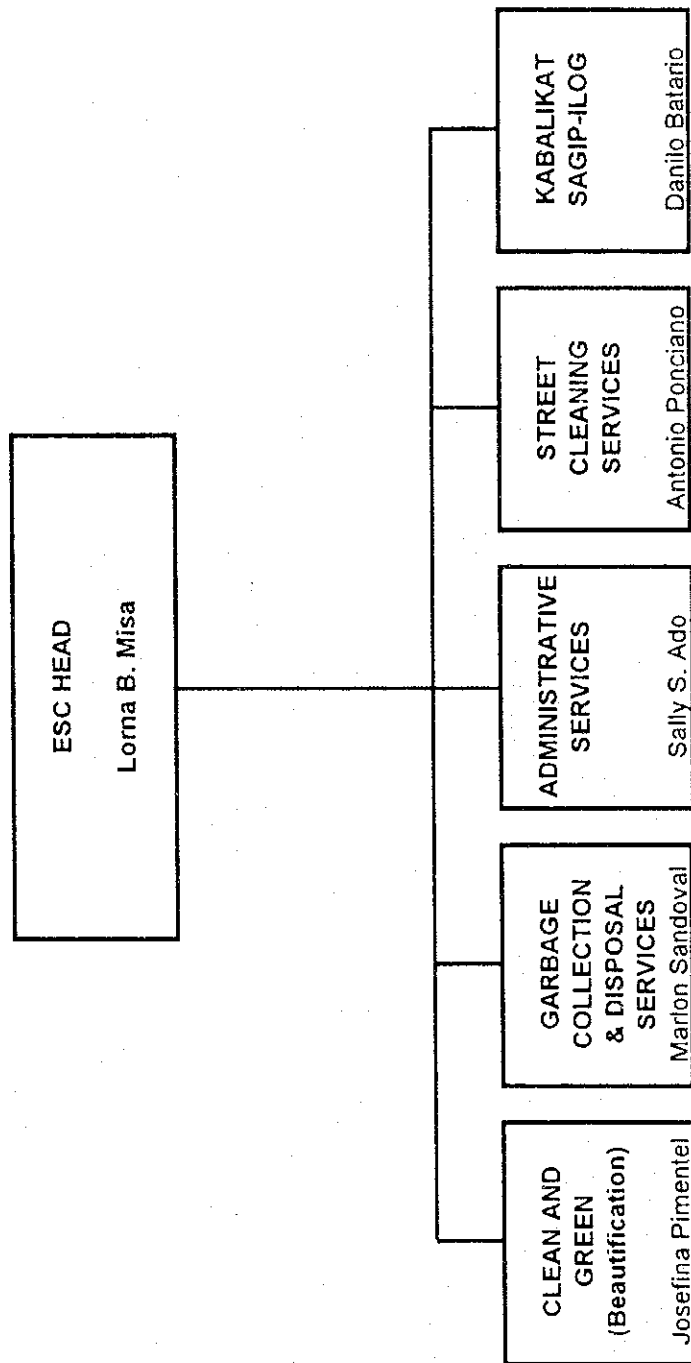
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**ENVIRONMENTAL SANITATION CENTER
PASAY CITY**



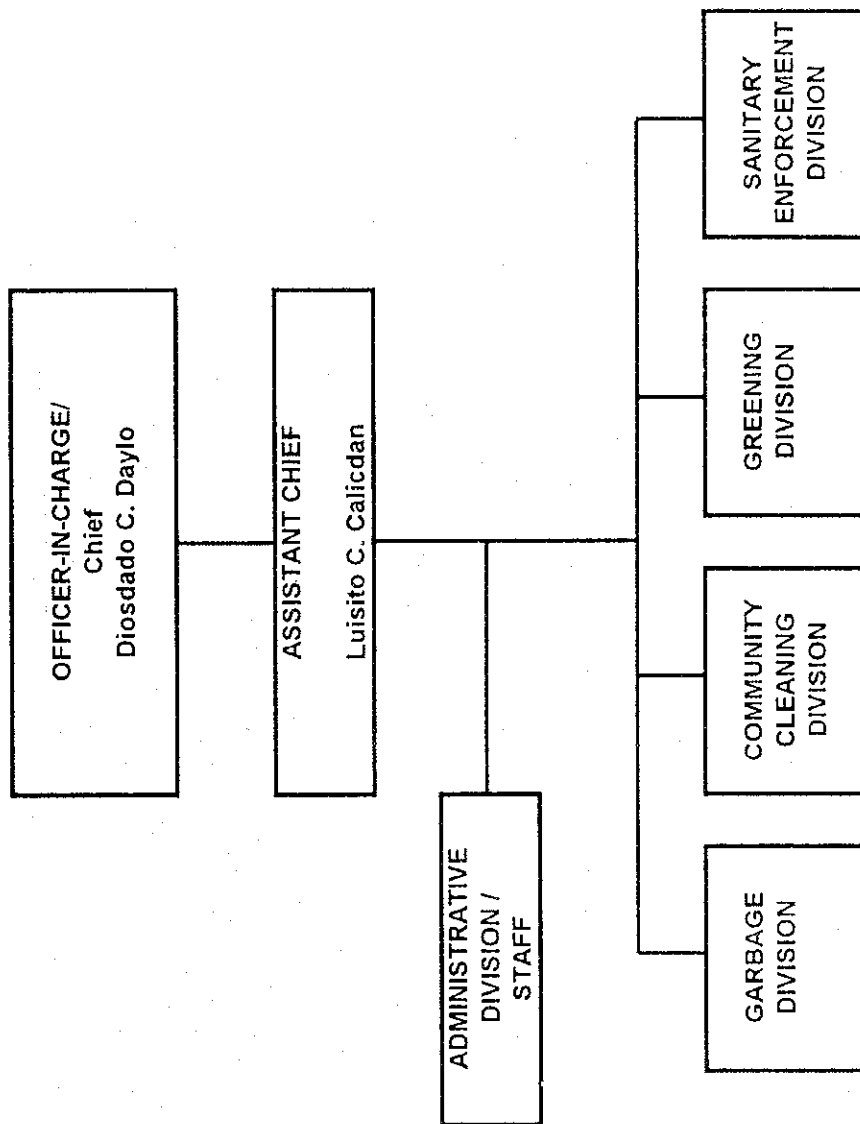
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ENVIRONMENTAL SANITATION CENTER
CITY OF MUNTINLUPA



ORGANIZATION:

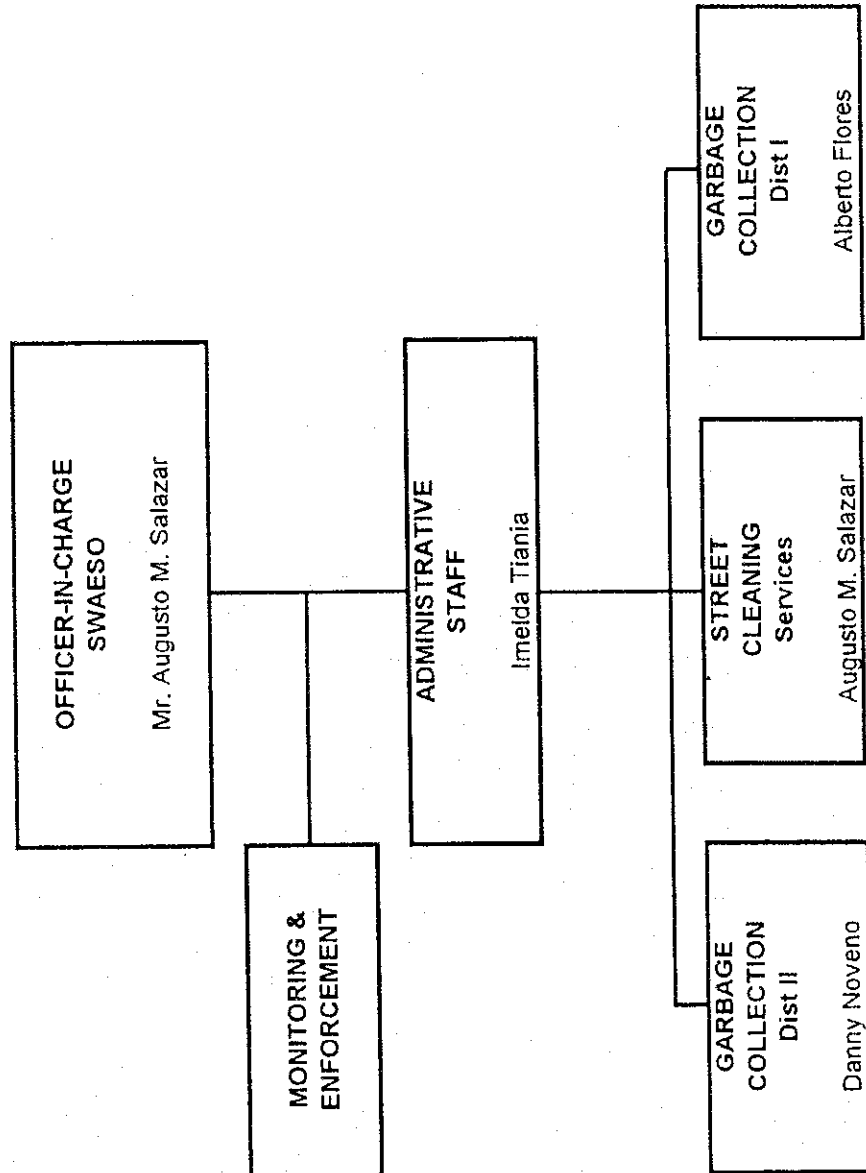
ENVIRONMENTAL AND GREENING BEAUTIFICATION CENTER
MANDALUYONG CITY



ORGANIZATION:

