3 POLICY AND INSTITUTIONAL FRAMEWORK

Until recently, sewerage and sanitation services in Metro Manila were scattered across the service area without a clear linkage to the generation of environmental and health benefits. In the meantime, water bodies were deteriorating rapidly. Its effects and economic losses have been significant, about PhP77 billion annually[29]. In 2004, the Philippine Congress passed a landmark law making water quality management as one of the ultimate objectives in the provision of sewerage and sanitation services. This objective was reiterated in the recent Supreme Court decision on the clean up of the Manila Bay (discussed below).

As such, this chapter starts with a discussion of the existing policy and institutional environment for water quality management as providing the larger framework for investments on sewerage and sanitation services. It then proceeds to discuss the policies and institutional set up in service provisioning and lastly, those of related sectors critical to providing affordable sewerage and sanitation investments and service levels (e.g. drainage management) and for ensuring sustainable water quality management, such as the issues of solid waste management, river clean up including relocation of informal settlers surrounding the water bodies of Metro Manila.

3.1 Water Quality Management

The Philippines has an extensive body of water and water related legislation and regulations that provide the legal bases for policies and programs related to water management (see **Table 3.1.1**). The *Philippine Clean Water Act of 2004 (Republic Act no. 9275),* the most recent piece of legislation, attempts to consolidate these different laws and unify efforts to fight water pollution. It is currently the centerpiece legislation for the environmental clean up of the country's water bodies.

[29] The 2003 Philippine Environment Monitor on Water Quality (World Bank). It discusses the effect and economic losses of poor water quality management. Economic losses due to water pollution was estimated in 2003 at an annual average of PhP13 billion for avoidable health costs, PhP17 billion for avoidable costs to fisheries production and up to PhP47 billion for avoidable losses to tourism.

Table 3.1.1: Legislation and policies

Legislation	Description	Responsible agencies E–Enforcer I–Implementer	Findings and analysis
Commonwealth Act 383, Anti Dumping Law (1938)	Prohibits dumping of refuse, waste matter or other substances into rivers.	DPWH (E/I)	Not fully enforced.
Republic Act 4850 (1966), creation of Laguna Lake Development Authority, as amended by Presidential Decree 813 (1975)	Regulates and controls the pollution of Laguna de Bay region, including sewage works and industrial waste disposal systems.	LLDA (E/I)	Strictly enforcing but not on domestic wastewater.
Presidential Decree 856 (1975), Sanitation Code	Requires cities and municipalities to provide an adequate and efficient system of sewage collection, transport and disposal in their areas of jurisdiction.	DOH (E) DPWH (I), LGUs (I)	Not adequately enforced and monitored, e.g., connection to sewer system of houses in areas where sewerage system is available.
Presidential Decree 600, as amended by PD 979 (1975), Marine Pollution Control Decree	Regulates and controls the pollution of seas.	PCG (E/I)	Coverage not efficiently monitored because of limited resources.
Presidential Decree 984 (1976), Pollution Control Law	Provides guidelines for the control of water pollution from industrial sources and sets penalties for violations; requires all polluters to secure permits.	DENR (E/I)	Not strict enforced; compliance on the provision of sanitation and sewerage facilities generally not met Repealed by the Clean Water Act.
Presidential Decree 1067 (1976), Water Code	Consolidates legislations relating to ownership, development, exploitation and conservation of water resources.	NWRB (E/I)	Not fully enforced.
Presidential Decree 1096 (1977), National Building Code	Requires connection of buildings to sewerage system.	DPWH (E) LGUs (I)	Proper wastewater and sewage disposal not fully enforced.
Presidential Decree 1151 (1978), Environmental Policy	Requires the right of the people to a healthy environment.	DENR (E/I)	EA system not strict in enforcement of sewerage and sanitation provisions.
Presidential Decree 1152 (1978), Philippine Environmental Code	Provides guidelines to protect and improve quality of water resources and defines responsibilities for surveillance and mitigation of pollution incidents.	DENR (E/I)	Only enforced on big polluters (i.e. industries).
Presidential Decree 1586 (1978), Environmental Impact Assessment System	Mandates the conduct of environmental impact assessment studies for all projects undertaken by government and private sector.	DENR (E/I)	Review not strict on sanitation and sewerage provisions.
Republic 6234 (1971), creation of Metropolitan Waterworks and Sewerage System	Construct, operate and maintain water supply systems, sewerage and sanitation facilities in the Metro Manila area	MWSS (E) Concessionaires (I)	Limited sewerage and sanitation service coverage.
Presidential Decree 198 (1973), creation of Local Water Utilities Administration and Provincial Water Utilities	Authorizes the creation of water districts to operate and administer water supply systems and wastewater disposal systems in provincial areas	LWUA (E) Water districts (I)	Operation and administration of wastewater disposal systems generally not implemented.
Presidential Decree 281 (1973), creation of Pasig River Development Council	Regulates and controls pollution of the Pasig River.	PRRC (E/I)	Not fully enforced.
Republic Act 7160 (1991), Local Government Code	Devolves enforcement of laws on sanitation to LGUs and the provision of basic services such as water supply, sewerage and sanitation.	DILG (E) LGUs (I)	Not strictly enforced due to budgetary constraints and low priority for sewerage and sanitation projects.

Source: 2003 Philippines Environmental Monitor on Water Quality, World Bank.

3.1.1 Philippine Clean Water Act (CWA) of 2004[30]

The CWA provides the policy and regulatory framework for comprehensive water quality management in the country. Its declared policy is *to pursue economic growth within a framework of sustainable development, in effect, in a manner consistent with the protection, preservation and revival of the quality of the country's fresh, brackish and marine waters.* It adopts a strategy that is integrated, holistic, decentralized and participatory in approach to abating, preventing, and controlling water pollution, specifically from land based sources. The main aspects of the CWA are to:

- streamline procedures to prevent and control water resource pollution;
- promote environmental strategies and control mechanisms;
- formulate a holistic national water quality management program;
- formulate an integrated water quality management framework;
- promote environmentally friendly commercial and industrial processes and products;
- encourage self-regulation of private industrial enterprises through incentives and market based instruments;
- provide a comprehensive management program to prevent pollution;
- promote public education and information to encourage active participation;
- formulate and enforce accountability for adverse environmental impacts; and
- motivate civil society to address environmental issues at the local and national levels.

Its main outputs and activities include the following:

- For DENR, in coordination with the National Water Resources Board (NWRB)[31], to designate water quality management areas across the country and for these WQMAs to be administered by a governing board comprised of multi-sectoral representatives from government and non government sectors;
- The identification of 'non-attainment' areas or areas where pollutants have exceeded their statutory limits and accordingly, prepare water quality improvement programs;
- The formulation of integrated water quality management frameworks and action plans;
- The preparation of a National Sewerage and Septage Management Program by DPWH, in coordination with other agencies;
- The enforcement and monitoring of implementation of policy guidelines on domestic sewage collection, treatment and disposal; and
- The imposition of fees and charges.

[30] Republic Act no. 9275

[31] NWRB's responsibility under CWA is to define the boundaries of WQMAs. NWRB is the government agency responsible for enforcing and implementing the *Water Code of the Philippines, Presidential Decree no. 1067 (1976),* which consolidates the laws relating to the regulation of ownership, development, exploitation and conservation of water resources. It is an attached agency to DENR.

Table 3.1.2 presents a summary of provisions of CWA. Metro Manila is covered by the CWA.

Table 3.1.2: Summary of main provisions of the Clean Water Act of 2004

Provision	Lead office and stakeholders
Water quality management area	Lead: DENR Others: NWRB in consultation with key stakeholders, governing board
Management of 'non attainment' areas	Lead: DENR Others: NWRB, DOH, governing board, LGUs, other concerned agencies, private sector
National Sewerage and Septage Management Program	Lead: DPWH Others: DOH, LWUA, MWSS, other concerned agencies
Domestic sewage collection, treatment and disposal	Lead: LGUs and/or agency vested to provide water supply and sanitation services, concessionaires Others: DENR, DOH, DPWH, other concerned agencies
National water quality status report	Lead: DENR Others: NWRB, PCG, other appropriate agencies and entities
Integrated water quality improvement framework	Lead: DENR Others: LGUs, concerned government agencies
Water quality management area action plan	Lead: DENR regional offices Others: NWRB, LGUs, civil society, other concerned stakeholders
National water quality management fund	Lead: DENR Others: DOST, PCG
Area water quality management fund	Lead: Governing board of each water quality management area
Groundwater vulnerability map	Lead: DENR-MGB Others: NWRB
Water quality guidelines	Lead: DENR Others: DOH, DA, other government agencies, private sector, academic institutions
Effluent standards	Lead: EMB
Procedures for sampling and analysis of pollutants	Lead: DENR Others: DOST, DTI, DOH, other concerned agencies, academe, professional associations, private sector
Classification and reclassification of water bodies	Lead: EMB Others: NWRB, other concerned agencies, public
Information and dissemination campaigns	Lead: DENR Others: DepEd, CHED, DILG, PIA
Water quality monitoring and surveillance	Lead: DENR with multi-sectoral group
Water pollution permits and charges	Lead: DENR regional offices Others: Project proponents, LGUs, other concerned agencies
Incentives and rewards	Lead: DENR
Civil liability and penal provisions	Lead: PAB

The CWA has identified the Laguna de Bay watershed as a water quality management area to be administered by LLDA as its governing board, and in accordance with LLDA's mandate under Republic Act no. 4850 (1966), as amended.[32] LLDA's primary task, under its charter, is to carry out the development of the Laguna Lake region including providing for adequate environmental management and control, and preservation against undue ecological disturbances, deterioration and pollution. Its mandate has both regulatory and developmental aspects. LLDA's jurisdiction in

[32] PD 813 (1975) strengthened the powers of LLDA over the conservation and development of resources of the Laguna de Bay region and the promotion the socio-economic well being of the people residing in the area.

Metro Manila extends to the cities of Pasay, Caloocan, Quezon, Manila, Marikina, Pasig, Taguig, Muntinlupa and Pateros as defined by Executive Order no. 927 (1983), which is not the entire area of Metro Manila[33] (see **Figure 2.1.2**). While LLDA has continued to operate as a regulatory body of the Laguna Lake region, it is uncertain whether it has aligned its plans and programs according to the requirements of a WQMA under CWA.

