

Annex M

The Master Plan

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M The Master Plan

M.1 Outline of the Master Plan

The M/P aims to establish plans for sustainable municipal SWM with primary target of 100% service coverage, and attempting to solve present problems of cleansing services that are observed through this Study.

Merits of regional management of municipal SW consist of the following:

- Large SWM facilities (e.g., a landfill) that one municipality can hardly have or manage due to problems of such as large financial burden, difficulty in recruiting technical human resources, administration complexity, can be controllable under a regional management scheme. Because, a burden on each member municipality is proportionally small in respective aspects.
- As for regional use facilities, economy of scale will be attained in facilities' size and such productivity will be in an optimum range compared with the individual municipal facilities. Consequently, its cost shared by member municipalities would be cheaper than the costs that an individual project requires.

On the other hand, it is sometimes very difficult for several municipalities that are politically financially autonomous to share the same scheme and to collaborate for an unanimous benefit.

Under the status quo, 10 municipalities out of 14 municipalities use MIDES Nejapa sanitary landfill (S/L), 2 municipalities use ESPIGA controlled dumping (C/D) site, and 2 municipalities dispose their waste at an open dumping (O/D) site that is within the respective jurisdiction (see Figure M-1).

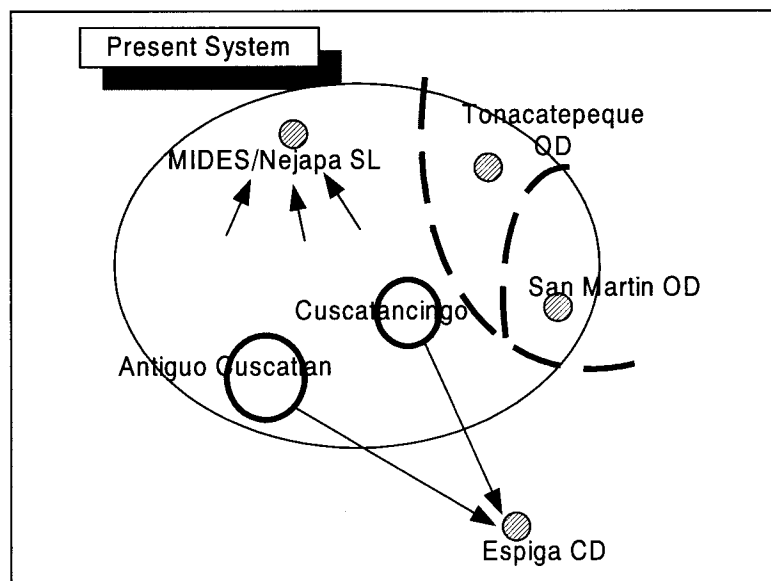


Figure M-1: Present Municipal SWM System

Viewing the present municipal SWM system in AMSS, the M/P proposes plans that merits of regional SWM can as much as possible be enjoyed by 14 respective municipalities of AMSS. The proposed municipal SWM system is presented in Figure M-2 below.

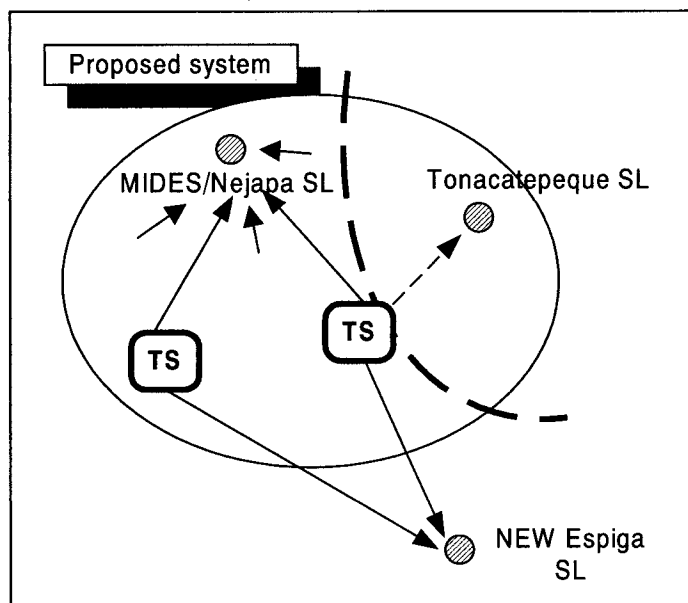


Figure M-2: Proposed MSWM System

On the other hand, the M/P will also formulate individual municipal SWM plans that are correlated with the regional SWM system.

M.1.1 Discharge and Storage System

Respective municipalities are in charge of such activities that are related with discharge and storage systems. However, as stated in a previous section, source separation and separate collection of waste will be an issue for the regional SWM that aims resource conservation. Accordingly the M/P proposes that municipalities that have achieved the more than 90% service coverage should introduce the separate collection system gradually, reminding that the principal target of collection system is 100% service coverage.

In practice,

- pilot projects on source separation and separate collection should be started only when the collection service coverage exceeds the 85% to total; and
- Reviewing and examining the outcome of the above mentioned pilot projects, source separation and separate collection should be put in practice.

In so doing, separation categories should only be two (2) categories (i.e., recyclable, non-recyclable). Table M-1 shows the trends forecast on collection service coverage and

Table M-2 shows timetable program of gradual introduction of separate collection coverage target. Municipalities in AMSS that already exceed the service coverage 90%, should start pilot projects of source separation and separate collection in year 2001 and practical introduction of separate collection system should be implemented from year 2002.