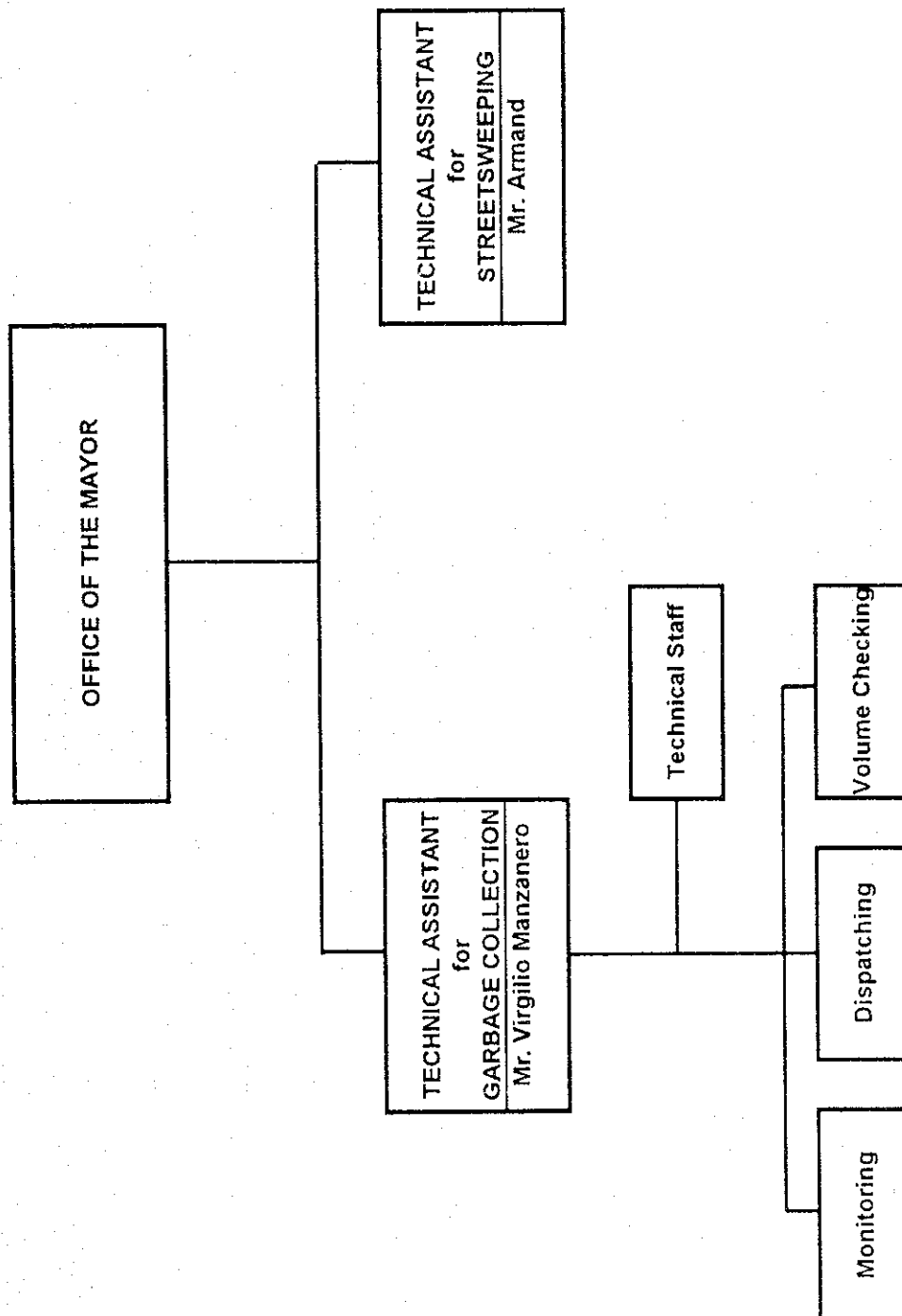
SOLID WASTE AND ENVIRONMENTAL SANITATION OFFICE
SWAESO

PARANAQUE



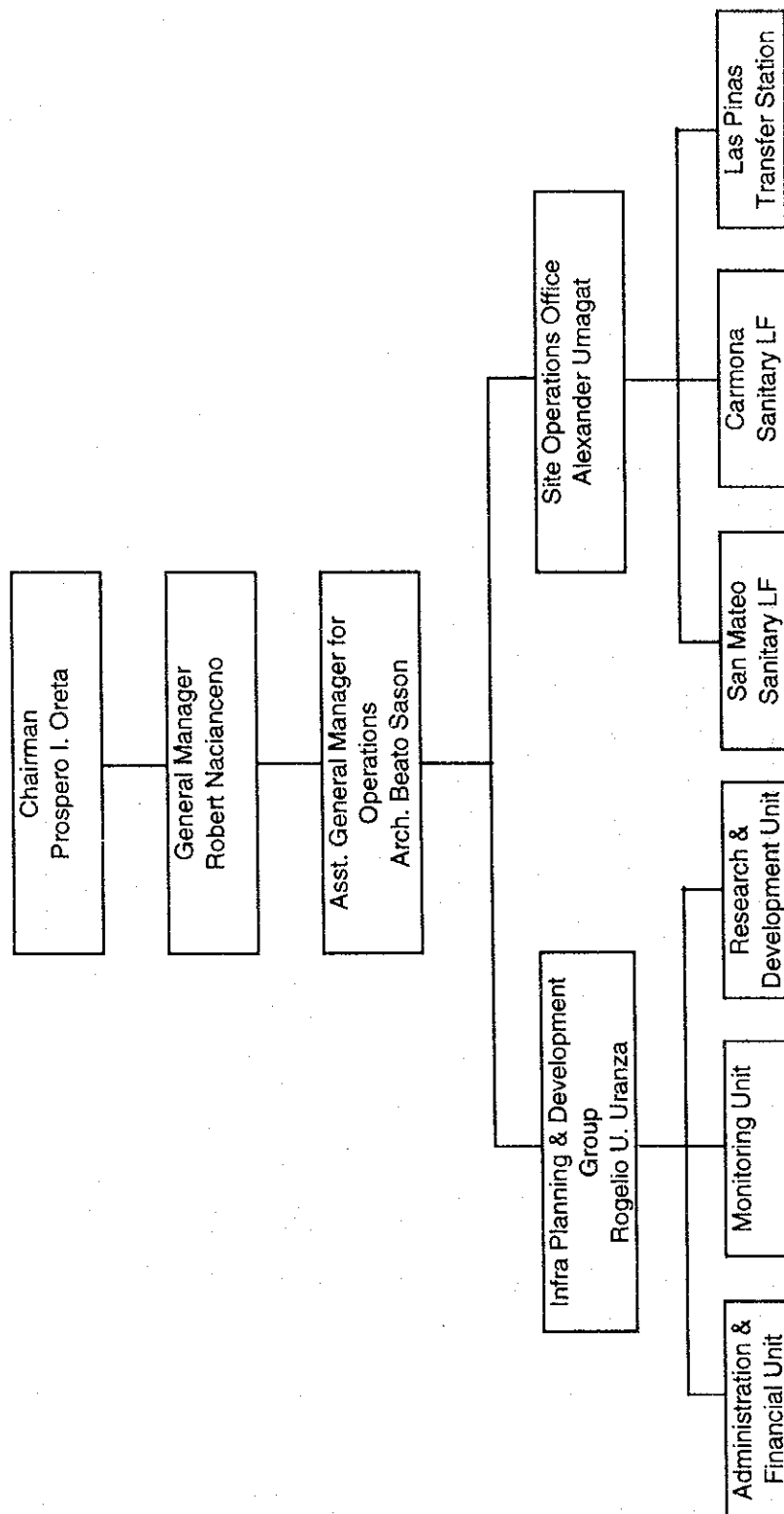
ORGANIZATION:

LAS PINAS CITY



ORGANIZATION:

SOLID WASTE MANAGEMENT TASK FORCE
METROPOLITAN MANILA DEVELOPMENT AUTHORITY



[illegible]

TYPE OF VEHICLE, EQUIPMENT, OR MACHINERY: *

ACCOMPLISHED BY:

DATE: _____

LEGEND:

ENGINE+: G = Good; MIN = Minor Repair Needed; MAJ = Major Repair Needed; NS = Non-Serviceable

BODY++; G = Good; F = Fair; P = Poor

STATUS WHEN ACQUIRED**: S = Second Hand; R = Reconditioned; N = New

[illegible]

ACCOMPLISHED BY: _____

DATE: _____

Possible Types of Facilities: Depot, workshop, container base, transfer station, sanitary landfill, administration house, etc.

* For "Equipment and Tools," indicate only the major tools that could do which kind of repair job, e.g., vulcanizing, mechanical repair, automobile electrical repair, welding, etc.

FORM 3: ORGANIZATION & STAFF

Type of Personnel	Deployment (No.)							TOTAL
	A	CT	SG	FD	TS	M	O	
Administrator/Supervisor								
Health Officer								
Senior Public Inspector								
Engineer								
Public Health Officer								
Technical Assistant								
Technician/Mechanic								
Clerical Staff								
Driver								
Laborer								
TOTAL								

LEGEND: A = Administration; CT = Collection and Transportation; SG = Street Sweeping & Grass Cutting; FD = Final Disposal; TS = Transfer Station; M = Maintenance; O = Others

AGENCY/LGU: _____

ACCOMPLISHED BY: _____

DATE: _____

DIRECTORY

	<i>Office</i>	<i>Contact Person</i>	<i>Address</i>	<i>Phone</i>
Manila	Dept. of Public Services	Capt. Edmidio Espiritu	1st Flr. City Hall of Manila	527-50-27
Quezon	Task Force Clean & Green	Ms. Tetchie Rentoy	Annex Bldg., Q. C. Hall	924-38-16; 924-15-39
Caloocan	Environmental Sanitation Services	Engr. Manuel Ignacio	Biglang-awa St., Kalookan City	364-98-52
Malabon	Clean & Green- Malabon	Mr. Toto Lumanog	2nd Flr. Mal. Central	288-35-93; 446-24-63
Navotas	Solid Waste Management Office	Mr. Ernesto Mendoza	M. Naval St., Navotas	281-34-89
Valenzuela	Solid Waste Management Office	Mr. Romulo Dulay	Bagbaguin Valenzuela	443-37-28
Mandaluyong	Environmental & Greening Beautification Center	Mr. Diosdado Daylo	ESC Office Mandaluyong City Hall	53-30-05
Makati	Solid Waste Management Division	Mr. Rolando Medina	Buendia cor. South Super Hi-way, Makati	899-9050
Pasay	Environmental Sanitation Center	Ms. Belinda Alagbate	Pasay City Hall	833-3738
Paranaque	Solid Waste & Environmental Sanitation Office	Mr. Augusto Salazar	3rd Flr Paranaque Municipal Hall	828-00-11 loc.129
Las Pinas	Environmental Sanitation Center	Mr. Virgilio Manzanero	Las Pinas Municipal Bldg.	800-43-62
Muntinlupa	Environmental Sanitation Center	Ms. Lorna Misa	ESC Field Office Tunasan St., Muntinlupa	842-28-35
Pateros	Environmental Sanitation Center	Mr. Ruben Rayos del Sol	Pateros Municipal Hall	642-4629; 642-3390
Taguig	Environmental Sanitation Center	Mr. Rogelio Montemayor	Taguig Municipal Hall	642-22-12
Pasig	Environmental Sanitation Center	Mr. Antonio Adoger	C. Raymundo St. Caniogan, Pasig	641-93-51
Marikina	Waste Management Office	Ms. Gloria Buenaventura	Marikina City Hall	642-23-60 to 71 Loc. 226 and 646-16-34
San Juan	Solid Waste Management Office	Councilor Rudy Chua	San Juan Municipal Hall	742-3603
MMDA	Solid Waste Management Task Force	Architect Beato Sason	MMDA Central Office, EDSA Makati	815-6020

PRIVATE		Contact Person	Address	Telephone #
QUEZON	Greenline	Bob Campos	1901 B West Tower Pasig	631-16-64 to 68
	Transtar	Manny de Dios	1002 Aurora Blvd. Quezon City	931-69-84/921-16-17
	REN	Edison Lim	Sitio Gulod Pasong Tarno Q.C	921-29-18/921-29-18
	Halrey	Jimmy Enriquez	421 E. Rodriguez Ave. QC	109-641-2680
	CARC	Cynthia Alda Cruz	Proj. 6 Q.C.	936-36-57
	UNICORN	Jesusa C. Elbo	59 Ma. Elena St. Proj. 6 QC	920-28-01
MANILA	Dept. Public Serv.	Nelso Ocampo	1st flr. Manila City Hall	527-50-27
EAST San Juan	Tuazon trading	Mariano Tuazon		
	JRD Trucking	Ricardo Maquiling		
	BBAL Trading	Jose Arman Dy		
	EER	Elisa E. Rama	7 Market Ave. Palatiaw, Pasig	641-53-77
	SVR			
	Greenline	Bob Campos	1901 IB West Tower Phil Stock	631-16-64 to 68
	Metrowide	Romualdo S. Cruz	135-B Dr. Sixto Antonio Rosario	
	Redfox	Ernesto Manalos	126 Tortaro San Miguel Bulacan	813-35-69 loc 6
	R.B. Yap			
	IPM			
San Juan	Metro Wide	Romualdo A. Cruz	135-B Sixto Antonio Rosario	
	Greenline Envitech	Bienvenido A. Juan	Suite 488 Rudgen Bldg. #17 Shaw	631-16-64/631-15-97
Taguig	Redfox	Ernesto Manalos	126 Tortaro San Miguel Bulacan	813-35-69 loc 6
NORTH Kalookan	Felgene		63 Paso de blaz Valenzuela	292-76-67/292-71-80
	EDC		154 P. Santiaso St. Paso de Blaz	292-56-60
	R & F	Michael Galang	C-3 Dagatdagatan, Navotas Pier	292-0443
	ETS	Philip cham	Himlayang Rd. Tandang Sora	
	Mudregal	Gide Malabute	90 B Stanford st. Cubao Q.C.	913-60-74/911-26-50
	Halrey	Celso Halili	282 Gov. FF Halili Ave. Bulacan	109-641-24-96
	NJ	Emong Malonzo	Hasa-Hasa St. Dagat-dagatan	287-57-31
Malabon	MPH	Mamerto Hilario	#13 Tunsuya st. near avon	285-39-60
	HSC	Orly Posadas	241 maysilo sangandaan	287-25-02
Navotas	HSC	Orly Posadas	241 Maysilo Sangandaan	287-25-02

PRIVATE	CONTRACTOR	CONTACT PERSON	ADDRESS	TELEPHONE #
SOUTH Makati	ACY JSDG NJ Bautista REN RTM	Alexander Yao Juanito de Guzman Noel Bautista Edison Lim Ramon Torres	3008 Jose Abad Santos Ave. Makati Rm. 208 City Land II Legaspi Mkt Sitio Gulod Pasong Tandang Sora	921-56-58/921-29-18
Mandaluyong	RMMS	Diosdado Daylo	ESC Mandaluyong City	533-79-75 to 76
Muntinlupa	Redfox	Ernesto G. Manalos	126 Tartaro San Miguel Bulacan	813-35-69 loc 6
Paranaque	Greenline EJR	Alfredo C. Del Rosario	46 Sadasalin St. Sikatuna Vill QC	921-69-84
Pasay	Leg Hauling	Erlinda Salvador	35 Ins. St. GSIS QC	99-93-33

CHAPTER 5

WASTE AMOUNT FORECAST



5. FUTURE WASTE AMOUNT AND COMPOSITION FORECAST

5.1 Forecast Conditions

5.1.1 Types of Waste

This study will deal with the following types of waste:

- household waste
- commercial waste
- market waste
- institutional waste
- street sweeping waste
- river cleansing waste

5.1.2 Target Years

The years targeted for the forecast of waste amount and composition are as follows:

- 2005 for the first priority project
- 2010 for the master plan

5.1.3 Factors Affecting Waste Increase and Composition

Future waste generation and composition will be influenced by the following factors:

- social welfare and financial capacity of individual consumers/families
- industrial technology
- importation

It is difficult to forecast future waste generation and composition in Metro Manila due to the absence of data on past conditions. Nonetheless, the wastes of the Philippines should identify with the developing state of the country (e.g. GDP growth).

5.2 Forecast Future Waste Amount

5.2.1 Previous Studies

Solid waste amount and composition surveys in Metro Manila have been undertaken 5 times in the past. However, there have only been three surveys on waste generation rate: in 1982 and 1993, and by the JICA Study Team in 1997. Table 5.1 shows the results of the waste generation surveys. The waste trend established by the 1993 survey in Makati City largely differed from the results of the 1982 survey and the recent one conducted by the JICA Study Team.

Table 5.1 Comparison of Household Waste Generation Rate in Metro Manila Based on Recent and Previous Surveys

	SWM-JICA Study 1997		1982 *1	1993 *2
	Dry Season	Rainy Season		
High Income Areas	503	497	477	934
Middle Income Areas	467	435	202	352
Low Income Areas	352	336	168	737

*1: Norconsult A.S. MMSWMS, 1982

Samples were collected at the curbside of residences

*2: The Makati Waste Characterization Project (MWCP) conducted in 1993 by a local consultant hired by the Makati Mayor. In the study, waste was divided as follows:

1. Residential sector (high, middle and low income by barangay)
2. Institutional sector
3. Commercial sector
4. School sector
5. Market sector
6. Hospital sector
7. Industrial sector (barangay Pateros)

5.2.2 Waste Generation Rate

To determine the relationship between GDP and waste generation, the increase in welfare services was taken into account. Although a direct connection is not anticipated, some aspects indicating further analysis may be identified.