The remaining areas of Metro Manila, particularly the Cities of Makati, Mandaluyong and San Juan, are under the jurisdiction of Environment Management Bureau (EMB) by virtue of Executive Order no. 192 (1987)[34]. EMB's mandate is national in scope and mainly regulatory. EMB's mandate covers pollution of air, land, noise and radiation. Among EMB's functions with respect to water quality management are the followings:

- Classification of Philippine waters according to their best usage;
- Reclassification of Philippine waters based on the intended beneficial use;
- Formulation of water quality standards;
- Setting up and promulgation of rules on effluent, stream, ambient and emission standards;
- Assistance in the conduct of public hearings in pollution cases;
- Promulgation of national rules and policies governing marine pollution, including discharge of effluent from any outfall structure, industrial and manufacturing establishments; and
- Issuance of rules and regulations on marine pollution, upon consultation with the Philippine Coast Guard. Both LLDA and EMB are under the administrative supervision of DENR.

At present, there seems to be a gray area in terms of management responsibility between LLDA and DENR-EMB in Metro Manila following the WQMA concept. WQMAs are identified based on watershed. While LLDA has been designated under the CWA as the WQMA governing board for Laguna Lake which covers Metro Manila, its jurisdictional authority in Metro Manila is LGU-based, and which covers only nine out of the 17 LGUs. This requires close coordination between the two agencies, e.g., harmonized monitoring systems and procedures. GEF-WB and JICA are providing assistance in improving coordination including harmonizing monitoring systems of all concerned agencies, with DENR-EMB as the lead agency.

The Laguna de Bay and the Pasig River are currently classified as Class C in water quality and are governed by *DENR Administrative Order nos. 34 (1990)* and *35-91(1993)* for effluent standards. Five rivers in Metro Manila, i.e. the Paranaque, San Juan, Marikina, Pasig, and Navotas-Malabon-Tenejeros-Tullahan Rivers, can be considered as 'non attainment' areas under CWA, because they have exceeded the statutory limits of identified pollutants according to their classification. The CWA requires that a water quality improvement program should be prepared in such cases. In this regard, it is uncertain whether LLDA and/or DENR−EMB have prepared a water quality improvement program for these water bodies as yet. It was gathered that no substantial or new inputs from these two agencies on this aspect was provided to MWSS-RO during the 2008 rate rebasing exercise.

Until the present, LLDA's efforts has concentrated on its regulatory function by implementing a zoning system on the use of the Lake for fishery and aquaculture activities, and an environmental user's fee system (EUFS) to control the discharge of industrial wastes into the Lake. The EUF consists of a fixed fee based on volume of discharge and a variable fee based on unit pollution load, a

[33] EO 927 (1983) further amends the original charter of LLDA granting it the power to control and abate pollution within the Laguna de Bay region. Other areas under LLDA's jurisdiction are the provinces of Rizal and Laguna; Tagaytay city, Tanauan, Sto. Tomas and Malvar in Batangas province; Silang and Carmona in Cavite province; and Lucban in Quezon province.

[34] EO 192 reorganizes DENR and creates the EMB.

combination of a market based system, and command and control.

The implementation of a EUFS has prompted heavy polluters to install their own pollution abatement systems. The successful piloting of EUFS in the Laguna Lake region has led to its adoption nationwide under CWA. Less attention has been given by LLDA to the control of domestic wastewater, which is its major challenge today. While Laguna Lake has been reported to be of fair water quality, it is recognized that it is becoming increasingly stressed (see Chapter 2). Moving forward, LLDA plans to more aggressively pursue its developmental mandate which includes the provision of sewerage and sanitation facilities.

With regard to Metro Manila, inasmuch as the Manila water concessionaires have the exclusive right in the provision of sewerage and sanitation services in the concession area, LLDA coordinates with these concessionaires to collect and treat domestic wastes of commercial establishments. Outside of Metro Manila, LLDA plans to forge partnerships with local governments in providing sewage and wastewater treatment facilities.

(a) National Sewerage and Sanitation Management Program (NSSMP)

The CWA mandates the preparation of a National Sewerage and Septage Management Program (NSSMP) with DPWH, as the lead, in coordination with other agencies. The NSSMP is intended to serve as a framework plan that would address issues on sewerage and sanitation, and treatment and disposal of wastewater focusing on, among others, objectives, strategies, targets, institutional and financing mechanisms, appropriate technology, programming of investments, and monitoring and evaluation. It would also include guidelines on sludge management for private companies engaged in desludging operations.[35]

The respective roles of other institutions in the preparation and implementation of the NSSMP are as follows:

- For DENR to contribute to specific environmental criteria and data for the prioritization of sanitation, sewerage, septage management and/or a combination of these different systems and projects. DENR will also prepare and present to LGUs, water concessionaires, water districts and other water utilities, sustainable options such as community based natural treatment systems, ecological sanitation concepts, water recycling and conservation systems, and other low cost innovative means and as a complement to other sewerage and sanitation programs;
- For DOH to provide specific health criteria and data; DepEd, CHED and PIA to provide assistance in developing IEC programs; MWSS and LWUA to provide inputs on responsibilities of water concessionaires and water districts in sewerage, septage and sanitation management; League of LGUs to contribute inputs on the interests of LGUs; and
- For each LGU to issue ordinances in providing land for sewage and/or septage treatment facilities and for right of way/access to these sites, as well as to generate funding through local real property taxes and/or imposing a service fee system for the operation and maintenance of sewage and/or septage treatment facilities.

World Bank and ADB are currently providing financing for the preparation of NSSMP and which is scheduled for completion in August 2009.

[35] The existing DOH guidelines on sludge and septage management prepared pursuant to the Sanitation Code would have to be reviewed and updated as necessary in the NSSMP.

(b) Domestic sewage management

The CWA also provides general policy guidelines on domestic sewage management. Among these are:

- All projects and activities that involve collection, transport, treatment and disposal of sewage shall comply with the guidelines set by DOH pursuant to the *Philippine Sanitation Code (Presidential Decree no. 856)*;
- Where sewage, septage and sludge collection, transport and treatment are done by a third party, the final disposal of treated sewage, septage and sludge should likewise be in accordance with DOH guidelines, provided that reuse for agricultural purposes shall comply with standards of DENR and DA;
- DENR may also impose guidelines for pre-treatment standards of effluents that go through sewerage treatment systems to be made applicable on existing sources and/or new sources. In coordination with DPWH, DENR shall inform the local government building officials of these guidelines in relation to their issuance of building permits, sewerage regulation, and municipal and city planning.

The DOH guidelines require it to issue an environmental sanitation clearance (ESC) to desludging companies and operators of wastewater treatment plants to ensure that their operations comply with operational standards imposed by DOH and as required by Law. Companies involved in disposing of treated sewage, septage and sludge (bio-solids) as fertilizer for agricultural purposes are required to comply with standards of the Fertilizer and Pesticide Authority (FPA) under the Department of Agriculture (DA) and to secure an operating license from the latter. It is reported that both concessionaires have been granted ESCs from DOH and operating licenses from FPA to dispose of its treated sludge for agricultural purposes. Nonetheless, it is also common knowledge that illegal desludging operators exist and are not adequately monitored nor regulated. In this regard, it is understood that proper measures should be undertaken by DOH and these operators.

The *Sanitation Code (SC) of the Philippines (Presidential Decree no 856),* as amended by CWA, remains in force. The Code provides specific guidelines on sewage collection disposal, excreta disposal, and drainage (Section 17 of the Code). It requires DOH to issue regulations on design and construction of septic tanks and on operation of sewage treatment plants of private and public sewage systems. LGUs are responsible for ensuring that septic tanks are designed according to standard and constructed properly prior to granting a building permit and an occupancy permit, respectively. Inspection of constructed facilities, however, is not adequately done by LGUs because of lack of resources, capacity and manpower.

(c) Policy on sewerage and sanitation services

With respect to sewerage and sanitation services, the policy espoused in CWA requires the following:

- The mandatory connection of identified commercial establishments and households to existing sewerage lines, subject to capacity limits of the sewerage system to accommodate the total wastewater load. Where sewerage lines are not yet available, all sources of pollution are required to connect once these lines are made available by the agency concerned;
- Both water concessionaires to comply with effluent standards formulated pursuant to the Act;
- For the water concessionaires of MWSS to be responsible for providing sewerage facilities and sewage lines in MWSS franchise areas in coordination with LGUs;
- For concerned agencies to impose actions against failure to connect to existing sewerage systems by refusing issuance of ECCs to industries by DENR, of environment sanitation clearances by DOH, and/or by cutting all or any of services provided by water districts pursuant to PD 198; and

- For water districts (WD) to be mainly responsible for providing sewerage facilities in their respective franchise areas. Where there are no existing facilities, water districts, water utilities and local governments are required to adopt septage management programs or other sanitation alternatives, and similarly, where there are no water districts and water corporations.

Compliance to effluent standards of DENR-EMB is captured through the EIA (environmental impact assessment) system and the grant of environmental compliance certificate (ECC) by DENR-EMB, which is applicable for all public and private projects. The ECC is issued prior to construction of facilities. However, the extent of monitoring and the imposition of penalties for non-compliance during operations seem to be weak due to budgetary and manpower constraints at EMB.

Institutional setup for policy and program formulation

DENR has the overall responsibility for implementation of the CWA. Within DENR, this responsibility is assigned to EMB. The responsibility covers formulation of water quality management policies, programs and guidelines including setting of effluent standards according to intended beneficial use of the water bodies. With respect to designation of WQMAs, DENR regional offices are mainly responsible, in coordination with NWRB which is responsible for defining the boundaries of the WQMAs[36] . LLDA and DENR-EMB are the two agencies with responsibility for managing the Metro Manila watershed.

With regard to developing the policy framework for sewerage and sanitation management for the country, oversight and coordination is the responsibility of DPWH in coordination with other concerned agencies and institutions such as DENR, DOH, DepEd, DA, LGUs, MWSS, LWUA, and water utilities. The respective inputs/roles of these agencies/institutions are discussed above.

Pasig River Rehabilitation Commission (PRRC) is also involved in ensuring water quality in the Laguna Lake – Pasig River – Manila Bay watershed. PRRC was created by virtue of *Executive Order nos. 54 and 65.* It has a specific mandate to ensure restoration and rehabilitation of the Pasig River to its historically pristine condition conducive to transportation, recreation and tourism.

Among the powers and functions of the PRRC are the following:

- The preparation of an updated and integrated master plan on the rehabilitation of the Pasig River, taking into account its potential for transportation, recreation and tourism;
- To ensure that the easements provided for in the Civil Code and other related laws are observed, including all the *esteros* (canals) and waterways that drain into the Pasig River;
- To integrate and coordinate all programs related to the rehabilitation of the Pasig River;
- To abate the dumping of untreated industrial wastewater and sewage into the rivers;
- To relocate settlers, squatters and other unauthorized or unlawful occupants along its banks; and
- To undertake civil works for the purpose, such as dredging, clearing of structures, cleaning of the River and all the *esteros* and waterways that drain into it.