Table M-1: Collection Service Coverage Ratio

Unit : %

City \ Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
San Salvador	81.1	82.8	84.5	86.3	88.0	89.7	91.4	93.1	94.8	96.6	98.3	100
Mejicanos	84.9	86.3	87.6	89.0	90.4	91.8	93.1	94.5	95.9	97.3	98.6	100
Delgado	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7	100
Cuscatancingo	71.5	74.1	76.7	79.3	81.9	84.5	87.0	89.6	92.2	94.8	97.4	100
Ayutuxtepeque	66.7	69.7	72.8	75.8	78.8	81.8	84.9	87.9	90.9	93.9	97.0	100
San Marcos	64.8	68.0	71.2	74.4	77.6	80.8	84.0	87.2	90.4	93.6	96.8	100
Nueva San Salvador	93.5	94.1	94.7	95.3	95.9	96.5	97.0	97.6	98.2	98.8	99.4	100
Antiguo Cuscatlán	92.1	92.8	93.5	94.3	95.0	95.7	96.4	97.1	97.8	98.6	99.3	100
Soyapango	94.7	95.2	95.7	96.1	96.6	97.1	97.6	98.1	98.6	99.0	99.5	100
Ilopango	50.0	54.5	59.1	63.6	68.2	72.7	77.3	81.8	86.4	90.9	95.5	100
San Martín	65.4	68.5	71.7	74.8	78.0	81.1	84.3	87.4	90.6	93.7	96.9	100
Apopa	72.7	75.2	77.7	80.1	82.6	85.1	87.6	90.1	92.6	95.0	97.5	100
Nejapa	52.7	57.0	61.3	65.6	69.9	74.2	78.5	82.8	87.1	91.4	95.7	100
Tonacatepeque	52.7	57.0	61.3	65.6	69.9	74.2	78.5	82.8	87.1	91.4	95.7	100
Average	73.8	75.2	77.7	80.1	82.6	85.1	87.6	90.1	92.6	95.0	97.5	100.0

Table M-2: Target of Separate Collection Ratio

City \ Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
San Salvador	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%
Mejicanos	-	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%
Delgado	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%
Cuscatancingo	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%
Ayutuxtepeque	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%
San Marcos	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%
Nueva San Salvador	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%
Antiguo Cuscatlán	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%
Soyapango	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%
Ilopango	-	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%
San Martín	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%
Apopa	-	-	-	-	-	-	-	5.0%	10.0%	15.0%	20.0%	25.0%
Nejapa	-	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%
Tonacatepeque	-	-	-	-	-	-	-	-	-	5.0%	10.0%	15.0%
Weighing Average	0.0%	0.0%	0.0%	1.2%	2.9%	4.6%	7.5%	11.3%	15.7%	20.7%	25.7%	30.7%

M.1.2 Collection and Haulage System

In order to solve the problems of long distance transport by collection vehicles, the M/P proposes that two (2) transfer stations: one in east part and another in west part of San Salvador should be constructed and operated, as sketched in the figure below.

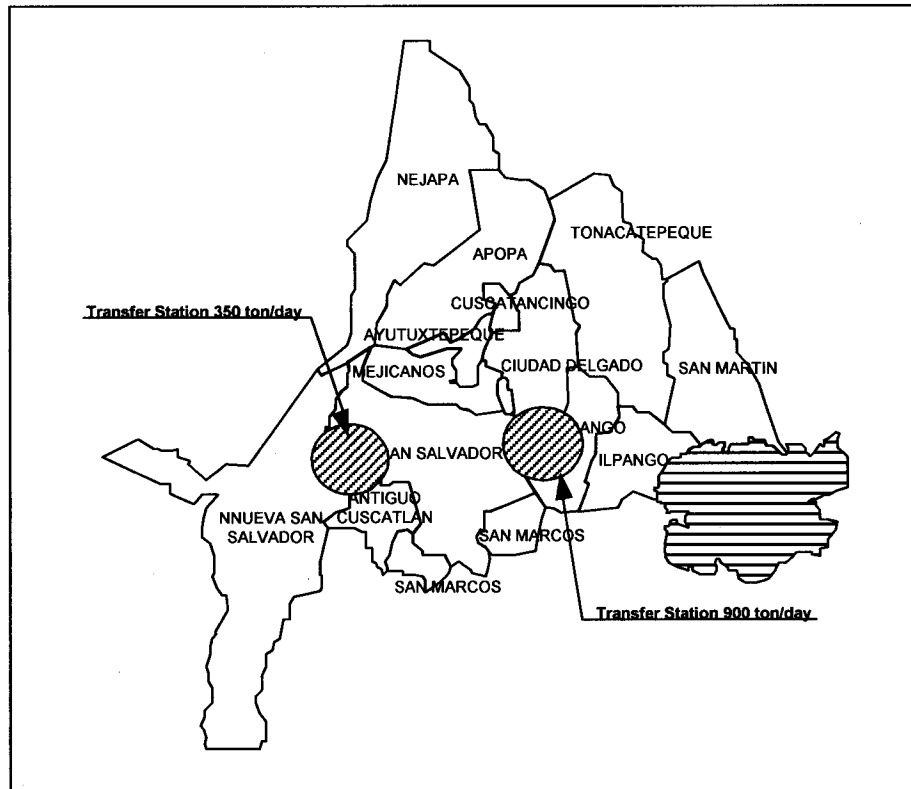


Figure M-3: Location of Transfer Station

M.1.3 Intermediate Treatment System

M.1.3.1 Selection Plant (S/P)

It is said that MIDES plans to construct a S/P with an input capacity of about 300ton/day, although its details are not known for the study.