GDP increase is expected to have a larger impact on waste generation per capita of developing countries than of developed countries. Also, at a certain welfare level, increase in GDP remarkably changes the composition of waste.

The future waste generation rate (WGR) of Metro Manila was forecast based on the results of the study conducted by the JICA Study Team. The WGR obtained through this study showed a 2% annual increase when compared with the results of the 1982 study. GDP growth correlates with changes in waste volume. The factors that define the relationship could not be determined, however, due to sharp fluctuations in the GDP of the Philippines since 1982. In comparison with cities of other developing countries, Metro Manila has a low WGR. It is assumed to increase in the future though, and this study assumes that the increase will be as before, at 2% per annum.

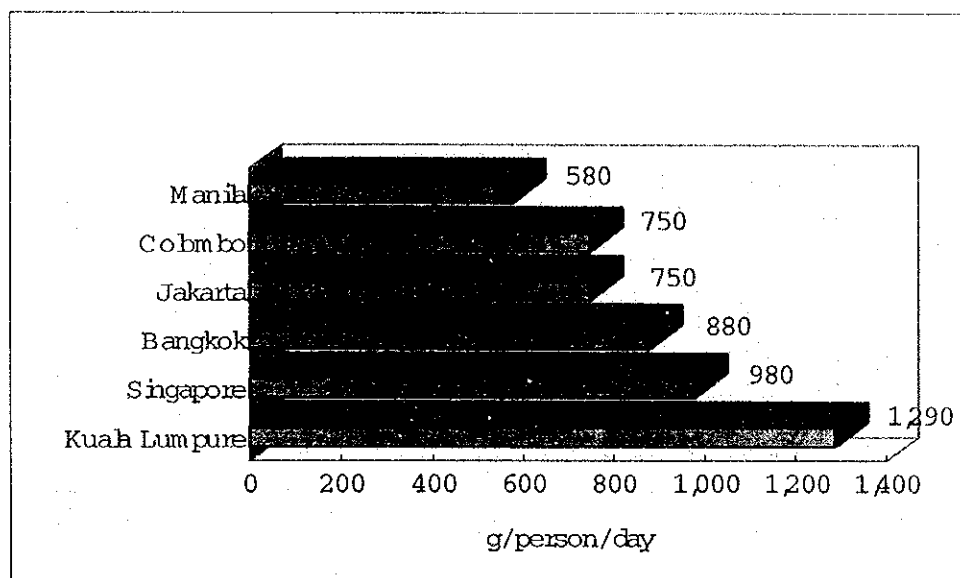


Figure 5.1 Comparison with MSW Generation Rate of Developing Countries

With the exception of household waste, the WGR of other waste types will be significantly influenced by economic developments and is estimated to increase together with the increase in household waste generation units. The increase in WGR is estimated to be similar with the increase in household waste generation units, at 2% per annum. Based on this, household UWG as of 2010 was estimated at 542 g/person/day.

Table 5.2 Waste Generation Rate Forecast

Category		Unit	1997	2000	2005	2010
Household Waste		g/person/day	419	445	491	542
Commercial Waste	Restaurants	g/shop/day	21,318	22,263	24,978	27,579
	Other Shops	g/shop/day	1,818	1,929	2,130	2,351
Institutional Waste		g/capita/day	72	75	85	95
Market Waste		g/shop/day	7,261	7,705	8,507	9,393
Street Sweeping Waste		g/km/day	10,702	11,357	12,539	13,844
River Cleansing Waste		g/km/day	18,062	19,167	21,162	23,364

5.2.3 Waste Amount Forecast

Generation Source Units

1) Population

Population change directly influences waste generation the most. The estimated annual population growth in the Study Area by planning period is tabulated in Table 5.3.

Table 5.3 Population Estimates

LGU	(persons)			
	1997	2000	2005	2010
Manila	1,654,761	1,644,000	1,638,000	1,623,000
Quezon	1,989,419	2,349,000	2,752,000	3,140,000
Caloocan	1,023,159	1,279,000	1,514,000	1,743,000
Navotas	229,039	266,000	297,000	325,000
Valenzuela	437,165	550,000	683,000	821,000
Malabon	347,484	419,000	482,000	542,000
Marikina	357,231	420,000	490,000	557,000
Pasig	471,075	561,000	663,000	762,000
Pateros	55,286	60,000	66,000	71,000
San Juan	124,187	132,000	145,000	155,000
Taguig	381,250	499,000	643,000	798,000
Makati	484,176	522,000	561,000	594,000
Pasay	408,610	454,000	503,000	546,000
Muntinlupa	399,846	565,000	783,000	1,036,000
Mandaluyong	286,870	317,000	349,000	378,000
Parañaque	391,305	476,000	574,000	672,000
Las Piñas	413,086	550,000	683,000	820,000
Total	9,454,049	11,063,000	12,826,000	14,583,000

2) Other Units

Commercial shops, market stalls, government and public offices are assumed to increase at the same rate with the population. Street sweeping and river cleansing services currently cover principal areas, and will be maintained in the future.

Forecast Waste Generation Amount

The future waste generation amount in Metro Manila was calculated based on the number of generation source units and the unit waste generation rate, using the equation below. The results indicate that the waste generation amount in Metro Manila in 2010 will be 10,300 tons/day, twice as much as present.

$$[\text{Waste Generation Amount}] = [\text{Waste Generation Rate}] \times [\text{Unit Number}]$$

Table 5.4 Waste Generation Amount (unit : ton/year)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		Restaurant	Other Shops					
1997	3,963.61	437.15	547.60	327.94	40.02	22.63	6.06	5,345.01
2000	4,923.07	504.62	645.08	395.15	47.09	23.99	6.46	6,545.46
2005	6,297.55	607.56	792.97	494.45	60.28	26.49	7.13	8,286.43
2010	7,903.98	724.70	962.54	608.93	74.71	29.24	7.86	10,311.96

5.3 Waste Composition Forecast

5.3.1 Physical Composition Forecast

Waste composition is assumed to change in consideration of new products in the market and a different consumption pattern.

Table 5.5 compares the MSW composition data of previous surveys and the data obtained from the WACS.

Table 5.5 Comparison of MSW Composition Data

	1982	1993	1997		1994
			WACS Household Waste	WACS MSW	Tokyo
Physical Composition (%)					
1. Combustibles	73.70	81.52	89.39	89.10	85.15
Kitchen Waste	36.50	33.27	45.82	45.35	25.11
Paper	14.50	11.87	15.39	16.80	35.64
Textile	1.80	4.67	4.33	3.88	3.44
Plastic	7.50	8.54	15.60	15.62	15.16
Grass & Wood	11.90	20.77	7.45	6.71	4.42
Leather & Rubber	1.50	2.40	0.80	0.74	1.38
2. Non-Combustibles	26.30	18.48	10.61	10.90	14.85
Metal	5.80	4.30	5.47	5.21	6.43
Glass	3.20	2.90	2.69	3.37	5.46
Ceramic & Stones	11.80	5.70	1.26	1.12	0.40
Others	5.50	5.58	1.20	1.20	2.56
Total	100.0	100.00	100.00	100.00	100.00
Apparent Specific Gravity (kg/m ³)	-	-	180	180	-

Wastes in Metro Manila contain a high proportion of paper and plastics, as is the case in developed nations. Also, because of progressive urbanization, the ratio of grass and wood has decreased. Taking this into account, the waste composition forecast particularly focused on the rate of increase in paper and plastics, and the rate of decrease in grass and wood (see Table 5.6). The waste composition in Metro Manila is assumed to undergo the following changes:

- The rate of increase in paper and plastics will be 19% and 17%, respectively.
- The rate of grass and wood will fall to 5% due to reduced urban vegetation
- Only minor changes are observed in other constituents

Table 5.6 Forecast MSW Composition

unit: %			
Composition	1997	2005	2010
1. Combustibles	89.10	89	89
Kitchen Waste	45.35	44	42
Paper	16.80	18	19
Textile	3.88	4	5
Plastic	15.62	16	17
Grass & Wood	6.71	6	5
Leather & Rubber	0.74	1	1
2. Non-Combustibles	10.90	11	11
Metal	5.21	6	6
Glass	3.37	3	3
Ceramic & Stone	1.12	1	1
Others (soils, etc.)	1.10	1	1
Total	100.0	100	100

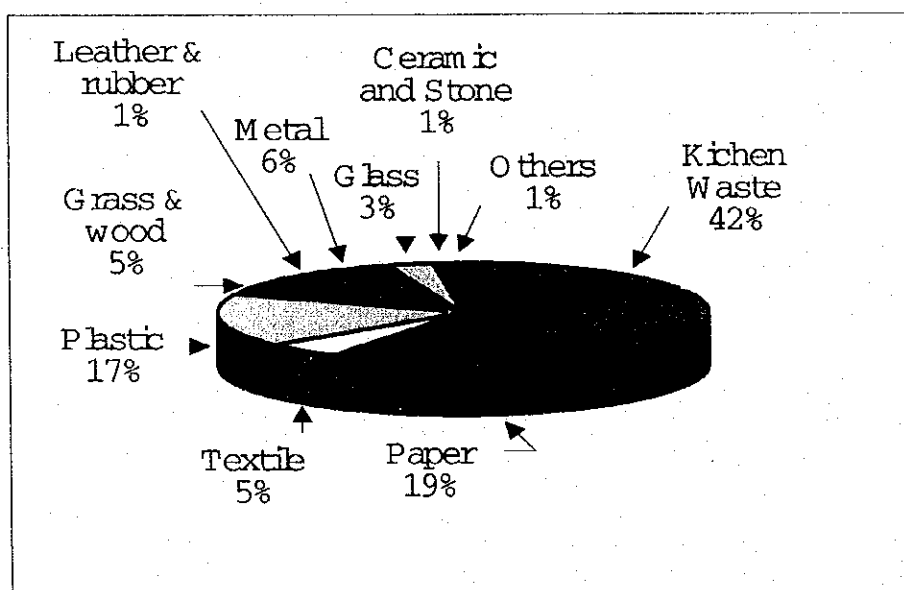


Figure 5.2 Waste Composition in 2010

5.3.2 Forecast Calorific Value

LCV of the Physical Composition of Each Waste Category

The calorific values of the following were measured in the WACS:

- combustibles from 8 generation sources, i.e. residential areas (high, middle, low income), markets, commercial areas (restaurants, etc.), institutions, roads
- each combustible item from middle income residential areas

The calorific value of waste differs according to physical composition, moisture content, combustible matter and ash contain, and the ratio of combustible waste and ash depends on the physical changes that occur. Table 5.7 shows the data on mixed combustibles as surveyed through this study and in 1982.

Table 5.7

Comparison of Moisture, Combustible, Ash Content and LCV

		1997 JICA Study		1982
		Household	MSW	
Moisture Content	(%)	45.76	45.00	42.6
Combustible Content	(%)	45.89	46.65	33.8
Ash Content	(%)	8.35	8.35	23.6
Lower Calorific Value	(kcal/kg)	1,686	1,709	1,843

The 1997 data obtained by the JICA Study Team shown in the table are weighing average figures of mixed wastes, taking the waste generation ratio by each category into account. The moisture content ranged between 30% - 55%.

The lower calorific value was high, mainly because of the high proportion of paper and plastics in the waste. However, the value is lower than in 1982. The following are pointed from data between in 1982 and 1997 ;

- Increase of moisture content from 1982 to 1997 is accurately accompanied by a decrease of calorific value .
- On the other hand, an increase of combustibles contents specially high calorific value plastic content is accompanied by a decrease in calorific value and not, as expected, an increase.
- The calorific value was estimated as follows;

The higher calorific value (HCV) in dry base of each combustible component of waste from middle income residential areas was also measured to calculate the lower calorific values (LCV), as shown in Table 5.8.

Table 5.8

HCV in Dry Base and LCV in Wet Base of Combustible Wastes

Combustible Wastes	HCV in Dry Base (kcal/kg)	LCV in Wet Base (kcal/kg)
Kitchen Waste	3,572	482
Paper	3,672	2,492
Textile	4,198	1,852
Plastic	6,566	3,406
Grass & Wood	3,555	1,139
Leather & Rubber	8,401	7,343

The LCV of wastes was calculated as follows:

$$LCV = (Rga^{*1} \cdot 482 + Rpa^{*2} \cdot 2,492 + RT^{*3} \cdot 1,852 + RPI^{*4} \cdot 3,406 + RGr^{*5} \cdot 1,139 + RL^{*6} \cdot 7,343) / 100$$

where,

- Rga^{*1} = ratio of kitchen waste in wet weight (%)
 Rpa^{*2} = ratio of paper in wet weight (%)
 RT^{*3} = ratio of textile in wet weight (%)
 RPI^{*4} = ratio of plastic in wet weight (%)
 RGr^{*5} = ratio of grass and wood in wet weight (%)
 RL^{*6} = ratio of leather and rubber in wet weight (%)

The calorific value was calculated as 1,570kcal/kg in 1997. The difference between the

analysis and calculation was only 140 kcal/kg which is a reliable figure. On the other hand, the calorific value was estimated as 1,455kcal/kg in 1982. The difference of an analyzed and calculated data was around 400 kcal/kg.