Its programs are currently concentrated on dredging of the river and its tributaries of solid wastes, and clearing up the areas surrounding the water bodies of illegal settlers, enforcing easement requirements and beautifying the river banks.

[36] Aside from Laguna Lake, there are only three WQMAs in the country that have so far been designated. These designated WQMAs are currently being defined as to their frameworks, objectives, targets, and investments.

There are significant gaps in policy implementation and enforcement, including being unable to deliver on commitments set in the Laws, much less within the prescribed timeframes. The main problems are

- Insufficient budgetary and manpower resources at both the national and local levels to address even basic, priority concerns of the sector such as the lack of streamlined and harmonized procedures and systems for monitoring and evaluation to produce accurate and useful data for better regulation;
- The need to address the institutional fragmentation of the sector and in turn, be able to develop strengthened partnerships among all government agencies and stakeholders concerned for more efficient and integrated interventions, and
- The need for a focused research agenda to support environmentally efficient investments.

Incremental steps are being taken by government to improve the situation. For example, in the 2007-08 rate rebasing exercise of the Manila water concessionaires, although the intention was for government to be prepared (through technical assistance provided under the GEF-MTSP) in the negotiations, in particular, having the upper hand in directing sewerage and sanitation investments to areas where they are deemed to be environmentally cost effective, it did not seem to be the case. Government was not prepared with its program of water quality improvement of major pollution load areas in the Metro Manila region. Nonetheless, wastewater effluent standards were introduced among the key performance indicators for sewerage and sanitation for MWCI. The parameters to be monitored are BOD, COD, TSS, oil and grease, and total coliform. The details of measurement of these parameters, however, are still yet to be finalized with the MWSS-RO.

On their own initiative, the concessionaires are working towards aligning their investments based on watershed/catchment areas. In addition, MWCI has proposed that performance on volume of septage collected and treated against forecast, subject to compliance with all other obligations under the Concession Agreement (CA), be considered for reward/penalty in the next rate rebasing exercise in 2012. Throughout the 2008 rate rebasing exercise with the concessionaires, it was reported that coordination between MWSS and other concerned agencies such as DENR- EMB, LLDA and DOH was done, albeit on a passive tone.

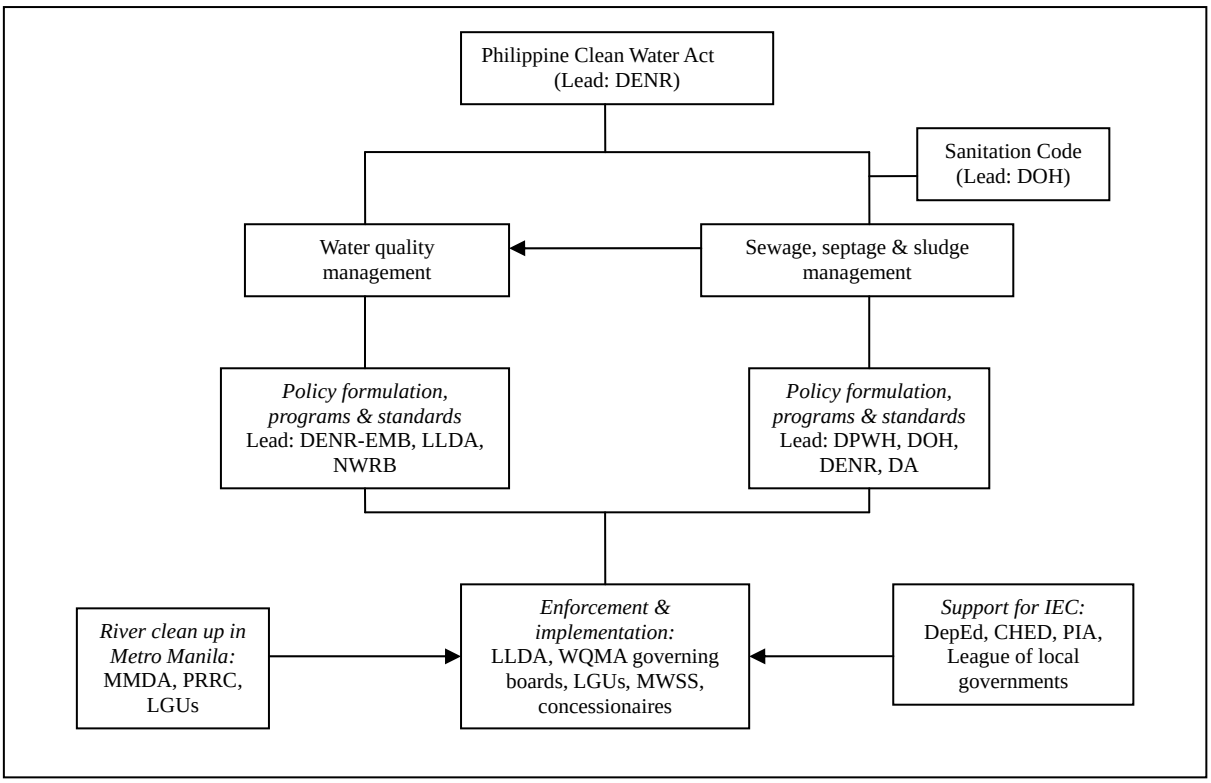


Figure 3.1.1: Policy and institutional set up for water quality management

(d) Supreme Court Decision on the Manila Bay

In December 2008, the Supreme Court (SC) issued a ruling upholding the Court of Appeals and Regional Trial Court rulings in September 2005 and September 2002, respectively, in favor of the respondents (concerned residents of the Manila Bay) and ordering the petitioners (10 concerned government agencies) to clean up and rehabilitate the Manila Bay. DENR, assigned as the lead agency, has been directed to coordinate and consolidate actions towards the rehabilitation and restoration of the Bay and to incorporate these into a program within six months of receipt of the ruling. Coordination is being handled by the River Basin Control Office (RBCO) of DENR which collects, consolidates and submits to the SC the quarterly reports on actions taken by the concerned government agencies.

In particular, the following directives are:

- For MWSS to install, operate and maintain adequate sewerage treatment facilities in strategic places under its jurisdiction and increase their capacities;
- For LWUA to ensure that the water districts under its supervision, provide, construct and operate sewage facilities for the proper disposal of waste;
- For DENR to install, operate and maintain waste facilities to rid the Bay of toxic and hazardous substances;
- For the Philippine Ports Authority (PPA) to prevent and also to treat the discharge not only of ship-generated wastes but also of other solid and liquid wastes from docking vessels that contribute to the pollution of the Bay;
- For MMDA to establish, operate and maintain an adequate and appropriate sanitary landfill and/or adequate solid waste and liquid disposal as well as other alternative garbage disposal system such as re-use or recycling of wastes;

- For DA, through the Bureau of Fisheries and Aquatic Resources, to revitalize the marine life in the Manila Bay and restock its waters with indigenous fish and other aquatic animals;
- For the Department of Budget and Management (DBM) o provide and set aside an adequate budget solely for the purpose of cleaning up and rehabilitation of the Manila Bay;
- For DPWH to remove and demolish structures and other nuisances that obstruct the free flow of waters to the Bay. These nuisances discharge solid and liquid wastes which eventually end up in the Manila Bay. As the construction and engineering arm of the government, DPWH is ordered to actively participate in removing debris, such as carcass of sunken vessels, and other non-biodegradable garbage in the Bay;
- For DOH to closely supervise and monitor the operations of septic and sludge companies and require them to have proper facilities for the treatment and disposal of fecal sludge and sewage coming from septic tanks;
- For the Department of Education (DepEd) to inculcate in the minds and hearts of the people through education the importance of preserving and protecting the environment; and
- For Philippine Coast Guard and the Philippine National Police (PNP) Maritime Group to protect at all costs the Manila Bay from all forms of illegal fishing.

In effect, the SC ruling has put pressure on the concerned government agencies to implement their respective mandates under the CWA and for DENR to supervise the implementation of the Operational Plan for the Manila Bay Coastal Strategy prepared in December 2005 by government and non-governmental organizations.

Manila Bay Coastal Strategy

The Manila Bay Coastal Strategy is a product of an extensive consultation among stakeholders representing national and local government agencies, civil society, business sector, academe, local communities, as well as donor agencies, bilateral and multilateral funding agencies. Recognizing the values and threats to Manila Bay, the stakeholders had agreed to a shared vision of making Manila Bay *a clean, safe, wholesome and productive ecosystem, a center of economic development, and a natural heritage nurtured by genuine Filipino values with regard to better quality of life for the present and future generation*. The strategy for achieving this vision was to be based on partnerships between and among stakeholders, sustainability by eliciting ownership of action plans and programs, synergy from the diversity of stakeholders, and building upon the direction of national and local policies, plans and programs, as well as from international conventions and programs.

Republic Act no. 6969, Toxic and Hazardous Wastes Law and its Implementing Rules and Regulations – Provides the mandate for environmental regulation, monitoring and enforcement covering numerous economic activities such as (1) importation, (2) manufacture, (3) processing, (4) handling, (5) disposal of all unregulated chemical substances and mixtures in the Philippines, as well as (6) entry and in transit, (7) storage, and (8) disposal of hazardous and nuclear wastes into the country for whatever purpose. These functions have been entrusted to the DENR and its IRR implemented by EMB.[37]

Presidential Decree no. 1586, Establishment of the Environment Impact Assessment System – Aims to "attain and maintain a rational and orderly balance between socio-economic growth and environmental protection through the sustainable use, development, management, renewal and conservation of the country's natural resources, including the protection and enhancement of the quality of the

[37] Volume 1, Assessment of the Legal Framework, Organizational Structure, and Environmental Management Function of the Environmental Management Bureau

environment, not only for the present generation but for the future generation as well". To achieve this aim, an Environmental Impact Statement (EIS) system was established that would reconcile socio-economic undertakings with the requirements of environmental equity. The functions of providing technical assistance on EIA implementation and monitoring, and setting of EIA rules and regulations have since been granted to EMB pursuant to Executive Order no. 192 (1987).

Presidential Decree no. 1152 (Philippine Environment Code) – Sets the basic policy guidelines on water quality management, among other environmental subsectors, including classification of Philippine waters and reclassification according to intended beneficial use, upgrading of water quality, water quality standards, and protection and improvement of water quality such as enforcement and coordination among concerned institutions, clean up operations, and water quality monitoring and surveillance.

Republic Act no. 7160 (1990), Local Government Code of the Philippines - Devolves enforcement of laws on sanitation to LGUs and the provision of basic services such as water supply, sewerage and sanitation. Local governments are also responsible for watershed protection.