On the other hand, it is informed that the MIDES Nejapa landfill has a disposal amount capacity of receiving municipal waste of AMSS for more than 20 years. Therefore, it is judged that there is no urgency in coping with problems of short remaining service life of final disposal site (i.e., final disposal amount minimization).

Meanwhile, this M/P attempts to implement the separate collection with an aim of contributing for "resource conservation".

It is foreseen that, for the time being, source separated recyclable materials (one category but various items) will be item-wise sorted by "particular collectors" and/or intermediate traders such as "gathering centers (centro de acopios)" in order to merchandize them. Since the present scale of recycling activities in AMSS is small, it will be appropriate that "particular collectors (e.g., micro-enterprises)" carry out

separate collection and transport them to a not distant “gathering centers” that could be more than several in AMSS and either or both of them sort recyclable materials item by item for sale.

However, when in future the scale of recycling activities becomes substantially bigger in AMSS, and if sorting works by “particular collectors” and/or “gathering centers” becomes impractical, it should then be necessary to have such a selection plant (S/P) that recyclable materials (one category but various items) are fed and sorting activities are carried out.

Although it is difficult to estimate when such S/P is necessary indeed, this Study considers that when all 14 municipalities practice separate collection (i.e., 2008) said S/P should start such operations.

M.1.3.2 Incinerator

Incinerator for municipal SW is such an intermediate processing facility that has definite effects on volume reduction. However, enormous investment costs and O&M costs are required. On the other hand as also previously described, the volume reduction of final disposal amount is not an urgent objective of SWM in AMSS.

Therefore, this Study recommends that examination on whether to introduce incineration process or not should take place at around the target year of the M/P (i.e., year 2009 to 2010).

M.1.3.3 Composting

Objectives of compost process mainly consist of:

- volume reduction by way of organic waste decomposition; and/or
- production of compost for soil conditioner.

The former objective (volume reduction by intermediate processing) is not outstanding in AMSS. Therefore, if a compost processing is attempted with an objective of compost production, its feasibility will largely depend on market demand of such product.

A few small-scale projects on composting such as market waste are carried out in AMSS, however, the Study’s field investigation revealed that market demand for compost products are fairly small in AMSS.

According, if a large-scale compost processing is introduced, following impacts and disadvantage will be envisaged:

- market demand of existing small-scale compost producers will be lessened; and
- composting of municipal waste requires thorough attentions in order to produce good quality products, otherwise the produce does not have a sale value.

Therefore, this Study judges that installation and operation of further composting facilities in AMSS should never be an advantageous alternative of intermediate processing for the SWM in AMSS.

Therefore the M/P considers that maintaining the current small-scale composting projects would be appropriate. No new composting facilities are accounted for in this M/P.

M.1.4 Final Disposal System

There are MIDES Nejapa sanitary landfill (S/L), ESPIGA controlled dumping site, Tonacatepeque open dumping site and San Martin open dumping site in AMSS.

However, final disposal site that complied with the recently published nation regulation on SWM seems to be only the MIDES Nejapa S/L. Meanwhile, municipalities that currently use ESPIGA site consider to participate in the New ESPIGA S/L that is supposed to be managed by a private sector and of course is supposed to comply with the regulation mentioned above. Therefore, measures to comply with the regulation are needed for the two (2) municipalities that currently have open dumping practices, i.e., Tonacatepeque and San Martin municipalities. Consequently, this M/P recommends constructing a regional sanitary landfill that said two municipalities are going to use.

Currently there is only one regional S/L (MIDES Nejapa) that complies with the national regulation of SWM. When the New ESPIGA S/L and another S/L for the Tonacatepeque and San Martin municipalities are constructed, AMSS in total will have 3 regional S/Ls. It consequently will raise the safety factor of final disposal management in AMSS that can fully cope with the emergency and accident occasions.

M.1.5 Medical Waste Management

Currently, most medical waste generated in AMSS receives the autoclave treatment at the MIDES Nejapa landfill site. However, some small medical institutions seem to mix the medical waste with general waste for municipal collection, which might be due to the lack of awareness of or ignoring the infectiousness of medical waste.

The Master Plan recommends the following:

- To enforce intra-hospital management of separating medical wastes which are infectious and/or hazardous, from general waste. To standardize classification of medical wastes in AMSS or nationwide and to actually utilize the classification for separate discharge of them;
- To establish an appropriate collection system for medical wastes that are separately discharged by all medical institutions; and
- To consolidate the medical waste treatment system in AMSS in order to ensure the treatment reliability: i.e., to introduce a medical waste incineration system that should serve for the AMSS in parallel with the current autoclave treatment system.

The action plan proposed for the medical waste management in AMSS is shown in the table below.

Table M-3: Action plan for Medical Waste Management

		Phase 1			Phase 2			Phase 3			
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Separate discharge in medical institutions		OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
Collection for medical waste		OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
Medical waste treatment	MIDES/Nejapa	OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
	New facility	FS EIA	B/D, D/D	Con.	OP	OP	OP	OP	OP	OP	OP

Notes: FS : feasibility study B/D : Basic design EIA : environmental impact assessment
D/D : detail design Con. : construction OP : operation

M.1.6 Outline of the Master Plan

The M/P outlines plans on regional issues and plans on individual municipal SWM issues. Such frameworks are described below.