5.9 Comparison calorific value between analysis basis data and estimation data(kcal/kg)

	1997	1982
Analysis	1,709	1,843
Estimation	1,570	1455
Difference	139	388

Lower calorific value forecast

Using the above mentioned formula, the future MSW LCV is estimated by multiplying the LCV in Table 5.8 by the ratio of the future physical composition shown in Table 5.6.

In case a separate collection system will not be introduced, the LCV of mixed waste is estimated as shown in Table 5.9.

Table 5.9 Lower Calorific Value Forecast

Year	Lower Calorific Value (kcal/kg)
1997	1,570
2005	1,597
2010	1,661

5.4 Future Waste Stream

5.4.1 Forecast Conditions

Recycling

The recycling rate in Metro Manila was set as shown in the table below.

Table 5.10 Recycling Rate

		1998-2004	2005	2010
Source Recycling	by NGO	4	6	6
	by LGU	0	0	(2)*
Recycling by collectors		1	0	0
Recycling by waste pickers		1	0	0
Recycling in recycling center		0	0	2*
Recycling in composting plant		0	1	2
Total		6	7	10

* Recyclable materials collected by LGU will be hauled to recycling plant for segregation

Source Recycling

The recyclable amount at the source varies according to changes in waste quality, socioeconomic activities, and policies to promote recycling activities. As stated in section c (Future Waste Composition), there will be no significant changes in the quality of waste in Metro Manila in the future. However, the recyclable amount might increase if separate discharge at the source is implemented in the future.

Taking this into account, the recyclable amount at the time of discharge is set as follows:

- The current recycling rate is 6% according to the WACS results.
 - The rate of recyclable materials recovered by NGOs at discharge sources is 4%.
 - The rate of recyclable materials recovered by waste collectors is 1%.
 - The rate of recyclable materials recovered by waste pickers is 1%.

The recyclable waste volume is considered to increase with the waste generation amount, and the increase rate by 2005 will be set as in the present. Recovery of recyclable materials by waste collectors and pickers will be terminated from 2005 as a result of improved collection efficiency and closure of open dumpsites. Also, the commencement of resource-recovery at the discharge source will enable the segregation of recyclable materials recovered by collectors and waste pickers at the discharge source. The satisfactory execution of segregated collection is predicted to increase the recycling rate, and the rate of recycling at generation sources as of 2010 was set at 8%, 2% higher than the present.

- The collection of recyclable materials at discharge sources will be entrusted to NGOs, as in the present. To supplement NGO recycling activities, the collection of a part of the generated recyclable materials will be done by the LGUs after 2010. Collected recyclable materials will be segregated at the recycling center.

1) Recycling at the Recycling Center (RRC)

From 2010, a part of the recyclable materials segregated from other wastes at discharge sources will be collected by LGUs, and segregated again at the recycling center. This study assumes that recyclable materials make up 2% of the generated waste amount.

2) Recycling in Composting Plant (RCP)

From 2005, a part of the market waste will be recycled by composting. The amount of market waste for composting will be gradually increased: 5% in 2005 and 58% in 2010. The compost volume that would result from the 5%, however, would only be equivalent to 1% of the total waste generation volume. For 2010, the project aims to actually recycle 2% of the total waste generation volume out of 58% of market waste.

Table 5.11 Recycling Rate and Amount by Composting

	2005	2010
Recycling Rate	1%	2%
Composting Amount	14t/day	206t/day
Market Waste Amount	24.72t/day (5% of market waste)	356t/day (58% of market waste)

According to the WACS results, the market wastes (58%) for composting in 2010 will be made up of organic materials.

Self-disposal (Collection Area)

The residential environment significantly affects self-disposal. The population of Metro Manila is predicted to further increase and, as a consequence, housing spaces are presumed to significantly change by district. The housing space per person in areas urbanized to a certain extent is assumed to decrease, as opposed to the surrounding areas which are less urbanized.

In consideration thereof, the self-disposal amount in collection areas was set at 5% of the generation amount, about the same as in the present.

$$SD = G \times 0.05 \text{ where,}$$

SD	:	Self-disposal amount (t/day)
G	:	Generation amount (t/day)
0.05	:	Self-disposal rate

Discharge

The waste discharge amount is obtained as follows:

$$D = G - SR - SD \text{ where,}$$

D	=	Discharge amount (ton/day)
G	=	Generation amount (ton/day)
SR	=	Source recycling amount by LGU (ton/day)
SD	=	Self-disposal amount (t/day)

Collection

The present collection ratio in the entire Metro Manila is approximately 73%. This is expected to increase to 80% in 2005 and 90% in 2010 as a result of the planned expansion of service area coverage. Table 5.12 shows the future collection ratio by LGU. These collection ratios were established with due consideration of areas, e.g. squatter areas, where collection is difficult to implement.

$$C = D \times [\text{collection coverage (\%)}] \div 100$$

Table 5.12 Collection Coverage (%)

	1997	2000	2005	2010
Manila	62.54	63	70	85
Quezon	83.34	84	90	95
Caloocan	37.33	38	50	70
Navotas	39.56	40	50	70
Valenzuela	78.01	79	80	90
Malabon	62.61	63	75	90
Marikina	50.91	51	60	85
Pasig	95.72	96	100	100
Pateros	70.47	71	80	90
San Juan	71.74	72	80	90
Taguig	56.79	57	65	85
Makati	97.86	98	100	100
Pasay	96.23	97	100	100
Muntinlupa	94.20	95	100	100
Mandaluyong	97.20	98	100	100
Parañaque	67.52	68	75	85
Las Piñas	87.41	88	90	95
Total	72.77	73	80	90

Final Disposal

The final disposal amount is calculated as follows:

$$FD = C - RRC - RCP + DHW$$

where,

FD	:	Final disposal amount (t/day)
C	:	Collection amount (t/day)
RRC	:	Recycling amount in recycling center
RCP	:	Recycling amount in composting plant
DHW	:	Direct haulage waste amount (t/day)

5.4.2 Future Waste Stream

The future waste streams are presented in Table 5.13 and 5.14 and Figure 5.3 and 5.4.

Five (5) percent of the waste generation amount is self-disposed either by burning in open fields or burying; five (6) percent are recycled (bottles, cans, paper, plastics) by NGOs. The rest are discharged into a landfill. Due to spatial restrictions (e.g. inaccessibility), however, some (9%) of the generated waste amount are not collected.

The amount of waste to be collected in 2010 is estimated to reach 8,400 tons/day.

The collected waste amount will be disposed of into a landfill. But for a better solid waste management system, a combination of appropriate technical systems, e.g. transfer station for haulage efficiency and intermediate treatment facilities for waste volume reduction and resource-recovery, will be adopted. The amount of non-hazardous industrial waste to be disposed in the future is estimated at 860 tons/day.

Table 5.13 Waste Stream (2005)

	Generation Amount	Self Disposal Amount	Recycling Amount			Discharge Amount	Collection Amount	Non-Collection Amount	Landfill Amount		
			Non-collection	Collection	Total				Municipal Solid Waste	Industrial Solid Waste (Directly Haulage)	Total
Manila	1,419.62	59.13	89.82	3.20	93.02	1,270.67	889.47	381.20	886.27	35.95	922.22
Quezon	1,686.13	99.35	106.68	2.87	109.55	1,480.10	1,332.09	148.01	1,329.22	0.00	1,329.22
Caloocan	848.10	54.66	53.66	0.96	54.62	739.78	369.89	369.89	368.93	0.00	368.93
Navotas	171.86	10.72	10.87	0.16	11.03	150.27	75.14	75.13	74.98	0.00	74.98
Valenzuela	395.17	24.66	25.00	0.77	25.77	345.51	276.41	69.10	275.64	0.00	275.64
Malabon	280.71	17.40	17.76	0.26	18.02	245.55	184.16	61.39	183.90	0.00	183.9
Marikina	299.92	17.69	18.98	0.58	19.56	263.25	157.95	105.30	157.37	0.00	157.37
Pasig	414.63	23.93	26.23	1.22	27.45	364.47	364.47	-0.00	363.25	98.57	461.82
Pateros	38.62	2.38	2.44	0.01	2.45	33.80	27.04	6.76	27.03	0.00	27.03
San Juan	110.08	5.23	6.96	0.35	7.31	97.89	78.31	19.58	77.96	0.00	77.96
Taguig	337.06	23.21	21.33	0.32	21.65	292.52	190.14	102.38	189.82	0.00	189.82
Makati	439.71	20.25	27.82	0.51	28.33	391.64	391.64	0.00	391.13	242.69	633.82
Pasay	302.45	18.16	19.14	0.61	19.75	265.15	265.15	0.00	264.54	145.53	410.07
Muntinlupa	506.37	28.27	32.04	0.67	32.71	446.06	446.06	0.00	445.39	66.41	511.8
Mandaluyong	275.18	12.60	17.41	0.74	18.15	245.17	245.17	0.00	244.43	14.24	258.67
Paranaque	373.18	20.72	23.61	0.55	24.16	328.85	246.64	82.21	246.09	0.00	246.09
Las Pinas	387.64	24.66	24.53	0.57	25.10	338.45	304.61	33.84	304.04	96.45	400.49
Total	8,286.43	463.02	524.28	14.35	538.63	7,299.13	5,844.34	1,454.79	5,829.99	699.84	6,529.83

Table 5.14 Waste Stream (2010)

	Generation Amount	Self Disposal Amount	Recycling Amount			Discharge Amount	Collection Amount	Non-Collection Amount	Landfill Amount		
			Non-collection	Collection	Total				Municipal Solid Waste	Industrial Solid Waste (Directly Haulage)	Total
Manila	1,552.95	51.94	85.41	62.12	147.53	1,415.60	1,203.26	212.34	1,141.14	39.32	1,180.46
Quezon	2,123.40	100.48	116.79	84.94	201.73	1,906.13	1,810.82	95.31	1,725.88	0.00	1,725.88
Caloocan	1,076.89	55.78	59.23	43.08	102.31	961.88	673.32	288.56	630.24	0.00	630.24
Navotas	207.54	10.40	11.41	8.30	19.71	185.73	130.01	55.72	121.71	0.00	121.71
Valenzuela	524.29	26.27	28.84	20.98	49.82	469.18	422.26	46.92	401.28	0.00	401.28
Malabon	348.35	17.34	19.16	13.94	33.10	311.85	280.67	31.18	266.73	0.00	266.73
Marikina	376.13	17.82	20.69	15.04	35.73	337.62	286.98	50.64	271.94	0.00	271.94
Pasig	525.50	24.38	28.90	21.02	49.92	472.22	472.22	0.00	451.20	124.93	576.13
Pateros	45.87	2.27	2.52	1.84	4.36	41.08	36.97	4.11	35.13	0.00	35.13
San Juan	129.76	4.96	7.14	5.20	12.34	117.66	105.89	11.77	100.69	0.00	100.69
Taguig	461.58	25.54	25.39	18.46	43.85	410.65	349.05	61.60	330.59	0.00	330.59
Makati	513.79	19.01	28.26	20.56	48.82	466.52	466.52	0.00	445.96	283.57	729.53
Pasay	362.36	17.47	19.93	14.50	34.43	324.96	324.96	0.00	310.46	174.35	484.81
Muntinlupa	739.32	33.15	40.66	29.58	70.24	665.51	665.51	0.00	635.93	96.96	732.89
Mandaluyong	328.93	12.10	18.09	13.16	31.25	298.74	298.74	0.00	285.58	17.02	302.60
Paranaque	482.05	21.50	26.51	19.28	45.79	434.04	368.93	65.11	349.65	0.00	349.65
Las Pinas	513.25	26.24	28.23	20.54	48.77	458.78	435.84	22.94	415.30	127.70	543
Total	10,311.96	466.65	567.16	412.54	979.70	9,278.15	8,331.95	946.20	7,919.41	863.85	8,783.26

Figure 5.3 Waste Flow in Metro Manila (2005)