3.2 Sewerage and Sanitation Management

3.2.1 National Policy for Urban Sewerage and Sanitation

The national policy for urban sewerage and sanitation is articulated in the *NEDA Board Resolution no.5, series of 1994.* It states the national policy as:

- Placing a high priority on the provision of improved sewerage and sanitation services in urban areas;
- Requiring onsite sanitation facilities in all urban households and establishments to be readily adaptable to further sewerage systems;
- Requiring all new subdivisions and housing developments to provide simplified or conventional sewerage system and sanitation facilities;
- Requiring provision of conventional and low cost sewerage for central business districts and high income residential areas;
- Requiring treatment of industrial and collected wastewater according to standards set by DENR prior to disposal in drainage system; and
- For providing services according to consumer demand and willingness to pay.

Under the above policy, LGUs are the primary implementers of the sanitation and sewerage program, with the national government providing assistance to develop their capacities in the following areas: community participation, subsector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, operation and maintenance, and monitoring and reporting.

For Metro Manila, MWSS, through the concessionaires, is responsible for sewerage and sanitation services. Outside Metro Manila, LWUA and the water districts have the mandate; where there are no water districts, LGUs are responsible. *NEDA Board Resolution no. 12, series of 1995* provides for the common definition of terms relative to water supply, sewerage and sanitation, approved types of toilet facilities, levels of toilet use and unapproved/ unsanitary types of toilet facilities.

3.2.2 Relevant Laws on Sewerage and Sanitation Management

The laws that deal specifically on policies relating to sewerage and sanitation management are briefly described below:

Republic Act no. 1378 (1955), National Plumbing Law, Section 5 – Provides guidelines on the design of plumbing systems and fixtures of dwelling units and their proper maintenance. The law requires that such guidelines be according to requirements of sanitation and personal hygiene. It also requires dwelling units to have a connection to a sewer where a public sewer exists.

Presidential Decree no. 856 (1975), Sanitation Code, Section 17 - Defines the structures relating to onsite sanitation facilities and scope of DOH's mandate on the supervision of septage management. DOH mandate includes issuance of guidelines for design and construction of individual excreta and disposal system, and operation of sewage treatment plants. The supplemental IRR for the sewage disposal and drainage provisions of the Sanitation Code discusses the requirements for the issuance of an environmental sanitation clearance for individuals or firms engaged in the collection/desludging, handling, transport, treatment and disposal of sludge and septage, including those engaged in the operation of disposal sites. It also discusses the standards to be observed in septage and domestic sludge collection and transport, processing/treatment, and disposal of treated/processed domestic sludge.

Presidential Decree no. 1096 (1977), National Building Code, Chapter 9 – Requires separate systems for sewage and storm water. Sanitary sewage is to be discharged to the nearest street sanitary sewer main where available. Where a sanitary sewerage is not available, sewage shall be disposed into a septic tank and subsurface absorption field.

Presidential Decree no. 1152 (1977), Philippine Environment Code, Chapter 3 – Requires wastewater from manufacturing plants, industries, communities and domestic sources to be treated either physically, biologically or chemically prior to disposal in accordance with rules and regulations issued by appropriate government authorities.

Republic Act no. 7160 (1991), Local Government Code – Devolves enforcement of laws on sanitation to LGUs and the provision of basic services and facilities to local governments, which include general hygiene and sanitation, beautification and solid waste collection, drainage and sewerage, and flood control. Local governments are also responsible for watershed protection.

3.2.3 Institutional Set-up in Service Provision

DENR-EMB sets the effluent standards according to water quality classification and to which water concessionaires are expected to comply with. These standards are contained in DAO 34 and 35. LLDA and EMB monitor and enforce compliance through a permitting system and an environmental user fee system, as well as through the EIA system (discussed above). The concessionaires are required to submit monthly monitoring reports on effluent discharges from their facilities to these agencies.

For sanitation management, DOH enforces the policies of the Sanitation Code by prescribing guidelines for the design and construction of septic tanks. Further enforcement and implementation of guidelines are done by local governments through their grant of building permits during construction and the issuance of occupancy permits upon construction. With regard to sewage disposal and drainage, DOH is mandated to closely supervise and monitor operations of septic tank desludging companies, and require the latter to have proper facilities for treatment and disposal of sludge and sewage coming from septic tanks. This is done through the grant of ESC by DOH, a requirement for local governments to issue a business permit and a license to operate to desludging companies.

In reality, enforcement of the Sanitation Code with respect to sewerage and sanitation management has been weak. DOH implements its mandate including providing technical assistance to LGUs to the extent that its limited resources allow, which has meant inadequate monitoring and regulation, and has led DOH to assume a reactive rather than a proactive involvement with respect to its mandate. Also, illegal providers of desludging services continue to exist and are not monitored as to where they dispose of the wastes collected; their exact number is not known. Meanwhile, MWSS and its concessionaires, a few water districts and local governments have taken the lead in evolving practical solutions to improving sewerage and sanitation management using their respective legal mandates as basis, while endeavoring to comply with DENR and DOH standards to the extent possible.

In terms of service provisioning, there are three agencies with this responsibility in the country:

- MWSS for Metro Manila region;
- LWUA and water districts for provincial cities and urban areas; and
- Local governments where there are no water districts and water concessionaires.

Republic Act no. 6234 (1971), creating the Metropolitan Waterworks and Sewerage System, as amended, mandates MWSS the following:

- To have jurisdiction, supervision and control over all waterworks and sewerage systems within Metro Manila, and some cities and towns of the provinces of Cavite and Rizal, for a total service area of 1,914 km^2.;
- To ensure uninterrupted, adequate supply and equitable distribution of safe, potable water at an affordable price, and in an equitable manner;
- To contribute to public health and safety through the maintenance and improvement of the urban environment and securing a sanitary environment; and
- To secure environmental conservation to preserve the quality of human life and ecological systems, and prevent ecological deterioration and pollution.

In 1997, the provision of water supply, sewerage and sanitation services was privatized by the government and awarded to two concessionaires: MWCI for East Zone, and MWSI for West Zone. The legal basis for the privatization was *Republic Act no. 8041 known as "The Water Crisis Act"*. The rationale for the privatization was as follows:

- To transfer financial burden to the private sector;
- To improve service standards;
- To increase operational efficiency; and
- To minimize tariff impact.

After the privatization, a residual MWSS was maintained. It has two main functions and these are reflected in the tasks of its two divisions: the Corporate Office (CO) and the Regulatory Office (CO). The main functions of the Corporate Office (MWSS-CO) are the following:

- To cooperate with the concessionaires in developing new raw water sources;
- To monitor, report and administer the MWSS loans and perform related functions in connection with ongoing projects; and
- To manage and/or dispose of retained assets.

On the other hand, the main function of the Regulatory Office (MWSS-RO) is to monitor and/or enforce the awarded Concession Agreement with respect to service standards to customers, production of audited financial statements, ruling on cost allocation and others pertinent to the rate rebasing methodology, reviewing water supply and sewerage rates and implementing extraordinary price adjustments and other rate rebasing provisions, and prosecuting or defending proceedings before the Appeals Panel.

For provincial capitals, secondary cities, and urban centers outside Metro Manila, LWUA and water districts are responsible for providing sewerage and sanitation services and to collect rates and other charges for services provided, including discontinuing all or any of its services in case of failure of property owners to connect to the sewerage system and pay for the services. In areas where there are no water districts, water supply systems are managed by local governments; sanitation services[38] in these areas are nil. The areas without water districts number over a thousand municipalities.

A long standing issue with regard to expanding sewerage services and coverage in Metro Manila is the difficulty in enforcing mandatory connection of households and commercial establishments to existing sewer lines[39]. While there is a preponderance of legal bases – CWA, Sanitation Code (section 74), National Plumbing Code (section 5e) and National Building Code (section 903) – it has been difficult to implement in practice.

Under the Law, a water concessionaire or utility has the right to cut off its other services to the household or property owner whenever it is found to be not complying. Also, a non-complying individual or operator/company is subject to sanctions, fines and penalties imposed by the CWA (further discussed below). There are two issues:

- Affordability of households to pay for the sewer connection charge (i.e. prohibitive cost especially for middle to low income households) and the monthly sewerage charge; and
- Cutting water services is counter productive to the concessionaires as this affects their revenues.

On the other hand, enforcement is a responsibility of the concessionaires per the Concession Agreement, in particular, in relation to complying with sewerage coverage targets. This issue is being addressed on two fronts:

- Coordination between the concessionaires and concerned LGUs; and
- Through policy instruments such as the tariff restructuring of sewerage and sanitation charges, and the use of combined drainage and sewage systems.

The latter does not require payment of sewer connection charges. LGUs have the power to issue ordinances including penalties to strengthen enforcement. Also, LGUs are closer to their constituents and can assist in raising public awareness of health and environmental benefits of sewerage and sanitation services. A tariff restructuring has been proposed in the 2008 rate rebasing (see Chapter 4 for detailed discussion) to provide for incentives to households to avail of the services provided by the water concessionaires and to pay the sewerage/sanitation charges.

MMDA, per its charter under *Republic Act no. 7924 (1994)*, has a mandate on sewerage management, and control and abatement of environmental pollution. This is defined in section 3(d) and (f) of RA 7924. Section 3(d) refers to *flood control and sewerage management which include the formulation and implementation of policies, standards, programs and projects for an integrated flood control, drainage and sewerage system*. Section 3(f) refers to *health and sanitation, urban protection and*

[38] Refers to septage management.
[39] Mandatory connections to existing drainage systems are likewise provided for under the Sanitation Code, section 79.

pollution control which include the formulation and implementation of policies, rules and regulations, standards, programs and projects for the safeguarding of the health and sanitation of the region and for the enhancement of ecological balance and the prevention, control and abatement of environmental pollution.

In practice, however, MMDA has not defined its role nor implemented programs relating to sewerage management. This is partly because this mandate has been overtaken by the privatization of services of MWSS which grants the concessionaires exclusivity of service in the concession area. MMDA has concentrated on flood control and drainage projects, river clean up and relocation of illegal settlers including those living in or along the waterways.