M.1.6.1 Regional Management System

The regional management system in this M/P comprises:

- systems that respective municipalities co-use such as transfer stations, intermediate processing facilities and final disposal sites; and
- system of medical waste intermediate treatment facilities.

The table below summarizes the outline of the regional management system.

Table M-4: Regional Management System

		Phase I			Phase II			Phase III			
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Transfer system	TS 1 (350 t/d)	FS, EIA	B/D, D/D	Con.	OP	OP	OP	OP	OP	OP	OP
	TS 2 (900 t/d)	FS	EIA, B/D	D/D, Con.	Con.	OP	OP	OP	OP	OP	OP
Intermediate treatment	MRF					FS, EIA	B/D, D/D	Con.	OP	OP	OP
	Incineration								Begin examine		
Landfill	MIDES Nejapa	OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
	New Tonacatepeque	FS, EIA	B/D, D/D	Con.	Con.	OP	OP	OP	OP	OP	OP
	New Espiga	Con.	Con.	OP	OP	OP	OP	OP	OP	OP	OP
Medical waste treatment	MIDES/Nejapa	OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
	New facility	FS, EIA	B/D, D/D	Con.	OP	OP	OP	OP	OP	OP	OP

Notes: FS: feasibility study B/D: basic design EIA : environmental impact assessment
D/D : detailed design, Con.: construction, OP: operation

M.1.6.2 Individual Management System

Program of actions plan for respective municipalities should be carefully considered reminding the intrinsic situation of each municipality. Therefore, when steps summarized in Table M-5 should take place might be different municipality by municipality. Table M-6 to Table M-9 describe a timetable of actions plan proposed by the Team for further reviews by each municipality.

Table M-5: Action plans of Technical Aspects

	Step I	Step II	Step III
Discharge/Storage	Improvement of hygienic condition of discharge areas	Implementation of pilot project for separate collection	Implementation of separate collection
Collection	Improvement of service coverage	Improvement of service coverage Renewal of collection vehicle	Improvement of service coverage after renewal of collection vehicle
Haulage	Direct transport		Transfer transport
Final disposal	Dispose to open dumping	Dispose to controlled dumping	Dispose to sanitary landfill

Table M-6: Action Plan for Respective Municipalities (1)

		Phase I			Phase II			Phase III			
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Step										
SS	Discharge/Storage	III									
		II									
		I									
	Collection	III									
		II									
		I									
	Haulage	III									
		II									
		I									
Final disposal	III										
	II										
	I										
MJ	Discharge/Storage	III									
		II									
		I									
	Collection	III									
		II									
		I									
	Haulage	III									
		II									
		I									
Final disposal	III										
	II										
	I										

Table M-7: Action Plan for Respective Municipalities (2)

		Step	Phase I			Phase II			Phase III				
			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
CD	Discharge/ Storage	III											
		II											
		I											
	Collection	III											
		II											
		I											
	Haulage	III											
		II											
		I											
	Final disposal	III											
		II											
		I											
CT	Discharge/ Storage	III											
		II											
		I											
	Collection	III											
		II											
		I											
	Haulage	III											
		II											
		I											
	Final disposal	III											
		II											
		I											
AY	Discharge/ Storage	III											
		II											
		I											
	Collection	III											
		II											
		I											
	Haulage	III											
		II											
		I											
	Final disposal	III											
		II											
		I											
SM	Discharge/ Storage	III											
		II											
		I											
	Collection	III											
		II											
		I											
	Haulage	III											
		II											
		I											
	Final disposal	III											
		II											
		I											

Table M-8: Action Plan for Respective Municipalities (3)

		Step	Phase I			Phase II			Phase III			
			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ST	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
AC	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
SY	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
IL	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											

Table M-9: Action Plan for Respective Municipalities (4)

		Step	Phase I			Phase II			Phase III			
			2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SMT	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
AP	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
NJ	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											
TN	Discharge/ Storage	III										
		II										
		I										
	Collection	III										
		II										
		I										
	Haulage	III										
		II										
		I										
Final disposal	III											
	II											
	I											

M.1.7 Institutional and Organizational System

M.1.7.1 Establishment of a Regional SWM System

In order to constitute a stable solid waste management system in AMSS, it is very important to establish a regional SWM system.

Such system will allow the following benefits:

- Metropolitan planning of the parts and elements that forms the integral SWM in AMSS.
- Benefit for the municipalities that face difficulties to get a final disposal site within their jurisdiction.
- A metropolitan management that will allow the expansion of the services and the introduction of a competitive market, which in turn will foster the participation of the private sector, such factors will help reduce SWM costs in the municipalities of AMSS.
- Economy of scale.
- Regional planning of SWM.
- Possibility that the municipalities of AMSS with very limited financial resources can have a qualified supervision and control at a low cost, for such as MIDES contract as well as for other SWM contracts in which these municipalities take part in.
- Facilitate coordination among municipalities, above political party differences.

However, due to the municipal autonomy provided by law that is strongly reinforced by the local governments in El Salvador, the proposal of one single institution responsible of the regional SWM system in AMSS is not recommended.

Instead, a system that involves the different institutions that should participate in the municipal SWM (domestic, commercials, institutional, markets and street sweeping wastes) of AMSS is proposed.

The proposal of the municipal regional SWM system is shown in Figure M-4. OPAMSS at a metropolitan level will plan, regulate, supervise, control and support with consulting and training, the 13 municipalities. The exception is San Salvador that has metropolitan features in the parts and elements of SWM.