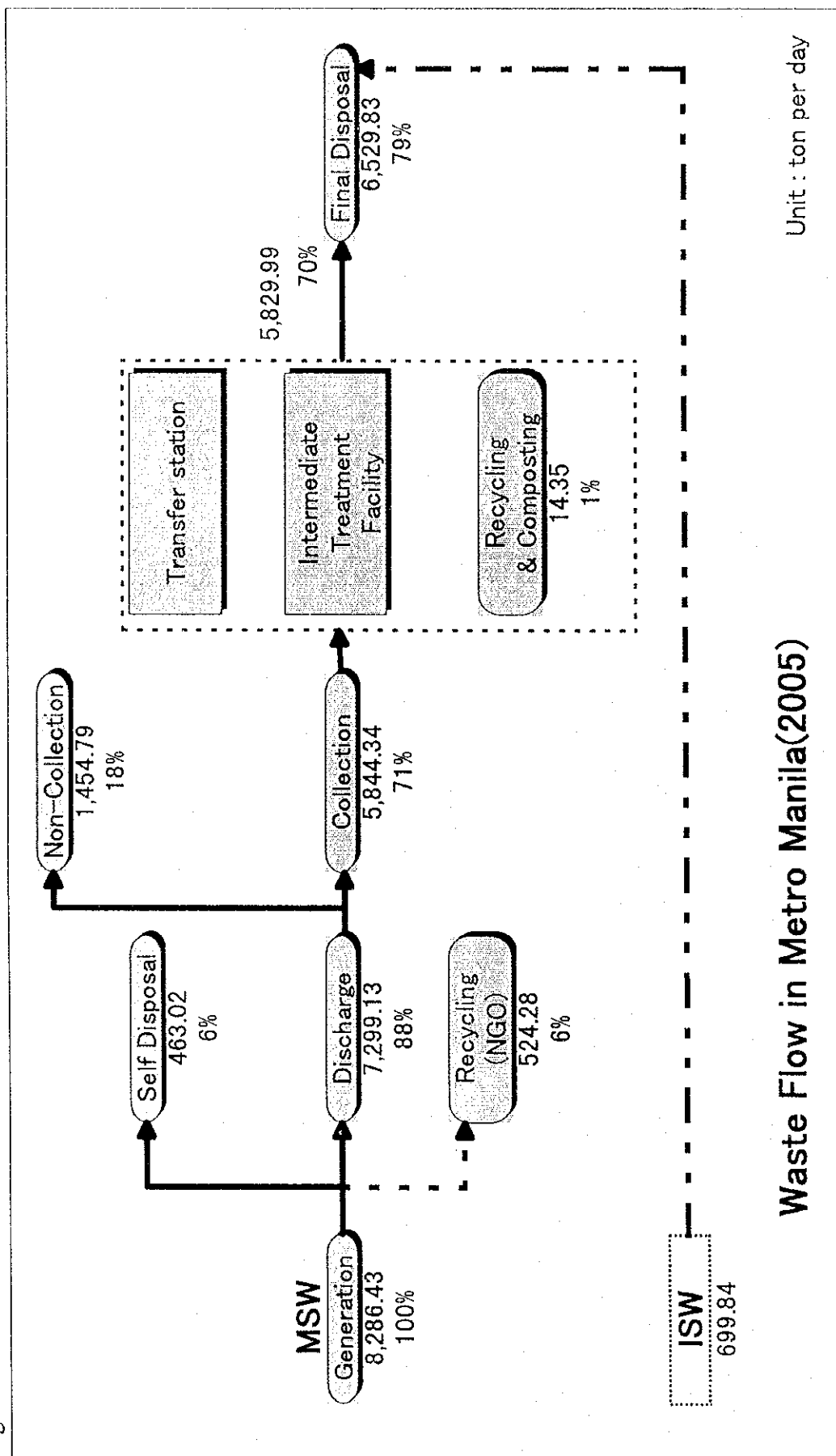


Figure 5.4 Waste Flow in Metro Manila (2010)

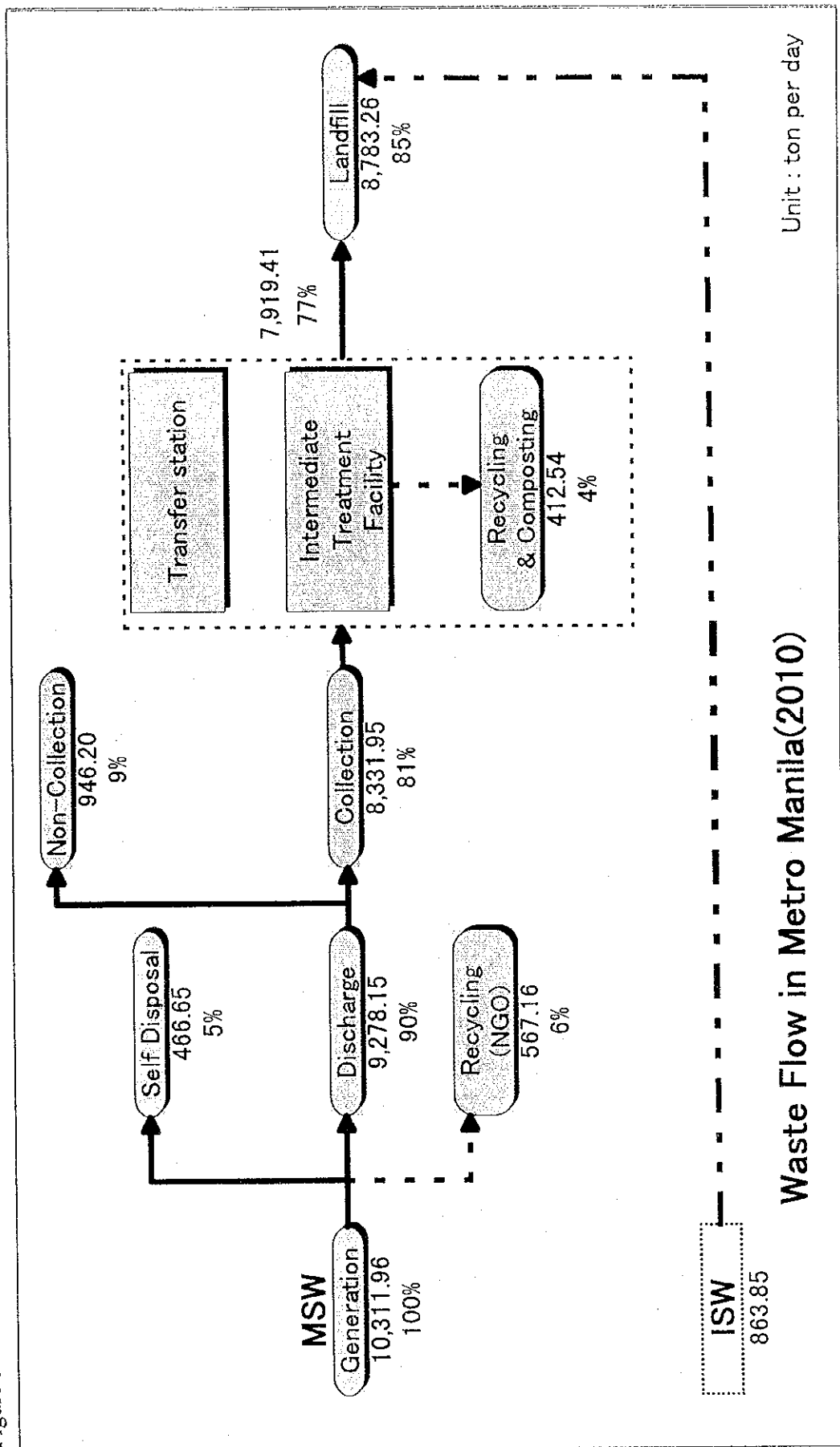


Table 5.15 Generation Ratio (1)

Summary of Waste Amount Survey(Dry Season)

Category	Unit	City			Average
		Quezon	Makati	Paranaque	
High Income	g/day/person	459	534	517	503
Middle Income	g/day/person	445	463	494	467
Low Income	g/day/person	400	352	305	352
Restaurant	g/day/shop	9,807	42,307	8,471	20,195
Other shops	g/day/shop	1,568	2,379	1,205	1,717
Institution	g/day/person	57	156	36	83
Market	g/day/shop	4,390	2,910	20,417	9,239
Street sweeping	g/day/km	9,700	21,860	3,430	11,663
River cleansing	g/day/km	80,060	4,270	13,250	32,527

Summary of Waste Amount Survey(Rainy Season)

Category	Unit	City			Average
		Quezon	Makati	Paranaque	
High Income	g/day/person	471	572	448	497
Middle Income	g/day/person	453	401	452	435
Low Income	g/day/person	344	327	337	336
Restaurant	g/day/shop	20,760	41,157	5,407	22,441
Other shops	g/day/shop	1,807	1,921	2,030	1,919
Institution	g/day/person	60	46	78	61
Market	g/day/shop	3,740	4,980	7,130	5,283
Street sweeping	g/day/km	11,420	16,160	1,640	9,740
River cleansing	g/day/km	3,050	2,920	4,820	3,597

Generation Ratio by Sources

Category	Unit	Generation Ratio
High Income	g/day/person	500
Middle Income	g/day/person	451
Low Income	g/day/person	344
Restaurant	g/day/shop	21,318
Other shops	g/day/shop	1,818
Institution	g/day/person	72
Market	g/day/shop	7,261
Street sweeping	g/day/km	10,702
River cleansing	g/day/km	18,062

Waste Generation Ratio in Metro Manila

	Generation Ratio (g/day/person)	Percentage of Families by Income Class (%)
High Income	500	0.16%
Middle Income	451	0.47%
Low Income	344	0.37%

$$500 \times 0.16 + 451 \times 0.47 + 344 \times 0.37 =$$

419.25

419

Table 5.16 Generation Ratio (2)

Category	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
High Income	500	510	520	530	541	552	563	574	585	597	609	621	633	646
Middle Income	451	460	469	478	488	498	508	518	528	539	550	561	572	583
Low Income	344	351	358	365	372	379	387	395	403	411	419	427	436	445
Average	419	427	436	445	454	463	472	481	491	501	511	521	531	542
Restaurant	21,318	21,744	22,179	22,623	23,075	23,537	24,008	24,488	24,978	25,478	25,988	26,508	27,038	27,579
Other shops	1,818	1,854	1,891	1,929	1,968	2,007	2,047	2,088	2,130	2,173	2,216	2,260	2,305	2,351
Institution	72	73	74	75	77	79	81	83	85	87	89	91	93	95
Market	7,261	7,406	7,554	7,705	7,859	8,016	8,176	8,340	8,507	8,677	8,851	9,028	9,209	9,393
Street sweeping	10,702	10,916	11,134	11,357	11,584	11,816	12,052	12,293	12,539	12,790	13,046	13,307	13,573	13,844
River cleansing	18,062	18,423	18,791	19,167	19,550	19,941	20,340	20,747	21,162	21,585	22,017	22,457	22,906	23,364

Table 5.17 Unit No. of Generation Sources (1997)

	Population (person)	Shops/Stores		No. of Stalls in the Market			No. of Employees			Length of Streets for Sweeping Services (Km)	Length of River for Cleansing Services (Km)
		Restaurant	Others	Public	Private	Talipapa	Total	Government Employees	Municipal Employees		
		(shop)	(shop)	(shop)	(shop)	(shop)	(shop)	(employee)	(employee)	(employee)	(employee)
Manila	1,654,761	9,514	121,015	10,044	2,238	796	13,078	113,995	13,605	127,600	261.5
Quezon	1,989,419	699	58,810	3,348	4,933	132	8,413	275,540	6,594	282,134	240.0
Caloocan	1,023,159	948	9,366	480	1,901	239	2,620	7,702	4,111	11,813	438.2
Navotas	229,039	506	1,293	0	150	348	498	0	660	660	31.4
Valenzuela	437,165	228	7,029	1,309	420	255	1,984	4,237	1,268	5,505	10.0
Malabon	347,484	511	5,649	308	382	68	758	0	1,246	1,246	10.8
Marikina	357,231	371	8,560	921	592	209	1,722	70	1,270	1,340	100.0
Pasig	471,075	566	7,291	3,000	110	403	3,513	13,828	884	14,712	260.7
Pateros	55,286	85	1,338	0	12	0	12	0	208	208	11.1
San Juan	124,187	332	6,177	1,200	25	0	1,225	748	630	1,378	107.6
Taguig	381,350	103	1,286	274	320	182	776	2,710	1,053	3,763	39.1
Makati	484,176	2,765	23,400	546	1,073	161	1,780	49,401	7,418	56,819	256.6
Pasay	408,610	522	5,614	795	1,180	50	2,025	20,673	3,087	23,760	33.0
Muntinlupa	399,846	901	12,634	1,119	246	33	1,398	4,238	2,020	6,258	43.4
Mandaluyong	286,870	1,585	10,951	955	1,364	145	2,464	4,713	2,895	7,608	74.6
Paranaque	391,305	701	14,196	340	932	239	1,511	4,194	4,783	8,977	99.8
Las Pinas	413,086	169	6,591	840	375	175	1,390	0	1,936	1,936	95.0
Total	9,454,049	20,506	301,200	25,479	16,253	3,435	45,167	502,049	53,668	555,717	2,112.7
											336.7

Sources:

* Population: 1995 National Statistic Office(NSO)

*No. of Shops/stores: LGU's Business Permits & Licensing Office, City/Mun. Planning & Dev. Office; Manila's Computer Services

*No. of Stalls in the Market: Public Market – LGU's Market Administration, Business Permits & Lic. Office & Makati's Office of Coun.

Javier Public and Talipapa – counted by JICA study team based on the market list.