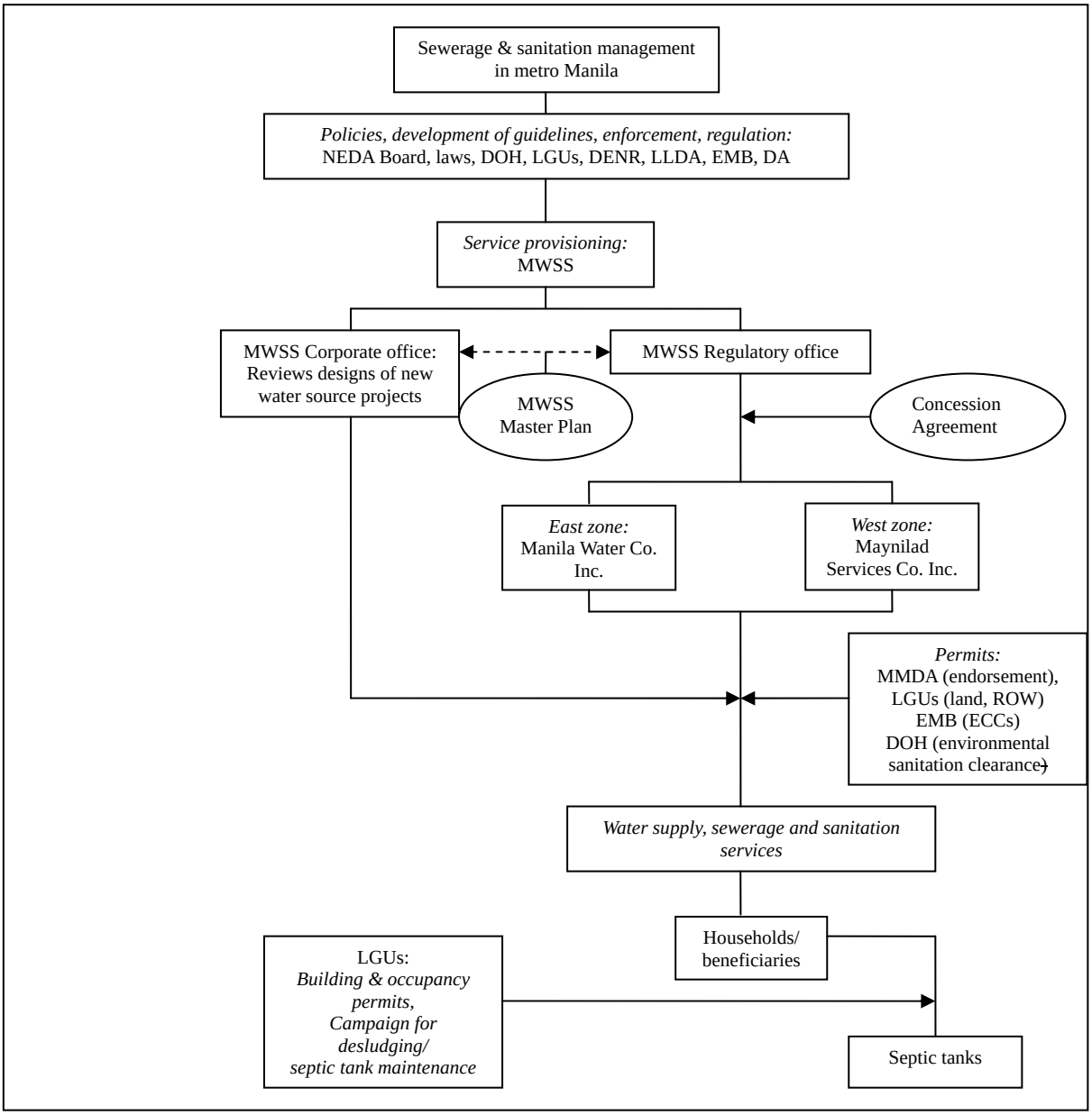


Figure 3.2.1: Institutional set up for sewerage and sanitation management and service provisioning in Metro Manila

3.2.4 Sewerage and Sanitation Development in Metro Manila

Metro Manila and secondary cities are leading the development of sewerage and sanitation management in the country. The evolution of the sector has been based on lessons learned by these implementing agencies from their projects on the improvement of services. In particular, practical insights and experiences have been gained from implementation of World Bank assisted Water Districts Development Program, Manila Second and Third Sewerage Projects where issues relating to expanding coverage of services have been grappled with and better understood.

In Metro Manila specifically, among the main issues constraining improvement in service coverage are the high cost of providing separate systems, high acquisition cost of land for treatment plants and unavailability of efficient size of land, low willingness to pay of beneficiaries, disturbance in economic activity caused by new construction particularly in built-up, highly dense areas. This has led to consideration of combined drainage-sewerage systems and treatment schemes, a decentralized approach involving independent, small scale treatment facilities rather than large, centralized systems, and a more aggressive provision of sanitation services in the interim, that is, by providing more equipment and facilities to increase coverage for desludging of septic tanks, and facilities for proper septage treatment and disposal, until such time that universal sewer coverage is achieved.

In addition, the government has approved the rationalization of the sewerage and sanitation tariff to a single tariff of 20% of the water bill by 2012 to spread the burden of environmental clean up across the concession area, as well as to address the low willingness to pay of consumers for sewerage and sanitation services. In the absence of clear direction from the government, the concessionaires have taken the initiative to plan their investments according to watershed/catchment areas in order to be able to better capture environmental benefits. The GEF-MTSP is helping the government, with DENR as the lead, to improve oversight of environmental concerns of water quality management in the Metro Manila region under the auspices of CWA. This is expected to improve government's capability to negotiate with the concessionaires in the next rate rebasing exercise in 2012.

Between the two concessionaires, MWCI is ahead of MWSI in terms of sewerage and sanitation coverage, in view of the financial difficulties encountered by MWSI in the early part of the concession period and the change in its ownership in 2007. MWSI is therefore on a 'catch up' mode with MWCI. In 1997, sewer coverage in the East Zone was merely 3%. MWCI has projected to reach 30% coverage by 2010 and a 100% sewer coverage in the three-river system of Marikina, San Juan and Pasig in the East Zone by 2018, requiring a total investment cost of PhP36 billion. Sanitation coverage is at 95% and will be maintained throughout the next five years until 2012.[40][41] For the West Zone, sewered customers constitute 9% of total population with access to water supply and unsewered customers 91%, for which septic tank desludging services are being provided. Based on MWSI's latest business plan (for the renewal of the CA to 2036[42]), sewerage coverage is projected to reach 31% by 2016, 66% by 2021, and 100% by 2036. Sanitation coverage is projected to decrease from 50% by 2016, to 34% by 2021, and finally 0% by 2036. Total cost is estimated at PhP51 billion by 2021 and PhP78 billion by 2036.

MWSI plans to achieve this through a three-pronged strategy as follows:

- Maximizing utilization of existing network and sewerage facilities which can accommodate an additional 38,000 new sewer connections;
- Expanding coverage using combined systems; and
- Maintaining sanitation facilities to serve customers outside of sewered areas.

[40] Based on MWCI's 2008 approved Business Plan
[41] So far MWSS-RO has not received the new MWCI Master Plan
[42] Subject to approval

MWSI has identified the following challenges ahead in the implementation of its sewerage and sanitation program:

- Enforcement of mandatory connections to existing sewer networks as mandated in the CWA; and
- Securing LGU commitment and other concerned government agencies for the provision of STP sites, relocation of informal settlers, maintenance of drainage networks and rectification of defective networks by LGUs, awareness campaign, identification of priority areas, and issuance of required environmental clearance and permits.

Table 3.2.1 provides a summary of rules and regulations pertinent to sewerage and sanitation projects of MWSI and its corresponding strategy for compliance.

Table 3.2.1: Summary of rules and regulations for compliance by MWSI (1/2)

Type of waste	Relevant laws, rules & regulations	Proposed strategy for compliance
Liquid wastes		
Effluent of individual/ household septic tank	PD 856, Sanitation Code, 1995 IRR of Chapter 17	• Implement guidelines for appropriate design and maintenance of septic tanks • Whenever available, sewerage disposal must be by means of Maynilad's sewage collection system
	RA 9275, Clean Water Act	• Impose mandatory connection to existing sewerage system
Effluent discharge of communal septic tanks, sewage treatment plants (STPs), septage treatment plants (SpTPs) and sewage outfalls	PD 856, Sanitation Code, 1995 IRR of Chapter 17	• Adopt internationally accepted procedures for design approval, construction, operation and maintenance
	RA 9275, Clean Water Act DAO 35, series of 1990	• Secure necessary discharge permit for all facilities discharging effluents • Report and apprehend unauthorized dumping of untreated sewerage and septage • Ensure that effluents from STPs and SpTPs comply with DAO 35 or any existing effluent standards • Conduct study and recommend effluent standards for sewage treatment via outfall-diffuser system
Domestic wastes from offshore sources (i.e. sea dumping)	PD 979, Marine Pollution Law	• Unauthorized dumping of untreated sewage shall not be tolerated • Any sea dumping activity shall be applied for permits from PCG and MWSI shall secure necessary permits/approval from concerned LGUs
Effluents from recycling/reuse	RA 9275, Clean Water Act	• Secure permit from DA and shall observe guidelines for safe reuse of wastewater for irrigation and agricultural processes
Septage/Bio-solids and other solid wastes		
Sewage from individual/household septic tank	PD 856, Sanitation Code, 2004 IRR of Chapter 17	• Secure necessary permits such as environmental sanitation clearance as an operator involved in collection, handling, treatment and disposal of septage
Bio-solids from STPs and SpTPs	PD 856, Sanitation Code, 2004 IRR of Chapter 17 RA 9275, Clean Water Act	• Comply with the allowable and acceptable limits for nutrients, heavy metals and pathogens as prescribed by DA through the Bureau of Solid Waste and Water Management

Table 3.2.1: Summary of rules and regulations for compliance by MWSI (2/2)

Type of waste	Relevant laws, rules & regulations	Proposed strategy for compliance
Preliminary treatment of residues, e.g., oil and grease, grits and screening	RA 9003, Ecological Solid Waste Management Act DAO 2001-34	• Comply with disposal and transport requirements prescribed by EMB or the concerned LGUs

Source: MWSI's Second Rate Rebasing Business Plan, September 2008

The role of LGUs in Metro Manila has been to provide support to the concessionaires by providing land for treatment plants[43] and for right of way/access to the sites, identification of priority areas for investments, issuance of clearances to facilitate project approvals, issuance of ordinances to enforce mandatory connections to existing sewerage networks, and to assist in public awareness campaigns. For example, in the case of Marikina city, the government used the opportunity presented by MWCI's sanitation program in improving their governance of environmental sanitation. After agreeing with MWCI on a schedule for septic tank desludging for the entire city being an unsewered area, the city government launched a "Todo Sipsip" program (translated as 100% septic tank desludging drive).