Besides, OPAMSS would also be in charge of the database for the 13 municipalities.

For the municipality of San Salvador, the San Salvador Municipal Public Company of Urban Cleansing (EMAUSS) is proposed, which would be in charge of all the organizational systems (planning, operation, management, financing) of SWM, as well as of the database for the municipality of San Salvador.

Finally, the 13 municipalities would have their cleansing units, with a better organization and strengthened and supported by the Solid Waste Unit of OPAMSS proposed before.

Besides, the regional system of MARN, MSPAS and the *Ministerio Público* would act as regulating, surveillance and auditing bodies.

Figure M-5 shows the metropolitan hazardous medical SWM system in which the main role is in charge of MSPAS, but health establishments of MSPAS, ISSS and the private sector of AMSS are also involved and the surveillance and auditing is by MARN and *Ministerio Público*.

M.1.8 Institutionalization of the M/P

M.1.8.1 Institutional system for AMSS

Table M-10 shows the organization proposed for the municipal SWM institutional system in AMSS, and the implementation by phases during the M/P period (2001 to 2010) of its main three components:

- OPAMSS Solid Wastes Unit.
- San Salvador Municipal Public Company of Urban Cleansing (EMAUSS).
- Cleansing services of the remaining 13 municipalities of AMSS.

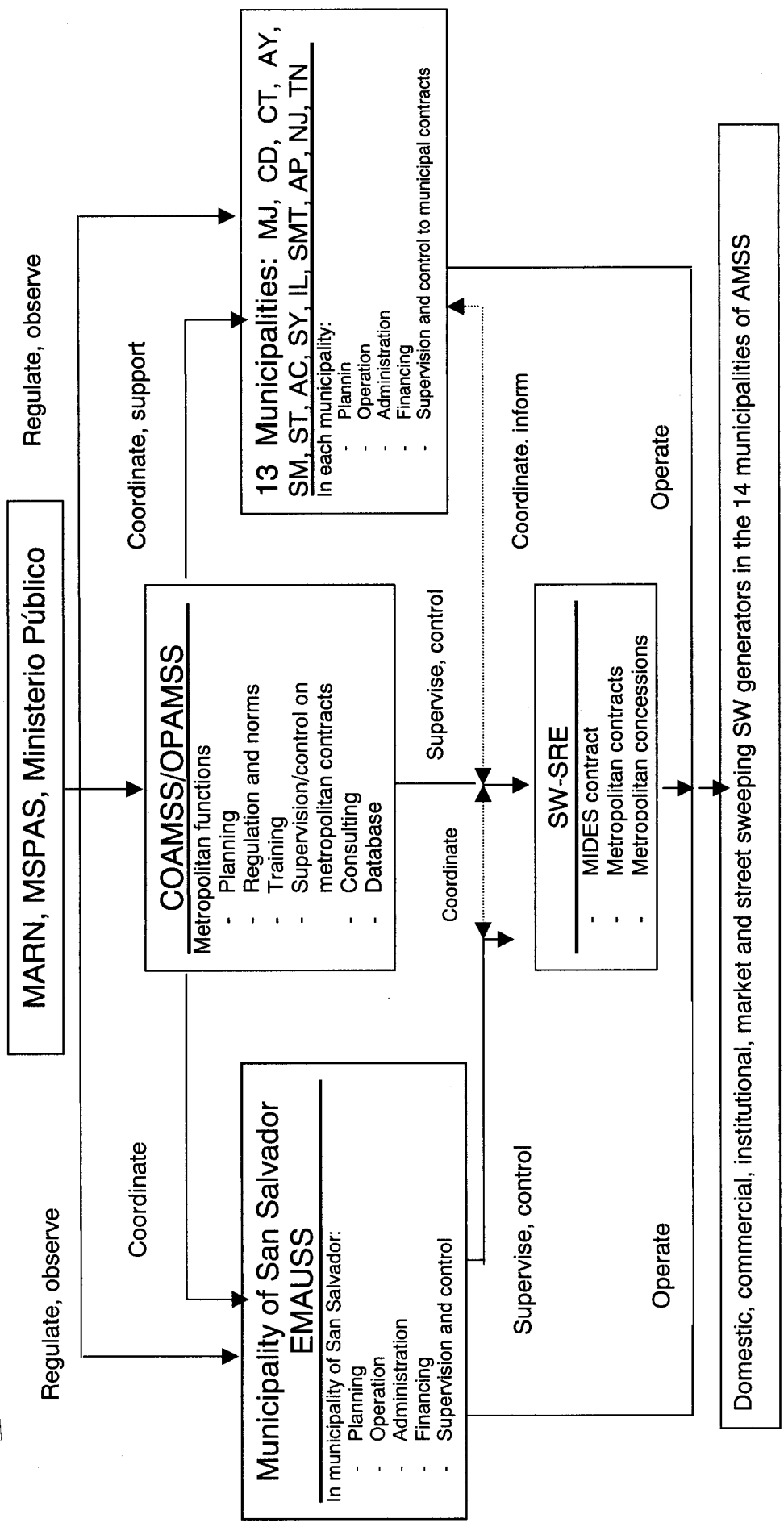
Organization of each one of them is detailed later.

The institutional system for the hazardous medical SWM, which is shown in Figure M-5 completes the institutional system of the M/P for SWM in AMSS, which is the subject of the current study.