*No. of employees: Field Office Coordination Center, Civil Service Commission– National Capital Region (December 1996 Data)

*Length of Streets for Sweeping Services : Manila's Dep. of Public Services, Navotas Planning Office, Environmental Sanitation

Office of other LGUs

*Length of River for Cleansing Services : Manila's Dept of Public Services, Navotas Planning Office, Mandaluyong City's

Environmental Sanitation Office

Table 5.18 Unit No. of Generation Sources (2000)

	Population	Shops/Stores		No. of Stalls in the Market			No. of Employees			Length of Streets for Sweeping Services (Km)	Length of River for Cleansing Services (Km)	
		Restaurant	Others	Public	Private	Tailorapa	Total	Government Employees	Municipal Employees			total
	(person)	(shop)	(shop)	(shop)	(shop)	(shop)	(shop)	(employee)	(employee)	(employee)		
Manila	1,644,000	9,452	120,228	9,979	2,223	791	12,993	113,254	13,517	126,771	261.5	39.0
Quezon	2,349,000	825	69,440	3,953	5,825	156	9,934	325,343	7,786	333,129	240.0	108.2
Caloocan	1,279,000	1,185	11,708	600	2,376	299	3,275	9,628	5,139	14,767	438.2	10.0
Navotas	266,000	588	1,502	0	174	404	578	0	767	767	31.4	5.0
Valenzuela	550,000	287	8,843	1,647	528	321	2,496	5,331	1,595	6,926	10.0	15.0
Malabon	419,000	616	6,812	371	461	82	914	0	1,502	1,502	10.8	20.0
Marikina	420,000	436	10,064	1,083	696	246	2,025	82	1,493	1,575	100.0	5.0
Pasig	561,000	674	8,683	3,573	131	480	4,184	16,468	1,053	17,521	260.7	11.3
Pateros	60,000	92	1,452	0	13	0	13	0	226	226	11.1	0.7
San Juan	132,000	353	6,566	1,275	27	0	1,302	795	670	1,465	107.6	8.0
Taguig	499,000	135	1,683	359	419	238	1,016	3,546	1,378	4,924	39.1	10.0
Makati	522,000	2,981	25,228	589	1,157	174	1,920	53,260	7,997	61,257	256.6	5.0
Pasay	454,000	580	6,238	883	1,311	56	2,250	22,969	3,430	26,399	33.0	27.5
Muntinlupa	565,000	1,273	17,852	1,581	348	47	1,976	5,988	2,854	8,842	43.4	13.8
Mandaluyong	317,000	1,751	12,101	1,055	1,507	160	2,722	5,208	3,199	8,407	74.6	2.2
Paranaque	476,000	853	17,269	414	1,134	291	1,839	5,102	5,818	10,920	99.8	4.0
Las Pinas	550,000	225	8,776	1,118	499	233	1,850	0	2,578	2,578	95.0	52.0
Total	11,063,000	22,306	334,445	28,480	18,829	3,978	51,287	566,974	61,002	627,976	2,112.7	336.7

Table 5.19 Unit No. of Generation Sources (2005)

	Population (person)	Shops/Stores		No. of Stalls in the Market				No. of Employees			Length of Streets for Sweeping Services (Km)	Length of River for Cleansing Services (Km)
		Restaurant	Others	Public	Private	Talipapa	Total	Government Employees	Municipal Employees	total		
		(shop)	(shop)	(shop)	(shop)	(shop)	(shop)	(employee)	(employee)	(employee)		
Manila	1,638,000	9,418	119,789	9,942	2,215	788	12,945	112,840	13,467	126,307	261.5	39.0
Quezon	2,752,000	967	81,353	4,631	6,824	183	11,638	381,160	9,122	390,282	240.0	108.2
Caloocan	1,514,000	1,403	13,859	710	2,813	354	3,877	11,397	6,083	17,480	438.2	10.0
Navotas	297,000	656	1,677	0	195	451	646	0	856	856	31.4	5.0
Valenzuela	683,000	356	10,982	2,045	656	398	3,099	6,620	1,981	8,601	10.0	15.0
Malabon	482,000	709	7,836	427	530	94	1,051	0	1,728	1,728	10.8	20.0
Marikina	490,000	509	11,741	1,263	812	287	2,362	96	1,742	1,838	100.0	5.0
Pasig	663,000	797	10,261	4,222	155	567	4,944	19,462	1,244	20,706	260.7	11.3
Pateros	66,000	101	1,597	0	14	0	14	0	248	248	11.1	0.7
San Juan	145,000	388	7,212	1,401	29	0	1,430	873	736	1,609	107.6	8.0
Taguig	643,000	174	2,168	462	540	307	1,309	4,569	1,775	6,344	39.1	10.0
Makati	561,000	3,204	27,113	633	1,243	187	2,063	57,239	8,595	65,834	256.6	5.0
Pasay	503,000	643	6,911	979	1,453	62	2,494	25,449	3,800	29,249	33.0	27.5
Muntinlupa	783,000	1,764	24,741	2,191	482	65	2,738	8,299	3,956	12,255	43.4	13.8
Mandaluyong	349,000	1,928	13,323	1,162	1,659	176	2,997	5,734	3,522	9,256	74.6	2.2
Paranaque	574,000	1,028	20,824	499	1,367	351	2,217	6,152	7,016	13,168	99.8	4.0
Las Pinas	683,000	279	10,898	1,389	620	289	2,298	0	3,201	3,201	95.0	52.0
Total	12,826,000	24,324	372,285	31,956	21,607	4,559	58,122	639,890	69,072	708,962	2,112.7	336.7

Table 5.20 Unit No. of Generation Sources (2010)

	Population	Shops/Stores		No. of Stalls in the Market			No. of Employees			Length of Streets for Sweeping Services (Km)	Length of River for Cleansing Services (Km)	
		Restaurant	Others	Public	Private	Talipapa	Total	Government Employees	Municipal Employees			total
	(person)	(shop)	(shop)	(shop)	(shop)	(shop)	(shop)	(employee)	(employee)	(employee)		
Manila	1,623,000	9,331	118,692	9,851	2,195	781	12,827	111,807	13,344	125,151	261.5	39.0
Quezon	3,140,000	1,103	92,823	5,284	7,786	208	13,278	434,899	10,408	445,307	240.0	108.2
Caloocan	1,743,000	1,615	15,955	818	3,238	407	4,463	13,121	7,003	20,124	438.2	10.0
Navotas	325,000	718	1,835	0	213	494	707	0	937	937	31.4	5.0
Valenzuela	821,000	428	13,201	2,458	789	479	3,726	7,957	2,381	10,338	10.0	15.0
Malabon	542,000	797	8,811	480	596	106	1,182	0	1,943	1,943	10.8	20.0
Marikina	557,000	578	13,347	1,436	923	326	2,685	109	1,980	2,089	100.0	5.0
Pasig	762,000	916	11,794	4,853	178	652	5,683	22,368	1,430	23,798	260.7	11.3
Pateros	71,000	109	1,718	0	15	0	15	0	267	267	11.1	0.7
San Juan	155,000	414	7,710	1,498	31	0	1,529	934	786	1,720	107.6	8.0
Taguig	798,000	216	2,691	573	670	381	1,624	5,671	2,203	7,874	39.1	10.0
Makati	594,000	3,392	28,708	670	1,316	198	2,184	60,606	9,101	69,707	256.6	5.0
Pasay	546,000	698	7,502	1,062	1,577	67	2,706	27,624	4,125	31,749	33.0	27.5
Muntinlupa	1,036,000	2,334	32,735	2,899	637	86	3,622	10,981	5,234	16,215	43.4	13.8
Mandaluyong	378,000	2,089	14,430	1,258	1,797	191	3,246	6,210	3,815	10,025	74.6	2.2
Paranaque	672,000	1,204	24,379	584	1,601	410	2,595	7,202	8,214	15,416	99.8	4.0
Las Pinas	820,000	335	13,084	1,667	744	347	2,758	0	3,843	3,843	95.0	52.0
Total	14,583,000	26,277	409,415	35,391	24,306	5,133	64,830	709,489	77,014	786,503	2,112.7	336.7

Table 5.21 Population Forecast in the LGUs

LGU	(person)			
	1997	2000	2005	2010
Manila	1,654,761	1,644,000	1,638,000	1,623,000
Quezon	1,989,419	2,349,000	2,752,000	3,140,000
Caloocan	1,023,159	1,279,000	1,514,000	1,743,000
Navotas	229,039	266,000	297,000	325,000
Valenzuela	437,165	550,000	683,000	821,000
Malabon	347,484	419,000	482,000	542,000
Marikina	357,231	420,000	490,000	557,000
Pasig	471,075	561,000	663,000	762,000
Pateros	55,286	60,000	66,000	71,000
San Juan	124,187	132,000	145,000	155,000
Taguig	381,350	499,000	643,000	798,000
Makati	484,176	522,000	561,000	594,000
Pasay	408,610	454,000	503,000	546,000
Muntinlupa	399,846	565,000	783,000	1,036,000
Mandaluyong	286,870	317,000	349,000	378,000
Paranaque	391,305	476,000	574,000	672,000
Las Pinas	413,086	550,000	683,000	820,000
Total	9,454,049	11,063,000	12,826,000	14,583,000

Table 5.22 Waste Generation Amount (1997)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		Restaurant	Other Shops					
Manila	693.76	202.82	220.01	94.96	9.19	2.80	0.70	1,224.24
Quezon	834.06	14.90	106.92	61.09	20.31	2.57	1.95	1,041.80
Caloocan	428.96	20.21	17.03	19.02	0.85	4.69	0.18	490.94
Navotas	96.02	10.79	2.35	3.62	0.05	0.34	0.09	113.26
Valenzuela	183.28	4.86	12.78	14.41	0.40	0.11	0.27	216.11
Malabon	145.68	10.89	10.27	5.50	0.09	0.12	0.36	172.91
Marikina	149.77	7.91	15.56	12.50	0.10	1.07	0.09	187.00
Pasig	197.50	12.07	13.26	25.51	1.06	2.79	0.20	252.39
Pateros	23.18	1.81	2.43	0.09	0.01	0.12	0.01	27.65
San Juan	52.07	7.08	11.23	8.89	0.10	1.15	0.14	80.66
Taguig	159.88	2.20	2.34	5.63	0.27	0.42	0.18	170.92
Makati	202.99	58.94	42.54	12.92	4.09	2.75	0.09	324.32
Pasay	171.31	11.13	10.21	14.70	1.71	0.35	0.50	209.91
Muntinlupa	167.64	19.21	22.97	10.15	0.45	0.46	0.25	221.13
Mandaluyong	120.27	33.79	19.91	17.89	0.55	0.80	0.04	193.25
Paranaque	164.05	14.94	25.81	10.97	0.65	1.07	0.07	217.56
Las Pinas	173.19	3.60	11.98	10.09	0.14	1.02	0.94	200.96
Total	3,963.61	437.15	547.60	327.94	40.02	22.63	6.06	5,345.01

Table 5.23 Waste Generation Amount (2000)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		Restaurant	Other Shops					
Manila	731.58	213.83	231.92	100.11	9.51	2.97	0.75	1,290.67
Quezon	1,045.31	18.66	133.95	76.54	24.98	2.73	2.07	1,304.24
Caloocan	569.16	26.81	22.58	25.23	1.11	4.98	0.19	650.06
Navotas	118.37	13.30	2.90	4.45	0.06	0.36	0.10	139.54
Valenzuela	244.75	6.49	17.00	19.23	0.52	0.11	0.29	288.39
Malabon	186.46	13.94	13.14	7.04	0.11	0.12	0.38	221.19
Marikina	186.90	9.86	19.41	15.60	0.12	1.14	0.10	233.13
Pasig	249.65	15.25	16.75	32.24	1.31	2.96	0.22	318.38
Pateros	26.70	2.08	2.80	0.10	0.02	0.13	0.01	31.84
San Juan	58.74	7.99	12.67	10.03	0.11	1.22	0.15	90.91
Taguig	222.06	3.05	3.25	7.83	0.37	0.44	0.19	237.19
Makati	232.29	67.44	48.66	14.79	4.59	2.91	0.10	370.78
Pasay	202.03	13.12	12.03	17.34	1.98	0.37	0.53	247.40
Muntinlupa	251.43	28.80	34.44	15.23	0.66	0.49	0.26	331.31
Mandaluyong	141.07	39.61	23.34	20.97	0.63	0.85	0.04	226.51
Paranaque	211.82	19.30	33.31	14.17	0.82	1.13	0.08	280.63
Las Pinas	244.75	5.09	16.93	14.25	0.19	1.08	1.00	283.29
Total	4,923.07	504.62	645.08	395.15	47.09	23.99	6.46	6,545.46

Table 5.24 Waste Generation Amount (2005)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		Restaurant	Other Shops					
Manila	804.26	235.24	255.15	110.12	10.74	3.28	0.83	1,419.62
Quezon	1,351.23	24.15	173.28	99.00	33.17	3.01	2.29	1,686.13
Caloocan	743.37	35.04	29.52	32.98	1.49	5.49	0.21	848.10
Navotas	145.83	16.39	3.57	5.50	0.07	0.39	0.11	171.86
Valenzuela	335.35	8.89	23.39	26.36	0.73	0.13	0.32	395.17
Malabon	236.66	17.71	16.69	8.94	0.15	0.14	0.42	280.71
Marikina	240.59	12.71	25.01	20.09	0.16	1.25	0.11	299.92
Pasig	325.53	19.91	21.86	42.06	1.76	3.27	0.24	414.63
Pateros	32.41	2.52	3.40	0.12	0.02	0.14	0.01	38.62
San Juan	71.20	9.69	15.36	12.17	0.14	1.35	0.17	110.08
Taguig	315.71	4.35	4.62	11.14	0.54	0.49	0.21	337.06
Makati	275.45	80.03	57.75	17.55	5.60	3.22	0.11	439.71
Pasay	246.97	16.06	14.72	21.22	2.49	0.41	0.58	302.45
Muntinlupa	384.45	44.06	52.70	23.29	1.04	0.54	0.29	506.37
Mandaluyong	171.36	48.16	28.38	25.50	0.79	0.94	0.05	275.18
Paranaque	281.83	25.68	44.36	18.86	1.12	1.25	0.08	373.18
Las Pinas	335.35	6.97	23.21	19.55	0.27	1.19	1.10	387.64
Total	6,297.55	607.56	792.97	494.45	60.28	26.49	7.13	8,286.43