Under the said above "Todo Sipsip" program, all households are required to have their septic tanks desludged according to schedule. Households which did not avail the service were inspected for any violation in their building and occupancy permits, and assessed a penalty where violations were found. Illegal or unregulated providers of desludging services were eliminated from operating in the city and a database on the number of households and establishments, number of septic tanks, size and other information was developed for the city. The "Todo Sipsip" program has contributed to improving water quality of the Marikina River and is currently linked to the program for relocating illegal settlers along the Marikina River; these relocation sites are being provided with communal septic tanks. The "Todo Sipsip" program is among the flagship programs of Marikina city.

3.2.5 Other Related Sectors

The concessionaires are increasingly utilizing combined drainage and sewerage systems in improving coverage and services, which makes drainage management a relevant sector in sewerage management. On the other hand, for water quality improvement to be sustainable in Metro Manila, solid waste management, and control and relocation of illegal settlers need to be addressed as well.

(a) Drainage Management

The provision of drainage services in the country has been closely linked with flood control. *Presidential Decree no. 1067 (1976), Water Code of the Philippines, chapter 4* requires that drainage systems be constructed in a manner that their outlets are to rivers, lakes, seas, natural bodies of water and such other water courses. For property owners in higher land, they are required to ensure that drainage methods result in minimum damage to lower lands. The *Philippine Environment Code (Republic Act no. 1152), chapter 4* provides measures in flood control programs to include considerations of soil erosion control for the banks of rivers, lakes and seas, control of flow and flooding in and from rivers and lakes, water conservation, the needs of fisheries and wildlife, and control diversion and use of water to the extent that it affects water quality and availability for other purposes.

DPWH provides oversight on drainage and flood control programs in the country in coordination with local governments. National projects are a responsibility of DPWH while secondary and micro drainage systems are a responsibility of local governments (LGUs) as well as maintenance of these drainage systems. In the case of Metro Manila, DPWH's mandate on drainage and flood control has

[43] For example, the LGUs provided the land for the MTSP Capitolyo (Riverbanks) and Pinagsama (low income) STPs.

been transferred to MMDA through a memorandum of agreement in 2003, which includes transfer of the budget, staff and equipment.

MMDA has since created a Flood Control Management Services department overseeing the operation of 40 pumping stations, dredging of waterways and clearing the areas along and around rivers and creeks of illegal settlers. An additional critical issue though in the operation of flood control/drainage facilities is the large amount of garbage thrown in the waterways that block flow of water to treatment plants and to the seas. For drainage systems in areas beyond Metro Manila but within the MWSS service area, DPWH remains responsible for capital expenditures.

(b) Solid Waste Management

Republic Act no. 9003 (2000), which also known as *Ecological Solid Waste Management Act*, provides the policy framework for solid waste management. This Act seeks to promote the utilization of environmentally sound methods that maximize the use of valuable resources and encourage resource conservation and recovery. It retains with the local government units the primary task of enforcing waste management while encouraging involvement of national government agencies, the private sector and communities in garbage control projects and initiatives.

In general, the Act seeks to promote the adoption of a systematic, comprehensive and ecological solid waste management program that will:

- protect public health and the environment;
- utilize environmentally sound methods to maximize use and encourage conservation and recovery of resources;
- provide guidelines/targets for solid waste avoidance and volume reduction through measures such as composting, recycling, re-use, recovery, green charcoal process and others, prior to collection, treatment and proper disposal;
- ensure proper segregation, collection, transport, storage and treatment, and disposal of solid waste through the formulation and adoption of the best environmental practice in ecological waste management except incineration;
- promote national research and development program for improved solid waste management and resource conservation techniques, more effective institutional arrangements, indigenous and improved methods of waste reduction, collection, separation and recovery;
- encourage private sector participation in solid waste management;
- retain primary enforcement and responsibility of solid waste management with local governments while establishing a cooperative effort among the national government, other local government units, non-governmental organizations, and the private sector;
- encourage cooperation and self-regulation among waste generators through the application of market based instruments;
- institutionalize public participation in the development and implementation of national and local integrated, comprehensive and ecological waste management programs; and
- strengthen the integration of ecological solid waste management and resource conservation and recovery topics into the academic curricula of formal and non formal education in order to promote environmental awareness and action among the citizenry.

A Solid Waste Management Commission was created to oversee the implementation of solid waste management plans and to prescribe policies to achieve the objectives of RA 9003. The Commission is composed of the heads of 14 government agencies in ex officio capacity and three private sector

representatives, with the DENR secretary as chairman. The government agencies represented in the Commission are DENR, DILG, DOST, DPWH, DOH, DTI, DA, MMDA, League of governors, city and municipal mayors, association of *barangay* councils, TESDA and PIA.

The Commission and its secretariat are based at the DENR. The tasks of DENR under RA 9003 are to conduct the following:

- Prepare an annual national solid waste management status report;
- Prepare and distribute solid waste management IEC materials;
- Establish methods and other parameters for the measurement of waste reduction, collection and disposal;
- Provide technical and other capacity building assistance to LGUs in developing and implementing local solid waste management plans and programs;
- Recommend policies to eliminate barriers to waste reduction programs; and
- Issue rules and regulations to effectively implement the provisions of RA 9003.

For Metro Manila, in addition to local governments, MMDA and PRRC have a role in solid waste management. MMDA is responsible for identifying, constructing and operating sanitary landfills. On the other hand, PRRC is involved in clean-up operation of the Pasig River including its tributaries which number over 40. This involves dredging of the waterways of solid wastes, relocation of illegal settlers along and within the waterways, implementing urban renewal projects along riverbanks including imposing easement requirements.

The removal of illegal settlers is governed by the Urban Development and Housing Act of 1992 (RA 7279), section 28. Under the law, eviction or demolition may be allowed "when persons or entities occupy danger areas such as *esteros*, railroad tracks, garbage dumps, riverbanks, shorelines, waterways, and other public places such as sidewalks, roads, parks and playgrounds". MMDA, as lead agency, in coordination with the DPWH, LGUs, and concerned agencies, can dismantle and remove all structures, constructions, and other encroachments built in breach of RA 7279 and other pertinent laws along the rivers, waterways, and *esteros* in Metro Manila. With respect to rivers, waterways, and *esteros* in areas outside of Metro Manila, DILG is responsible to direct the concerned LGUs to implement the demolition and removal of such structures, constructions, and other encroachments built in violation of RA 7279 and other applicable laws in coordination with the DPWH and concerned agencies.

3.3 Summary of Institutional Framework and Issues

The CWA and the Sanitation Code are the main legislations that provide the policy and regulatory framework for sewerage and sanitation management in Metro Manila. They support the higher level goals discussed in Chapter 6. The CWA sets water quality management as the main objective by which investments in sewerage and sanitation are to be made. On the other hand, the Sanitation Code provides policy support from a public health perspective. NEDA through Board resolutions issue sector program and investment policies to better define the strategy for implementation, including funding of capital expenditures, as well as ensuring consistency of sector interventions linked to international commitments such as the Millennium Development Goals. Thus, the oversight agencies are DENR, DOH and NEDA.

The provision of services is mainly a responsibility of MWSS and delegated to the two Manila water concessionaires, MWCI and MWSI of the east and West Zone s, respectively. The two concessionaires are regulated by a Concession Agreement (CA) where coverage targets are updated

every five years through the rate rebasing exercise. Support services are provided by LGUs, DPWH, MMDA and PRRC. For sewerage services, LGU's responsibilities include provision of land for wastewater treatment plants and access to these sites, assisting in enforcing mandatory connection of households and commercial establishments to existing sewer lines, and maintenance of drainage systems with regard to the use of combined systems. DPWH and MMDA provide the capital expenditures of drainage systems, and MMDA and PRRC address solid waste management including providing for sanitary landfills, dredging of solid wastes from the water bodies, and relocating illegal settlers from the surrounding areas of the water bodies.

The responsibility for monitoring and enforcement are summarized in **Table 3.3.1** below. Gaps in the implementation of laws and agency mandates are summarized in **Table 3.3.2** and **Table 3.3.3**, respectively. It must be noted that the analyses shown in the aforementioned three tables are based on wider perspectives toward achieving the higher goals of water quality improvements and promotion of public health. Hence, the focuses are not limited solely on sewerage and sanitation sector in Metro Manila, but including other related aspects, particularly water quality improvements.

Table 3.3.1: Monitoring and enforcement (1/2)

Agency/ Institution	What is being monitored	Frequency of monitoring	Legal basis or purpose of monitoring	Enforcement or regulatory instrument	Sanctions/Penalties for non-compliance
DENR-EMB	– Water quality of water bodies (general) – Effluent discharges from point sources (specific) – Environmental impact of investments/projects	– Concessionaires submit monthly reports on effluent discharges from their wastewater treatment plants to DENR-EMB – For environmental impact assessment (EIA), submission of project proposal is prior to construction; regular monitoring per the approved environment management plan	CWA (RA 9279), Philippine Environment Code (PD 1152), EO 192 (creation of EMB), DAO 34 & 35 (prescribing effluent standards according to water classification), PD 1586 establishing the EIA system	– Discharge permit (subject to renewal every 5 years & payment of annual permit fee) – Wastewater discharge fee (based on a prescribed formula) – Issuance of environmental compliance certificate (ECC) upon approval of EIA	– Suspension or revocation of permit or operations – Upon recommendation of the Pollution Adjudication Board, fines of not less than PhP10,000 to not more than PhP200,000 for every day of violation of CWA – Other sanctions defined for more grave violations of CWA – Non-approval of project or investment
LLDA	– Use of lake waters – Lake water quality – Effluent discharges from point sources	– Concessionaires submit monthly reports on effluent discharges from their wastewater treatment plants to LLDA	LLDA charter (RA 4850), CWA, Philippine Environment Code	– Same as above since LLDA is a WQMA	– Same as above since LLDA is a WQMA
DOH	– Design of individual septic tanks – Plans, designs and specifications of new and existing sewerage systems and sewage treatment plants – Method of disposal of sludge from septic tanks and other treatment plants	– For individual septic tanks, design guidelines are issued to LGUs for enforcement – Prior to construction of wastewater treatment facilities by private companies/operators	Sanitation Code (PD 856, chapter 17), CWA	– Grant of environmental sanitation clearances (ESCs) to private companies/operators (an ESC is a requirement of LGUs to issue a business permit and a license to operate)	– As prescribed in CWA; CWA amended the Sanitation Code
DA	– Reuse of wastewater for irrigation and other agricultural purposes – Application of treated bio-solids according to standard for agricultural purposes.	– Prior to disposal or reuse of treated wastewater/ septage/sludge for irrigation and other agricultural purposes	CWA, DA charter, FPA charter, DA effluent standards for disposal on land	– Grant of license to operate – Wastewater discharge fee	– As prescribed in CWA