Table M-10: Institutionalization of the M/P for SWM in AMSS

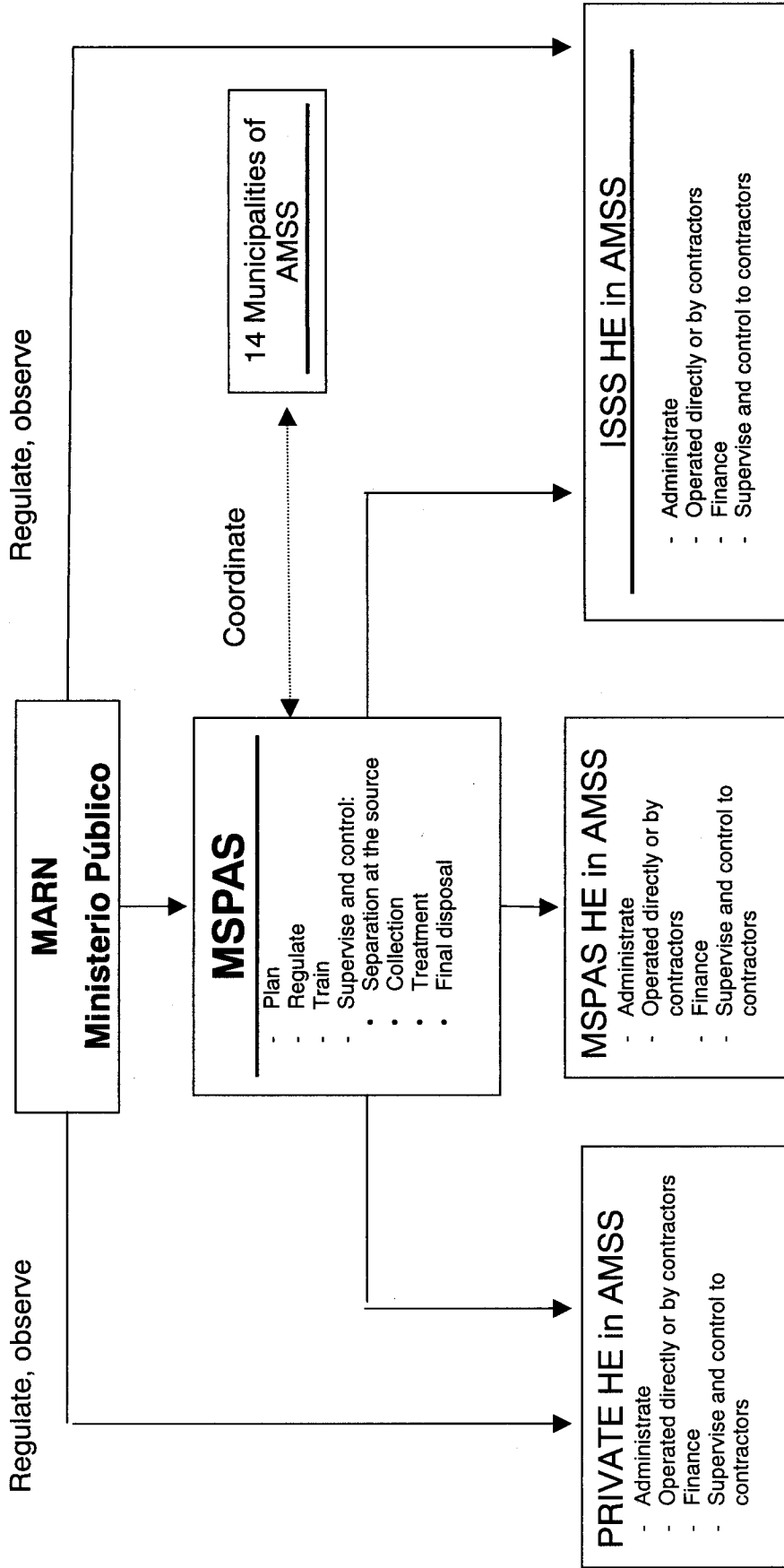
Component	Phase I	Phase II	Phase III
	2001 – 2003	2004 – 2006	2007 – 2010
SW Unit of OPAMSS	<ul style="list-style-type: none"> • Approval for the establishment of the SW unit in OPAMSS. • Commissioning of the unit 	<ul style="list-style-type: none"> • Supervision and control of metropolitan projects. • Consulting and training to 13 municipalities. • Monitoring of database. • Technical consulting to COAMSS in SWM. 	<ul style="list-style-type: none"> • Continue with the process • Technical consulting to COAMSS in SWM.
Municipality of San Salvador (EMAUSS)	<ul style="list-style-type: none"> • Approval for the establishment of EMAUSS. • Commissioning of EMAUSS 	<ul style="list-style-type: none"> • Planning, operation, administration, commercialization and financing of SWM in the municipality of San Salvador. • Supervision and control. 	<ul style="list-style-type: none"> • Continue with the process
Public cleansing sections of the 13 municipalities of AMSS: MJ, CD, CT, AY, SM, ST, AC, SY, IL, SMT, AP, NJ, TN	<ul style="list-style-type: none"> • Improvement of operative, commercial, administrative and financial systems of the cleansing services in the 13 municipalities. • Implement supervision and control of SWM within each municipality. 	<ul style="list-style-type: none"> • Continue the improvement of organizational systems of supervision and control. • Study the possibility of providing autonomy for collection service in the municipalities of SY, ST and AC. 	<ul style="list-style-type: none"> • Continue with the process of organizational systems of supervision and control. • Administrative and operative autonomy in the cleansing services of SY, ST and AC.