Table 5.25 Waste Generation Amount (2010)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		Restaurant	Other Shops					
Manila	879.67	257.34	279.04	120.48	11.89	3.62	0.91	1,552.95
Quezon	1,701.88	30.42	218.23	124.72	42.30	3.32	2.53	2,123.40
Caloocan	944.71	44.54	37.51	41.92	1.91	6.07	0.23	1,076.89
Navotas	176.15	19.80	4.31	6.64	0.09	0.43	0.12	207.54
Valenzuela	444.98	11.80	31.04	35.00	0.98	0.14	0.35	524.29
Malabon	293.76	21.98	20.71	11.10	0.18	0.15	0.47	348.35
Marikina	301.89	15.94	31.38	25.22	0.20	1.38	0.12	376.13
Pasig	413.00	25.26	27.73	53.38	2.26	3.61	0.26	525.50
Pateros	38.48	3.01	4.04	0.14	0.03	0.15	0.02	45.87
San Juan	84.01	11.42	18.13	14.36	0.16	1.49	0.19	129.76
Taguig	432.52	5.96	6.33	15.25	0.75	0.54	0.23	461.58
Makati	321.95	93.55	67.49	20.51	6.62	3.55	0.12	513.79
Pasay	295.93	19.25	17.64	25.42	3.02	0.46	0.64	362.36
Muntinlupa	561.51	64.37	76.96	34.02	1.54	0.60	0.32	739.32
Mandaluyong	204.88	57.61	33.92	30.49	0.95	1.03	0.05	328.93
Paranaque	364.22	33.21	57.32	24.37	1.46	1.38	0.09	482.05
Las Pinas	444.44	9.24	30.76	25.91	0.37	1.32	1.21	513.25
Total	7,903.98	724.70	962.54	608.93	74.71	29.24	7.86	10,311.96

Table 5.26 Generation Amount (1)

LGU	Generation Amount (ton/day)	Percentage Total (%)
Manila	1224.24	22.9%
Quezon	1041.8	19.5%
Caloocan	490.94	9.2%
Navotas	113.26	2.1%
Valenzuela	216.11	4.0%
Malabon	172.91	3.2%
Marikina	187	3.5%
Pasig	252.39	4.7%
Pateros	27.65	0.5%
San Juan	80.66	1.5%
Taguig	170.92	3.2%
Makati	324.32	6.1%
Pasay	209.91	3.9%
Muntinlupa	221.13	4.1%
Mandaluyong	193.25	3.6%
Paranaque	217.56	4.1%
Las Pinas	200.96	3.8%
Total	5,345.01	100.0%

Table 5.27 Generation Amount (2)

	Household Waste	Commercial Waste		Market Waste	Institutional Waste	Street Sweeping Waste	River Cleansing Waste	Total
		estauran	Other Shops					
1997	3,963.61	437.15	547.60	327.94	40.02	22.63	6.06	5,345.01
2000	4,923.07	504.62	645.08	395.15	47.09	23.99	6.46	6,545.46
2005	6,297.55	607.56	792.97	494.45	60.28	26.49	7.13	8,286.43
2010	7,903.98	724.70	962.54	608.93	74.71	29.24	7.86	10,311.96

Table 5.28 Collection Coverage

	1997	2000	2005	2010
Manila	62.54	62.4	70.00	85.00
Quezon	83.34	83.06	90.00	95.00
Caloocan	37.33	37.27	50.00	70.00
Navotas	39.56	39.37	50.00	70.00
Valenzuela	78.01	77.49	80.00	90.00
Malabon	62.61	62.6	75.00	90.00
Marikina	50.91	50.53	60.00	85.00
Pasig	95.72	95.39	100.00	100.00
Pateros	70.47	71.69	80.00	90.00
San Juan	71.74	70.83	80.00	90.00
Taguig	56.79	56.25	65.00	85.00
Makati	97.86	97.82	100.00	100.00
Pasay	96.23	95.94	100.00	100.00
Muntinlupa	94.20	93.95	100.00	100.00
Mandaluyong	97.20	97.05	100.00	100.00
Paranaque	67.52	67.17	75.00	85.00
Las Pinas	87.41	87.01	90.00	95.00
Total	72.77	72.71	80.00	90.00

Table 5.29 Waste Stream (1997)

	Generation Amount	Self Disposal Amount	Recycling Amount at Generation Stage	Discharge Amount	Collection Amount	Illegally Dumped Amount	Transfer Amount			Amount Recycled by Collector	Amount Recycled by Waste Picker
							Las Pinas Transfer Station	LGU Transfer Station/System	Total		
Manila	1,224.24	59.74	34.92	1,129.58	706.39	423.19	31.00	698.00	729.00	8.39	-
Quezon	1,041.80	71.82	41.98	928.00	773.42	154.58	0.00	756.00	756.00	17.42	25.15
Calocan	490.94	36.94	21.59	432.41	161.42	270.99	0.00	0.00	0.00	2.42	12.07
Navotas	113.26	8.27	4.83	100.16	39.62	60.54	9.00	39.00	48.00	0.62	-
Valenzuela	216.11	15.78	9.22	191.11	149.08	42.03	0.00	149.00	149.00	1.08	5.03
Malabon	172.91	12.54	7.33	153.04	95.82	57.22	0.00	0.00	0.00	0.82	20.71
Marikina	187.00	12.90	7.54	166.56	84.80	81.76	0.00	83.00	83.00	1.80	-
Pasig	252.39	17.01	9.94	225.44	215.78	9.66	0.00	211.00	211.00	4.78	-
Pateros	27.65	2.00	1.17	24.48	17.25	7.23	0.00	0.00	0.00	0.25	-
San Juan	80.66	4.48	2.62	73.56	52.77	20.79	0.00	0.00	0.00	0.77	-
Taguig	170.92	13.77	8.05	149.10	84.68	64.42	47.00	0.00	47.00	0.68	-
Makati	324.32	17.48	10.22	296.62	290.28	6.34	38.00	0.00	38.00	7.28	8.05
Pasay	209.91	14.75	8.62	186.54	179.50	7.04	126.00	0.00	126.00	1.50	-
Muntinlupa	221.13	14.43	8.44	198.26	186.77	11.49	186.00	0.00	186.00	0.77	-
Mandaluyong	193.25	10.36	6.05	176.84	171.89	4.95	18.00	0.00	18.00	3.89	-
Paranaque	217.56	14.13	8.26	195.17	131.77	63.40	8.00	0.00	8.00	2.77	-
Las Pinas	200.96	14.91	8.72	177.33	155.01	22.32	204.00	0.00	204.00	1.01	-
Total	5,345.01	341.31	199.50	4,804.20	3,496.25	1,307.95	667.00	1,935.00	2,602.00	56.25	71.01

	Disposal Amount										Total				
	Municipal Solid Waste					Industrial Solid Waste(Directly Hauled Waste)									
	San Mateo	Carmona	Payatas	Catmon	Sub-Total	San Mateo	Carmona	Payatas	Catmon	Sub-Total					
Manila	206.00	492.00	0.00	0.00	698.00	0.00	31.00	0.00	0.00	31.00	206.00	523.00	0.00	0.00	729.00
Quezon	13.00	0.00	743.00	0.00	756.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	743.00	0.00	756.00
Calocan	117.00	0.00	42.00	0.00	159.00	0.00	0.00	0.00	0.00	0.00	117.00	0.00	42.00	0.00	159.00
Navotas	30.00	9.00	0.00	0.00	39.00	0.00	0.00	0.00	0.00	0.00	30.00	9.00	0.00	0.00	39.00
Valenzuela	0.00	0.00	148.00	0.00	148.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	148.00	0.00	148.00
Malabon	0.00	0.00	0.00	95.00	95.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.00	95.00
Marikina	83.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00	83.00
Pasig	211.00	0.00	0.00	0.00	211.00	60.00	0.00	0.00	0.00	60.00	271.00	0.00	0.00	0.00	271.00
Pateros	17.00	0.00	0.00	0.00	17.00	0.00	0.00	0.00	0.00	0.00	17.00	0.00	0.00	0.00	17.00
San Juan	11.00	0.00	41.00	0.00	52.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	41.00	0.00	52.00
Taguig	37.00	47.00	0.00	0.00	84.00	0.00	0.00	0.00	0.00	0.00	37.00	47.00	0.00	0.00	84.00
Makati	88.00	0.00	195.00	0.00	283.00	132.00	47.00	0.00	0.00	179.00	220.00	47.00	195.00	0.00	462.00
Pasay	52.00	126.00	0.00	0.00	178.00	21.00	80.00	0.00	0.00	101.00	73.00	206.00	0.00	0.00	279.00
Muntinlupa	0.00	186.00	0.00	0.00	186.00	2.00	27.00	0.00	0.00	29.00	2.00	213.00	0.00	0.00	215.00
Mandaluyong	150.00	18.00	0.00	0.00	168.00	10.00	0.00	0.00	0.00	10.00	160.00	18.00	0.00	0.00	178.00
Paranaque	22.00	107.00	0.00	0.00	129.00	0.00	0.00	0.00	0.00	0.00	22.00	107.00	0.00	0.00	129.00
Las Pinas	0.00	154.00	0.00	0.00	154.00	0.00	50.00	0.00	0.00	50.00	0.00	204.00	0.00	0.00	204.00
Total	1,037.00	1,139.00	1,169.00	95.00	3,440.00	225.00	235.00	0.00	0.00	460.00	1,262.00	1,374.00	1,169.00	95.00	3,900.00

Table 5.30 Waste Stream (2000)

	Generation Amount	Self Disposal Amount	Recycling Amount at Generation Stage	Discharge Amount	Collection Amount	Illegally Dumped Amount	Transfer Amount		Amount Recycled by Collector	Amount Recycled by Waste Picker				
							Las Pinas Transfer Station	LGU Transfer Station/System						
Manila	1,290.67	59.35	38.83	1,194.49	745.38	446.11	33.00	769.00	938	-				
Quezon	1,304.24	84.80	52.62	1,166.82	959.15	197.97	0.00	946.00	23.15	26.69				
Calapan	650.06	46.17	23.65	575.24	214.40	360.84	0.00	0.00	3.40	12.81				
Navotas	139.54	9.60	5.96	123.98	49.81	75.17	11.00	48.00	0.81	-				
Valenzuela	288.39	19.86	12.32	256.21	198.53	57.68	0.00	197.00	1.53	5.24				
Malabon	221.19	15.13	9.39	196.67	123.11	73.56	0.00	0.00	1.11	21.98				
Marikina	233.13	15.16	9.41	208.56	105.38	103.18	0.00	103.00	2.38	-				
Pasig	318.38	20.25	12.57	285.56	272.39	13.17	0.00	286.00	6.39	-				
Patrons	31.84	2.17	1.34	28.33	20.31	8.02	0.00	0.00	0.31	-				
San Juan	90.91	4.77	2.96	83.18	58.92	24.26	0.00	0.00	0.92	-				
Taguig	237.19	18.01	11.18	208.00	117.01	90.99	54.00	0.00	54.00	1.01				
Makati	370.78	18.84	11.69	340.25	332.84	7.41	38.00	0.00	38.00	8.84				
Pasay	247.40	16.35	10.17	220.84	211.87	8.97	149.00	0.00	149.00	1.87				
Muntinlupa	331.31	20.40	12.66	298.25	280.22	18.03	278.00	0.00	279.00	1.22				
Mandaluyong	226.51	11.44	7.10	207.97	201.84	6.13	21.00	0.00	21.00	4.84				
Paranaque	280.83	17.18	10.66	252.79	169.79	83.00	8.00	0.00	8.00	3.79				
Las Pinas	283.29	19.85	12.32	251.11	218.50	32.61	287.00	0.00	287.00	1.50				
Total	6,545.46	399.38	247.83	5,898.25	4,288.45	1,609.80	890.00	2,298.00	72.45	75.36				
0.061016339 0.0378629														
	Municipal Solid Waste					Industrial Solid Waste (Directly Hauled Waste)					Total			
	San Mateo	Carmona	Payatas	Catmon	Sub-Total	San Mateo	Carmona	Payatas	Catmon	Sub-Total	San Mateo	Carmona	Payatas	Sub-Total
Manila	217.00	519.00	0.00	0.00	736.00	0.00	33.00	0.00	0.00	33.00	0.00	552.00	0.00	385.00
Quezon	16.00	0.00	930.00	0.00	946.00	0.00	0.00	0.00	0.00	0.00	16.00	0.00	0.00	946.00
Calapan	155.00	0.00	56.00	0.00	211.00	0.00	0.00	0.00	0.00	0.00	155.00	0.00	56.00	211.00
Navotas	37.00	11.00	0.00	0.00	48.00	0.00	0.00	0.00	0.00	0.00	37.00	11.00	0.00	48.00
Valenzuela	0.00	0.00	197.00	0.00	197.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	197.00	0.00
Malabon	0.00	0.00	0.00	122.00	122.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122.00
Marikina	103.00	0.00	0.00	0.00	103.00	0.00	0.00	0.00	0.00	0.00	103.00	0.00	0.00	103.00
Pasig	266.00	0.00	0.00	0.00	266.00	76.00	0.00	0.00	0.00	76.00	342.30	0.00	0.00	342.30
Patrons	20.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	20.00
San Juan	12.00	0.00	46.00	0.00	58.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	12.00
Taguig	51.00	65.00	0.00	0.00	116.00	0.00	0.00	0.00	0.00	0.00	51.00	0.00	48.00	99.00
Makati	101.00	0.00	223.00	0.00	324.00	151.00	94.00	0.00	0.00	205.00	51.00	65.00	0.00	116.00
Pasay	61.00	148.00	0.00	0.00	209.00	25.00	40.00	0.00	0.00	69.00	252.00	243.00	0.00	495.00
Muntinlupa	0.00	279.00	0.00	0.00	279.00	3.00	0.00	0.00	0.00	3.00	86.00	3.00	0.00	89.00
Mandaluyong	176.00	21.00	0.00	0.00	197.00	12.00	0.00	0.00	0.00	12.00	188.00	21.00	0.00	209.00
Paranaque	28.00	138.00	0.00	0.00	166.00	0.00	0.00	0.00	0.00	0.00	28.00	138.00	0.00	166.00
Las Pinas	217.00	0.00	0.00	0.00	217.00	70.00	0.00	0.00	0.00	70.00	0.00	287.00	0.00	287.00
Total	1,243.00	1,399.00	1,452.00	122.00	4,216.00	287.00	291.00	0.00	0.00	558.00	1,510.00	1,690.00	1,432.00	4,774.00