Table 3.3.1: Monitoring and enforcement (2/2)

Agency/ Institution	What is being monitored	Frequency of monitoring	Legal basis or purpose of monitoring	Enforcement or regulatory instrument	Sanctions/Penalties for non-compliance
LGUs	– Compliance to building/plumbing/ sanitation standards of onsite sanitation facilities – Compliance to DOH standards on septage management and disposal	– Prior to construction of building/housing structures and upon their completion – Upon application of business permit and license to operate by private companies/ operators	CWA, Local Government Code (RA 7160), Sanitation Code, Building Code, Plumbing Code	– Building permit and occupancy permit for individual home owners – Business permit and license to operate for private companies/ operators	– As prescribed in CWA, Sanitation Code, Building Code, Plumbing Code – -LGU may issue ordinances, including sanctions and penalties
MWSS-RO	– Compliance of concessionaires with the CA as revised/updated during rate rebasing every 5 years	– Regular reports (e.g., self monitoring reports), rate rebasing proposals every 5 years	Concession Agreement	– Rate rebasing review and approval	– Reward and penalty system in the CA as amended for water services; disallowances during rate rebasing exercises for sewerage and sanitation services
Public at large	– Quality of water supply, sewerage and sanitation services and customer services/relations	– Individual/community monitoring – Conduct of *barangay* wide survey intermittent depending on fund availability of MWSS-RO	Public performance assessment, public disclosure of survey results	Not applicable	Not applicable
PRRC	– Water quality of the Pasig River and its tributaries	– Regular monitoring pursuant to its specific mandate	EO 54 and 65	No enforcement	Not applicable

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (1/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
1.0	**Philippine Clean Water Act and its Implementing Rules and Regulations**					
1.1	MWSS and its concessionaires shall connect the existing sewage line found in all subdivisions, condominiums, commercial centers, hotels, sports and recreational facilities, hospitals, market places, public buildings, industrial complex and other similar establishments including households to available sewerage system, unless the sources had already utilized their own sewerage system.	MWSS (MWCI/ MWSI)	2009	Based on the latest Business Plans of MWCI and MWSI, it was stated that: – MWCI is targeting to achieve 30% sewerage coverage by the end of 2010; and – MWSI has achieved 9% sewerage coverage in 2007.	The figures reflect the number of connections against water-connected houses but not reflecting the figure of 'connections against total houses*'.	In order to understand the overall picture of sewerage and sanitation condition, the following figures are necessary: – Sewer-connected houses – Water-connected houses – Total houses
1.2	DOH shall formulate guidelines and standards for the collection, treatment and disposal of sewage including guidelines for the establishment and operation of centralized sewage system.	DOH	Imme diate	The 'Operations Manual on the Rules and Regulations Governing Domestic Sludge and Septage' was published in January 2008.	Guideline for sewage management is not available.	Guideline for sewage management is necessary.
1.3	All activities involving the collection, transport, treatment and disposal of sewage shall be in accordance with the guidelines on sanitation set by DOH.	DOH, MWSS (MWCI/ MWSI)	Imme diate	Collection, transport, treatment and disposal of sewage are being carried out by MWCI and MWSI according to their CAs.	As mentioned in 1.2 above, so far DOH has not prepared any detailed guideline for sewage management. There are still some private desludging companies operating without any proper treatment facilities.	A guideline for sewage management is necessary. Strict enforcement is necessary.
1.4	The reuse of treated sludge for agriculture purposes shall comply with the standards set by DA.	DOH, DA, MWSS (MWCI/ MWSI)	Imme diate	Presently, bio-solids from septage treatment facilities are being used as soil conditioner in sugarcane plantation in Pampanga Province, and periodic monitoring is being carried out.	-	-

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (2/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
1.5	For effluents that go through sewerage treatment systems, DENR may impose either Pre-treatment Standards for Existing Sources (PSES) and/or Pre-treatment Standards for New Sources (PSNS), upon the recommendation of the operators of sewerage system/wastewater treatment facilities. Separate standards for combination of different systems effluent should be set by DENR.	DENR	Imme diate	Basically if commercial establishments such as restaurants are equipped with oil and grease trap, their wastewater would be accepted for treatment by the concessionaires.	The Pre-treatment Standards for Existing Sources (PSES) and Pre-treatment Standards for New Sources (PSNS) are still not available.	Pre-treatment Standards for Existing Sources (PSES) and Pre-treatment Standards for New Sources (PSNS) are necessary.
1.6	DPWH and DENR shall inform LGU building officials of the requirements in the CWA pertinent to issuing building permits, sewerage regulations, municipal and city planning.	DPWH, DENR, LGUs	Imme diate	LGU building officials are carrying out their duties in checking the sewerage/sanitation facilities of all building plan applications.	Some private homes, commercial and industrial establishments are built not according to the approved plans. This resulted in non-compliance of their sewerage/sanitation facilities.	Strict enforcement is necessary to ensure all buildings are built according to approved building plans and building permits. A detailed inventory survey to verify the compliance status of sewerage/sanitation facilities is necessary.
1.7	DPWH shall coordinate with MWSS and its concessionaires in preparing a compliance plan for mandatory connection of the identified establishments and households to the existing sewerage system.	DPWH, MWSS (MWCI/ MWSI)	2009	Under the master plans of MWCI and MWSI, the concessionaires have worked out strategies to tackle the problem of that some households are refusing to connect to the sewer lines. DENR may initiate sanctions against any establishments and households that fail to connect to available MWCI/MWSI sewer lines.	This sanction is deemed low impact actions and it is difficult to implement due to complicated procedures involving different organizations. Some house owners have low awareness on the importance of connecting to sewer lines. Lack of incentives to connect to sewer lines.	More stringent sanctions are necessary to avoid any resistance to connect to sewer lines. It is necessary to work out attractive incentives to consumers to connect to the sewerage systems.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (3/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
1.8	Water concessionaires shall ensure compliance with effluent standards formulated pursuant to the CWA.	MWSS (MWCI/ MWSI)	Imme diate	Regular monitoring of discharge standard is being carried out by both concessionaires.	-	-
1.9	For industries with domestic wastewater, a one-year phase-in period is given to restructure the drainage system to connect to the existing wastewater treatment facilities.	DENR, MWSS (MWCI/ MWSI)	2006	According to the officials of MWSI and MWCI, although it is not within the scope of concession, as long as the domestic wastewaters from these industries are free of oil and grease and heavy metals, they would be accepted for treatment by the existing facilities of MWSI/MWCI.	No reliable database on the domestic wastewater discharge from industrial establishments is available.	A comprehensive inventory survey is necessary to identify all the existing industrial and commercial establishments in Metro Manila.
1.10	In MWSS service area, sewerage facilities and sewage lines shall be provided by water concessionaires in coordination with LGUs in accordance with their concession agreements.	MWSS (MWCI/ MWSI)	Imme diate	Sewerage and sanitation services in Metro Manila area are being provided by MWCI and MWSI.	While the progress of MWCI is quite satisfactory, MWSI is still behind schedule.	-
2.0	**The Code on Sanitation of the Philippines and its Implementation Rules and Regulations**					
2.1	Every new house/building to be constructed shall be provided with plan and specifications for excreta disposal system approved by the local health authority prior to construction. The city or municipal Building Official shall refer all applications for Sanitary (Plumbing) Permit to the local health authority for checking of sanitary facilities, prior to the issuance of the building permit.	LGUs	Imme diate	See 1.6	See 1.6	See 1.6