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EMAUSS: Municipal urban cleansing enterprise of San Salvador
 SW-SRE: Solid waste service-rendering enterprises
 Municipal wastes: Domestic, commercial, institutional, market and street sweeping SW

Figure M-4: Regional Municipal Solid Waste Management in AMSS



HE: Health establishments

Figure M-5: Metropolitan Hazardous SWM System in AMSS

M.1.8.2 Institutionalization of M/P Components

Institutionalization of SWM components in AMSS should be conducted gradually within the framework of the M/P.

Table M-11 shows the summary of the institutional considerations proposed in the M/P.

Phase I (2001 – 2003) will be a key period for the institutionalization of the components in the M/P.

a. Separation at the Source

Pilot projects for separation at the source have been initiated in San Salvador, Nueva San Salvador and Antiguo Cuscatlán. Then, this separation must be institutionalized by issuing the corresponding municipal ordinances, taking into account that this separation should be restricted to urban high and middle income residential areas, commercial and institutional zones in which SW with a greater composition of recyclable materials are generated. This sub-system will be in charge of each municipality.

b. Street Sweeping

During Phase I, the efficiency and cost of direct operation of manual and mechanical sweeping versus the sweeping contract-out will be analyzed, looking forward to optimizing it in the succeeding phases.

c. Collection

Apart from optimizing the collection by direct operation, contracted and/or concession in the 3 phases, institutionalization of the separate collection of recyclable products as from Phase I is required, by contract-out or granting the concession to enterprises or cooperatives formed by former scavengers preferably. This component will also be in charge of each municipality.

Table M-11: Summary of the Institutional Considerations Proposed in the M/P

Component	SW Flow	Phase I	Phase II	Phase III
		2001 – 2003	2004 – 2006	2007 – 2010
Separation at the source.	↓	<ul style="list-style-type: none"> Pilot projects in SS, ST and AC. Regulate with municipal ordinances 	<ul style="list-style-type: none"> Continue with SS, ST and AC . Begin in SY, MJ and SM. Regulate with ordinances 	<ul style="list-style-type: none"> Achieve separation in 40% of generation sources.
Street cleansing.	↓	<ul style="list-style-type: none"> Analysis of direct operation of manual and mechanical sweeping versus contracted sweeping 	<ul style="list-style-type: none"> Implement optimal system in SS, ST, AC, SY, MJ and SM 	<ul style="list-style-type: none"> Implement in other municipalities
Collection of municipal SW	↓	<ul style="list-style-type: none"> Begin collection optimization. Determine collection costs. Analysis of direct collection versus contract-out and/or concession. Begin collection contract-out in unattended areas. 	<ul style="list-style-type: none"> Continue collection optimization. Improve the commercial system. Contract-out and concession of unattended areas. 	<ul style="list-style-type: none"> Achieve a total collection coverage.
Separate collection of recyclable SW.	↓	<ul style="list-style-type: none"> Formalize collection micro-enterprises by former scavengers. 	<ul style="list-style-type: none"> Contract-out or concession to micro-enterprises in SS, ST and AC. 	<ul style="list-style-type: none"> Continue contract-out and concessions.
T/S and transport	↓	<ul style="list-style-type: none"> Draft for 2 or 3 T/S by OPAMSS. Public tender of T/S by OPAMSS. Construction of T/S. 	<ul style="list-style-type: none"> Contract-out or concession. Supervision and control by OPAMSS and EMAUSS. 	<ul style="list-style-type: none"> Continue contract-out and concession. Continue supervision.
S/P		<ul style="list-style-type: none"> Market survey on recyclable materials. Consent with scavengers. S/P design and tender document preparation. Public tender for construction of S/P. 	<ul style="list-style-type: none"> Concession to scavengers. Operation by scavengers. Supervision by OPAMSS 	<ul style="list-style-type: none"> Continue operation by scavengers. Continue supervision by OPAMSS.
C/P		<ul style="list-style-type: none"> Compost market survey in AMSS. Study for the generation of organic SW. 	<ul style="list-style-type: none"> Promotion with incentives, so that the private sector participates in compost processing. 	<ul style="list-style-type: none"> Processing and commercialization of compost by private sector.
S/L	↓	<ul style="list-style-type: none"> Supervision and control of MIDES S/L. Preparation of S/L projects for AC, CT, SMT y TN. Public tender of new S/L. 	<ul style="list-style-type: none"> Supervision of MIDES S/L and other S/L. 	<ul style="list-style-type: none"> Supervision of MIDES S/L and new S/L by OPAMSS and EMAUSS.

d. Selection Plant (S/P)

The institutionalization of this component requires a further analysis during phase I of the Master Plan. The aforementioned involves: the market survey of recyclable wastes in AMSS; the analysis of the results and trends of the separation of these wastes at the source; and negotiation and arrangement achieved by OPAMSS with the scavengers. As mentioned before, the costs of a S/P or a C/P should be borne by the municipalities, which at the same time will be reflected upon the fees or tariffs charged to the users of the service. In consequence, the plant's capacity should be limited, the design features should also be simple and elemental in order to reduce investment and to arrange its construction enabling that the operation and maintenance costs be covered at least by the scavengers.

e. Compost Plant (C/P)

During Phase I, the compost market should be analyzed, as well as the generation of organic SW in AMSS during the same phase. In the succeeding phases, OPAMSS

and the municipalities will promote it through incentives if possible, so that the private sector takes part in compost processing.