Table 5.31 Waste Stream (2005)

Generation Amount	Self Disposal Amount	Recycling Amount at Generation Stage	Discharge Amount	Collection Amount	Non-collectio Amount	Transfer Amount				Amount of Market Waste used o Compositin	Amount of Composting	
						Las Pinas	Quezon	Marikina	Fort Bonifacio			Manila
1,419.82	59.13	89.82	1,270.67	889.47	381.20				883.96	883.96	5.51	3.20
1,686.13	99.35	106.88	1,480.10	1,332.09	148.01				663.57	663.57	4.95	2.87
848.10	54.66	53.66	739.78	369.89	369.89						1.65	0.96
171.86	10.72	10.37	150.27	75.14	75.13						0.00	0.16
395.17	24.66	25.00	345.51	278.41	69.10						1.32	0.77
280.71	17.40	17.76	245.55	184.18	61.39						0.00	0.26
299.92	17.69	18.98	263.25	157.95	105.30						1	0.58
414.63	23.93	26.23	364.47	364.47	-0.00				362.37	362.37	2.1	1.22
38.82	2.38	2.44	33.80	27.04	6.78				27.03	27.03	0.01	0.01
110.08	5.23	6.96	97.89	78.31	19.58				77.70	77.70	0.61	0.35
337.06	23.21	21.33	292.52	190.14	102.38				189.58	189.58	0.56	0.32
439.71	20.25	27.82	391.64	391.64	0.00				390.76	390.76	0.88	0.51
302.45	18.16	19.14	265.15	265.15	0.00				264.09	264.09	1.06	0.61
506.37	28.27	32.04	446.06	446.06	0.00				444.90	444.90	1.16	0.67
275.18	12.80	17.41	245.17	245.17	0.00				243.89	243.89	1.28	0.74
373.18	20.72	23.61	328.85	246.64	82.21				245.70	245.70	0.94	0.55
387.64	24.66	24.53	338.45	304.61	33.84				303.63	303.63	0.98	0.57
8,286.43	483.02	524.28	7,299.13	5,844.34	1,454.79				549.33	549.33	24.72	14.34
524.28	0.06	0.0833		0.80					1126.78	883.96	4,254.13	0.002
0.06326971											494.45	0.002
											0.05	

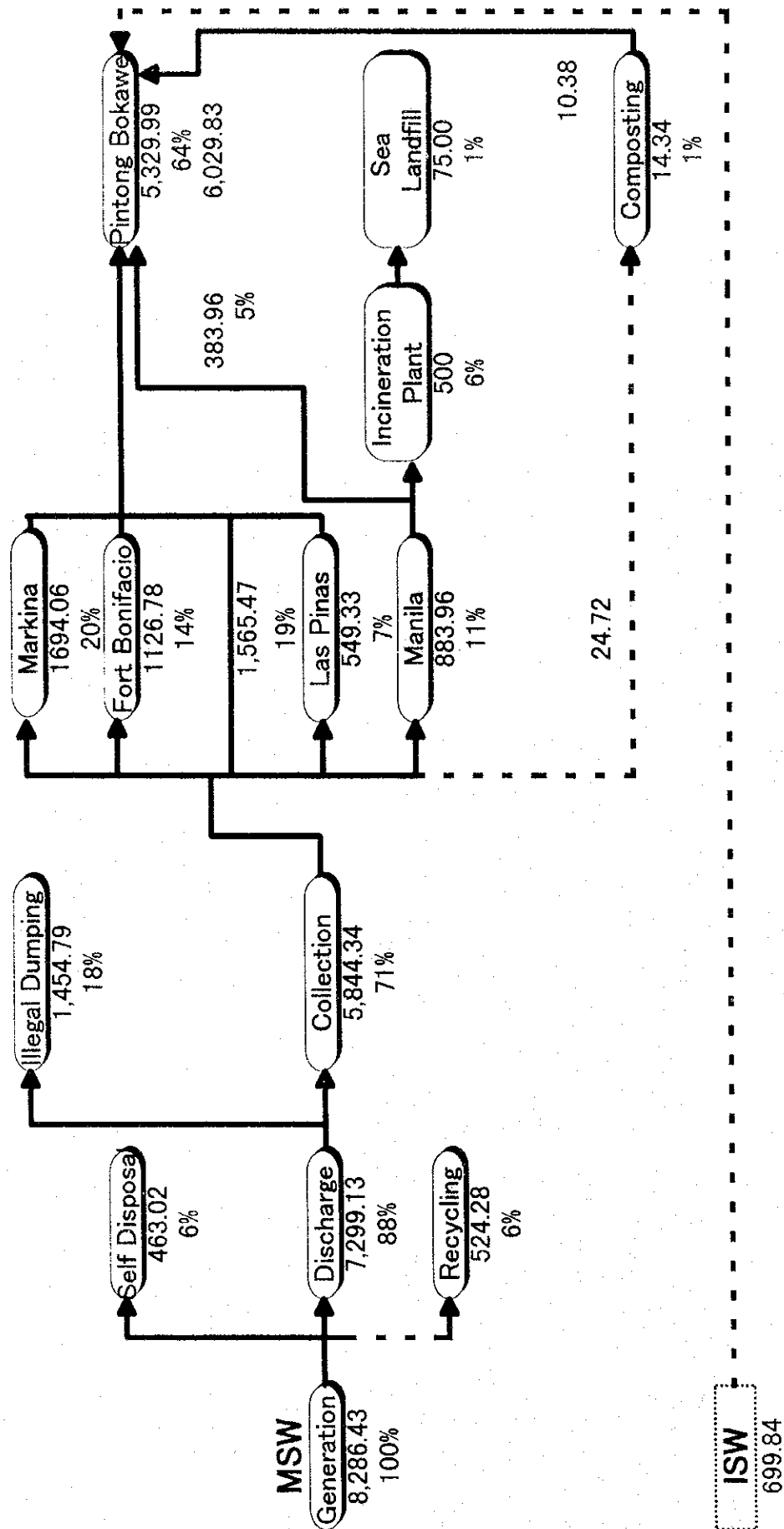
Incineration	Intermediate Treatment Facility		Disposal Amount				Total	
	Recycling	Composting	Municipal Solid Waste	Industrial Solid Waste/Direct	Sea Landfill	Sub-Total	Sea Landfill	Total
Plant	Plant	Plant	Pintong Bokaw	Sea Landfill	Sub-Total	Pintong Bokaw	Sea Landfill	Total
500	0	5.51	386.27	75.00	461.27	35.95	0	35.95
	0	4.95	1,329.22		1,329.22	0.00	0.00	1,329.22
Quezon	0	1.65	368.93		368.93	0.00	0.00	368.93
Calabocan	0	0.28	74.98		74.98	0.00	0.00	74.98
Navotas	0	1.32	275.64		275.64	0.00	0.00	275.64
Valenzuela	0	0.45	183.90		183.90	0.00	0.00	183.90
Malabon	0	1	157.37		157.37	0.00	0.00	157.37
Marikina	0	2.1	363.25		363.25	98.57	0.00	98.57
Pasig	0	0.01	27.03		27.03	0.00	0.00	27.03
Pateros	0	0.61	77.96		77.96	0.00	0.00	77.96
San Juan	0	0.58	189.82		189.82	0.00	0.00	189.82
Taguig	0	0.88	391.13		391.13	242.69	0.00	242.69
Makati	0	1.06	264.54		264.54	145.53	0.00	145.53
Pasay	0	1.16	445.39		445.39	66.41	0.00	66.41
Muntinlupa	0	1.28	244.43		244.43	14.24	0.00	14.24
Mandaluyong	0	0.94	246.09		246.09	0.00	0.00	0.00
Paranaque	0	0.98	304.04		304.04	96.45	0.00	96.45
Las Pinas	0					699.84	0.00	699.84
total	500	0	5,329.99	75.00	5,404.99	699.84	0.00	6,104.83

Table 3.5.32 Waste Stream (2010)

	Generation Amount	Self Disposal Amount	Recycling Amount at Generation Stage	Discharge Amount	Collection Amount	Non-collection Amount	Transfer Amount				Amount of Recycling	Amount of Market Waste used o Compositin	Amount of Composting
							Las Pinas	Quezon	Marikina	Fort Bonifacio	Manila	Total	
Manila	1,552.95	51.94	85.41	1,415.60	1,203.26	212.34					1,118.65	1,118.65	31.06
Quezon	2,123.40	100.48	116.79	1,906.13	1,810.82	95.31		0.00	847.57		847.57	847.57	53.55
Calabcan	1,076.89	55.78	59.23	961.88	673.32	288.56		0.00			21.54	0.00	73.22
Navotas	207.54	10.40	11.41	185.73	130.01	55.72		0.00			4.15	0.00	37.14
Valenzuela	524.29	26.27	28.84	469.18	422.26	46.92		0.00			10.49	0.00	7.16
Malabon	348.35	17.34	19.16	311.85	280.67	31.18		0.00			0.00	0.00	18.09
Marikina	376.13	17.82	20.69	337.62	286.98	50.64			266.49		266.49	266.49	12.02
Pasig	525.50	24.38	28.90	472.22	472.22	0.00			443.59	34.45	443.59	443.59	12.87
Pateros	458.7	2.27	2.52	410.8	36.97	4.11					34.46	34.46	18.12
San Juan	129.76	4.96	7.14	117.66	105.89	11.77			98.81		98.81	98.81	1.39
Taguig	461.58	25.54	25.39	410.65	349.05	61.60			323.91		323.91	323.91	2.60
Makati	513.79	19.01	28.26	466.52	466.52	0.00			438.52		438.52	438.52	4.48
Pasay	382.36	17.47	19.93	324.96	324.96	0.00			305.21		305.21	305.21	15.91
Muntinlupa	739.32	33.15	40.66	665.51	665.51	0.00			625.22		625.22	625.22	17.72
Mandaluyong	328.93	12.10	18.09	298.74	298.74	0.00			280.82		280.82	280.82	10.28
Paranaque	482.05	21.50	26.51	434.04	388.93	65.11	342.67					342.67	7.25
Las Pinas	513.25	26.24	28.23	458.78	435.84	22.94	407.86					407.86	25.50
Total	10,311.96	466.65	567.16	9,278.15	8,331.95	946.20	750.53	0.00	2,261.19	1,403.41	1,118.65	5,533.78	6.58
			0.06		0.90								11.34
													2.60
													9.84
													16.82
													17.71
													355.64
													206.27
													0.02
													0.58
													608.93

	Intermediate Treatment Facility				Disposal Amount				Total			
	Incineration Plant	Recycling Plant	Composting Plant		Municipal Solid Waste	Industrial Solid Waste (Direct)	Sub-Total		Pintong Bokaw	Sea Landfill	Sub-Total	Total
Manila	1,118.65	31.06	53.55		167.80	0	167.80		39.32	0	39.32	167.80
Quezon	847.57	42.47	73.22		1,005.45	0.00	1,005.45		878.32	0.00	878.32	1,005.45
Calabcan	614.64	21.54	37.14		92.20	0.00	92.20		0.00	0.00	0.00	92.20
Navotas	118.7	4.15	7.16		17.81	0.00	17.81		0.00	0.00	0.00	17.81
Valenzuela	393.68	10.49	18.09		59.05	0.00	59.05		0.00	0.00	0.00	59.05
Malabon	261.68	6.97	12.02		39.25	0.00	39.25		0.00	0.00	0.00	39.25
Marikina		7.52	12.97		271.94	0.00	271.94		271.94	0.00	271.94	271.94
Pasig		10.51	18.12		451.20	124.93	576.13		576.13	0.00	576.13	576.13
Pateros		0.92	1.59		35.13	0.00	35.13		35.13	0.00	35.13	35.13
San Juan		2.6	4.48		100.69	0.00	100.69		100.69	0.00	100.69	100.69
Taguig		9.23	15.91		330.59	0.00	330.59		330.59	0.00	330.59	330.59
Makati		10.28	17.72		445.96	283.57	729.53		729.53	0.00	729.53	729.53
Pasay		7.25	12.5		310.46	174.35	484.81		484.81	0.00	484.81	484.81
Muntinlupa		14.79	25.5		635.93	96.96	732.89		732.89	0.00	732.89	732.89
Mandaluyong		6.58	11.34		285.58	17.02	302.60		302.60	0.00	302.60	302.60
Paranaque		9.84	16.62		51.40	0.00	51.40		51.40	0.00	51.40	51.40
Las Pinas		10.27	17.71		61.18	0	61.18		127.70	0.00	127.70	188.88
Total	4,105.45	206.27	355.64		6,158.2	883.85	7,042.05		4,609.65	5,715.10	6,158.2	5,225.47
	3,000.00				4,851.25		4,851.25					6,165.10

Figure 5.5 Waste Flow in Metro Manila (2005)



Unit : ton per day

Waste Flow in Metro Manila(2005)

Figure 5.6 Waste Flow in Metro Manila (2010)