OPAMSS and the municipalities should avoid participating in the construction, operation and maintenance of C/P, nor in their financing or the commercialization of the compost product.

f. Sanitary Landfills (S/L)

During Phase I, the projects for the construction of new sanitary landfills will be prepared.

Supervision and control of the current Nejapa S/L, as well as the new sanitary landfills, will be in charge of OPAMSS.

M.1.8.3 Institutional Arrangement to Minimize Social Restrictions

Table M-12 suggests the institutional arrangement to be implemented in the 3 phases of the M/P, in order to minimize the inherent social restrictions of SWM in AMSS. Such refer to the following:

- Collection in low-income marginal areas.
- Presence and participation by scavengers.
- Working relationships with the municipal workers of SWM.

M.1.8.4 Strengthening of the Cleansing Services in the 13 Municipalities

Table M-13 shows the recommendations that would have to be implemented in phases I and II of the M/P, in order to strengthen the organizational systems (planning, operation and maintenance, commercial, financial, administrative) of the cleansing service in the 13 municipalities of AMSS. The exception would be of de San Salvador, for which another procedure is proposed by means of San Salvador Municipal Public Company of Urban Cleansing.

For instance, a useful instrument to determine costs of each one of the components in the cleansing service could be the software "COSEPRE" which was developed by CEPIS (PAHO) within a Windows environment.

Table M-12: Institutional Arrangement to Minimize Social Restrictions

Components	Phase I	Phase II	Phase III
	2001-2003	2004-2006	2007-2010
a. Collection in low-income marginal areas	<ul style="list-style-type: none"> Formalize small collection enterprises and micro-enterprises Organize collection system by the community itself Contract-out collection in low-income areas Promote the culture of payment in these low-income areas 	<ul style="list-style-type: none"> Subsidized collection contracts in extreme poverty areas Tariff structuring based on social criteria Commercialization through electricity bills 	<ul style="list-style-type: none"> Achieve 100% collection coverage in low-income marginal areas in year 2010
b. Scavengers	<ul style="list-style-type: none"> Arrangement for participation in S/P Organization of SW micro-enterprises with former scavengers 	<ul style="list-style-type: none"> Consent of SP concession Contract and concession awarding in: <ul style="list-style-type: none"> Marginal areas Collection of separate recyclable materials 	<ul style="list-style-type: none"> Continue with the process Incorporate scavengers into recycling industry
c. Municipal SWM workers	<ul style="list-style-type: none"> Training Consent 	<ul style="list-style-type: none"> Optimize services and avoid separation of recyclable materials during collection 	<ul style="list-style-type: none"> Study the possibility to create small collection enterprises formed by the own municipal workers

Table M-13: Strengthening of SWM organizational systems in each of the 13 municipalities (*)

Systems	Recommendations
Planning	<p>With support and consulting by OPAMSS SW Unit in each municipality:</p> <p>Formulate a medium term planning (2-5 years) and operative planning in a short term (1 year) of SWM within the corresponding municipality.</p> <p>Organize an information sub-system with performance, management and cost indicators.</p> <p>Organizational structure: municipal structure arrangement in order to place the Cleansing Service at a level that corresponds to its importance.</p> <p>Prepare and implement the Regulating Ordinance of the Cleansing Service of each municipality.</p>
Operation and maintenance	<p>Optimize collection routes and better use of the corresponding manual.</p> <p>Optimize street sweeping and public road cleansing.</p> <p>Create a fund for equipment depreciation and replacement.</p> <p>Promote the formalization of micro-enterprises and cooperatives for SWM.</p> <p>Foster the participation by the private sector (SW-SRE, micro-enterprises, cooperatives) in SWM by means of contracts and/or concessions, in order to achieve a total collection coverage.</p> <p>Study the possible alternative of fostering small enterprises with the municipal cleansing workers.</p> <p>Analyze efficiency and costs of equipment maintenance at municipal workshops versus external workshops.</p> <p>Establish a supervision and control sub-system.</p>
Commercial	<p>Establish and update the cadastre of users to be utilized for billing and collection of the services rendered.</p> <p>Coordinate and exchange information with OPAMSS on weighing control at the weighbridges of the S/L and T/S.</p> <p>Achieve the collection of the cleansing and S/L fee to be conducted along with electricity bills of CAESS and DELSUR.</p> <p>Review and update the tariff structure periodically.</p>
Financial	<p>Establish separate accounts (costs and budget accounts) of the cleansing service.</p> <p>Analyze the costs of the different components of the cleansing service.</p> <p>Utilize cost indicators as an element to improve the service efficiency.</p> <p>Employ the service unit costs obtained as a basis for public tenders, contracts and concessions.</p> <p>Create a fund for equipment replacement and depreciation.</p>
Administrative	<p>Establish the autonomy of the Cleansing Service to manage their own staff.</p> <p>Coordinate cleansing service personnel training with OPAMSS.</p> <p>Prepare a manual of work with the functions of the cleansing staff.</p> <p>Facilitate the supplies management system:</p> <p>Management and control of stock in hand.</p> <p>Eliminate the bureaucracy for acquisitions and purchases.</p> <p>Activate the storage and supplies distribution sub-system.</p> <p>Establish a sub-system for social communication and information to citizens.</p>

Note: * Municipalities: MJ, CD, CT, AY, SM, ST, AC, SY, IL, SMT, AP, NJ, TN.