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (4/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
2.2	All houses/buildings without an approved excreta disposal system shall be required to construct such facilities under the supervision of the local health officer.	LGUs	Immediate	See 1.6	Enforcement is insufficient.	A thorough inventory survey on the availability and conformity of the sewerage/sanitation systems of existing houses/buildings is necessary.
2.3	Whenever an approved public sanitary sewerage system is accessible to the property, any individual sewage disposal system shall be abandoned and the house sewer shall be directly connected to the public sewer.	MWSS (MWCI/ MWSI), LGUs	Immediate	Those houses connected to the sewerage systems should have already abandoned their individual sewage disposal system (mainly septic tanks).	-	-
2.4	The local health authority at any reasonable time may inspect the sewage disposal system, sample the effluent, or take any other step which he deems necessary to ensure compliance with these rules and regulations. The local health authority may utilize inspection and reports submitted by local health officer, sanitary engineer or other qualified national or local government personnel to determine operational compliance.	LGU	Immediate	Regular monitoring of discharge standard is being carried out by both concessionaires.	-	-
2.5	Plans and specifications for all septic tanks shall be submitted to the local health authority for approval.	LGU	Immediate	See 1.6.	See 1.6 and 2.2.	See 1.6 and 2.2.
2.6	Septic tanks shall be cleaned before excessive sludge or scum is allowed to accumulate and seriously reduce the settling efficiency. They shall be inspected at least once a year and be cleaned when the bottom of the scum mat is within 7.50 cm (3 inches) of the bottom of the outlet device or the sludge and scum has reduced the liquid capacity by 50%.	MWSS (MWCI/ MWSI)	Immediate	Under the concession agreements, MWCI and MWSI are required to desludge these septic once every 5 to 7 years.	Furthermore, since, privatization in 1997, by now (2009), concessionaires should have completed (or about to complete) two rounds of desludging. From the progress of both concessionaires, it is found that both concessionaires are still yet to complete the first round of desludging.	It is to expedite the desludging works.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (5/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
2.7	Plans of subdivisions shall be submitted to the DOH for approval of the sewage disposal system before commencement of construction or before any of the lots in the subdivision are sold.	DOH, LGU	Imme diate	See 1.6.	See 1.6.	See 1.6.
3.0	**Manila Bay Coastal Strategy and its Operational Plan**					
3.1	50% reduction of the discharges of raw sewage, septage and untreated and inadequately treated wastewater by 2015	DENR, MWSS (MWCI/ MWSI), DOH, LGUs, etc.	2015	Treatment of domestic wastewaters is being addressed by MWSS (MWCI/MWSI).	Thorough pollution load study for the whole Manila Bay basin is not available.	Thorough pollution load study for the whole Manila Bay basin is necessary.
3.1.1	*Conduct study to identify point sources and determine total discharge loading (TDL) of raw sewage and other key parameters from domestic sources.*	DENR	2007	A pollution load analysis was carried out in 2005 under the MWSS Sewerage and Sanitation Master Plan, and present Survey includes pollution load assessment for the MWSS service area.	Thorough pollution load study for the whole Manila Bay basin is not available. Furthermore, detailed database of point sources is still not available.	Thorough pollution load study for the whole Manila Bay basin is necessary. A comprehensive inventory survey on all point sources of wastewater discharges is necessary.
3.1.2	*Establish time-bound pollution-reduction targets for identified major point sources in the identified river systems.*	DENR	2007	Not target has been set so far.	Specific pollution reduction targets need to be set for all major point sources and critical river catchment.	Specific pollution reduction targets need to be set for all major point sources and critical river catchment.
3.1.3	*Enforce the ordinances on the installation and maintenance of adequate septic tanks.*	MWSS (MWCI/ MWSI), LGUs	2007	Treatment of domestic wastewaters is being addressed by MWSS (MWCI/MWSI).	Inadequate enforcement by LGUs.	Enforcement should be strengthened.
3.1.4	*Implement a pilot project on sewerage system in the Paranaque, Las Piñas and Zapote river systems.*	MWSS (MWCI/ MWSI)	2007	The present concessions for sewerage and sanitation service cover the entire MWSS service area.	-	Pilot project(s) for selected basin(s) is necessary.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (6/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
3.1.5	*Prepare, update and implement investment plan or master plan for the establishment of sewerage systems/sewerage treatment plants for the priority point sources in the other major rivers to meet the allowable TDL/reduction targets by 2015.*	MWSS (MWCI/ MWSI)	2006	Both concessionaires have prepared their business plans and master plans.	-	-
3.1.6	*Prepare and implement investment plan for common waste water treatment facilities in key industrial areas and economic zones.*	DENR, MWSS, LGUs	2006	The existing concession agreements do not cover industrial areas.	-	-
3.1.7	*Construct sewerage systems and centralized sewage treatment facilities in priority areas, including subdivisions and housing projects, based on the reduction targets and investment plan.*	MWSS (MWCI/ MWSI)	2015	Facilities development is in progress.	-	-
3.1.8	*Monitor the implementation of MWSS programs/concession projects.*	DENR, MWSS	2015	The progress of concessionaires is being monitored by MWSS.	Pollution load reduction from the improvement of sewerage/ sanitation service against the overall target of pollution load reduction for the Manila Bay is unknown.	A detailed pollution load analysis covering the entire Manila Bay basin is necessary. Then monitoring on the progress of MWCI and MWSI against the overall target is important.
3.2	Stop sea-dumping of sewage in the Manila Bay					
3.2.1	*Identify sea dumping activities of septage sludge*	DENR, MWSS	2006	In 2003, both MWCI and MWSI have formally written to MWSS to express their position to cease/not to pursue septage sea dumping operations.	There are possibilities that some of the unlicensed septic tank deludging operators are discharging septage into the Manila Bay or other waterways.	All private septic tank desludging operators should be identified and indiscriminate disposal of septage must be stopped.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (7/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
3.2.2	*Identify companies with dumping permits*	DOH	2006	DOH is in the progress of identifying all the private septic tank desludging operators in and around Metro Manila.	The progress has been very slow due to insufficient manpower[44].	It is necessary to identify those unlicensed operators to ensure their operations are in compliance with the DOH guidelines and not conflicting with the concession agreements of MWSS.
3.2.3	*Identify, develop and implement guidelines on alternative land-based disposal sites, treatment and disposal method*	DOH	2006	The 'Operations Manual on the Rules and Regulations Governing Domestic Sludge and Septage' was published in January 2008.	The guideline mentioned on the left is focusing of septage management (sanitation) whereas guideline for sewerage management is not available.	A guideline for sewerage management is necessary.
3.2.4	*Issue and enforce moratorium on sea dumping and prohibit future dumping*	DENR	2006	See 3.2.1.	See 3.2.1.	See 3.2.1.
3.2.5	*Provoke licenses and permits of dumping*	DENR	2006	See 3.2.1.	See 3.2.1.	See 3.2.1.
4.0	**Supreme Court Decision**					
4.1	MWSS is ordered to provide, install, operate and maintain the necessary adequate (sewerage) treatment facilities in Metro Manila, Rizal and Cavite where needed at the earliest possible time.	MWSS (MWCI/ MWSI)	Imme diate	Being provided by MWCI and MWSI.	-	-
4.2	DOH is ordered to closely supervise and monitor the operations of septic and sludge companies and require them to have proper facilities for the treatment and disposal of fecal sludge and sewage coming from septic tanks.	DOH	Imme diate	See 3.2.2.	See 3.2.2.	See 3.2.2.

[44] According to the interview with DOH officials.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (8/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
4.3	DOH shall, in coordination with DENR, DPWH and other concerned agencies, shall formulate guidelines and standards for the collection, treatment, and disposal of sewage and the establishment and operation of a centralized sewage treatment system.	DOH, DENR, DPWH	Imme diate	See 3.2.3.	See 3.2.3.	See 3.2.3.
4.4	DOH is ordered to ensure the regulation and monitoring of the proper disposal of wastes by private sludge companies through strict enforcement of the requirement to obtain an environmental sanitation clearance of sludge collection treatment and disposal before these companies are issued their environmental sanitation permit.	DOH	Imme diate	See 3.2.2.	See 3.2.2.	See 3.2.2.
4.5	DOH is ordered to determine if all licensed septic and sludge companies have the proper facilities for the treatment and disposal of fecal sludge and sewage coming from septic tanks.	DOH	2010	See 3.2.2.	See 3.2.2.	See 3.2.2.
4.6	LGUs are ordered to inspect all factories, commercial establishments, and private homes along the banks of the major river systems in their respective areas of jurisdiction to determine whether they have wastewater treatment facilities or hygienic septic tanks as prescribed by existing laws, ordinances, and rules and regulations. If none be found, these LGUs shall be ordered to required non-complying establishments and homes to set up said facilities or septic tanks within a reasonable time.	LGUs	Imme diate	Progress unknown.	-	A comprehensive inventory survey is necessary to identify all the existing industrial and commercial establishments in Metro Manila.

Table 3.3.2: Gap analysis on the implementation of laws relating to sewerage and sanitation management (9/9)

No.	Law/relevant provision	Agencies	Target Year	Present status	Remaining issues (Gaps)	Recommendations
5.0	**National Plumbing Law, RA 1378**					
5.1	Provides guidelines on the design of plumbing systems and fixtures of dwelling units and their proper maintenance. The Law requires that such guidelines be according to the requirements of sanitation and personal hygiene.	DOH, LGUs	Imme diate	See 1.6	See 1.6	See 1.6
6.0	**National Building Code, PD 1096**					
6.1	Requires separate systems for sewage and storm water, Sanitary sewage is to be discharged to the nearest sewer main where available. Where a sanitary sewage is not available, sewage shall be disposed into a septic tank and subsurface absorption field.	DOH, LGUs, MWSS	Imme diate	Combined sewerage-drainage system being implemented to increase sewerage coverage	-	-
7.0	**Philippine Environment Code, PD 1152**					
7.1	Requires wastewater from manufacturing plants, industries, communities and domestic sources to be treated either physically, biologically or chemically prior to disposal in accordance with rules and regulations issued by appropriate government authorities.	DENR-EMB, LLDA, MWSS (MWCI, MWSI)	Imme diate	See 1.8 and 1.9	-	Close monitoring by DENR-EMB and LLDA is necessary.

Table 3.3.3: Gap analysis on implementation of agency mandates (1/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
DENR-EMB				
Classification of Philippine waters according to best usage	EO192	The Laguna de Bay and the Pasig River are classified as Class C waters. (The Pasig River is a 'non-attainment area' as per definition under CWA.)	EMB has not reviewed/updated the classification according to CWA by declaring the Pasig River and other water bodies within Metro Manila as 'non-attainment areas' and implementing water quality improvement programs.	Need to review those water bodies potentially classified as 'non attainment areas' and to prepare water quality improvement programs accordingly.
Reclassification of Philippine waters based on intended beneficial use		Under the Supreme Court ruling, the Manila Bay is classified as Class SB, while the existing water quality is Class SC.	EMB has not reclassified the corresponding rivers to conform to the classification of the Manila Bay in the Supreme Court ruling.	Assess the need for reclassification.
Formulation of water quality standards		Water quality and effluent standards issued through DAO34 and DAO35; recent update is pending final government approval prior to issuance.	-	-
Setting up and promulgation of rules on effluent standards		Relevant rules are reflected, among others, in the CWA.	Weak enforcement, inadequate monitoring.	(GEF WB and JICA are currently assisting in strengthening monitoring system.)

Table 3.3.3: Gap analysis on implementation of agency mandates (2/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
On the preparation of the NSSMP, DENR-EMB to contribute specific environmental criteria and data for the prioritization of sanitation, sewerage and septage management and/or a combination of these different systems and projects. Also, DENR to prepare and present to LGUs, water concessionaires, water districts and other water utilities, sustainable options	RA 9275 (CWA)	-	-	(Preparation of the NSSMP ongoing with World Bank-WSP and ADB assistance; for completion in September 2009.)
On domestic sewage management, DENR may impose guidelines for pre treatment standards of effluents that go through sewerage treatment plants		No guidelines have been developed so far	No guidelines have been developed so far	DENR should develop these guidelines.
LLDA				
To carry out the development of the Laguna Lake region, including providing for adequate environmental management and control, and preservation against undue ecological disturbances, deterioration and pollution	RA 4850, EO 927 EO 927	*Regulatory aspect:* LLDA is implementing zoning on the use of the Lake for fishery and aquaculture activities, and an environmental users' fee system on industries discharging effluent into the Lake Institutional capacity building being provided under LISCOP (World Bank funded) *Development aspect:* LLDA is coordinating with the concessionaires to collect and treat domestic wastes of industries	LLDA has not given sufficient attention to the control of domestic wastes.	Review and define LLDA's responsibility in the control of domestic wastes coming from Metro Manila (e.g., planning and prioritization of investments) given the presence of the Manila water concessionaires (GEF-MTSP is providing assistance to harmonize monitoring systems of EMB, LLDA and other concerned agencies.)
Jurisdiction over the cities of Pasay, Caloocan, Quezon, Manila, Marikina, Pasig, Taguig, Muntinlupa, Pateros		Monitors and regulates effluent discharges of industries located in these LGUs	LLDA is implementing its own monitoring system which is not entirely harmonized with that of EMB.	Harmonize monitoring system with EMB

Table 3.3.3: Gap analysis on implementation of agency mandates (3/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
LLDA designated as the governing board of Metro Manila WQMA	RA 9275 (CWA)	Management of Laguna Lake is 'business as usual'	Unclear whether LLDA has aligned its plans and programs according to requirements of the CWA Unclear delineation with EMB on responsibility for water quality management since EMB has jurisdiction on some parts of Metro Manila	Assist LLDA to fulfill its responsibilities as WQMA governing board Study appropriate delineation with EMB in terms of WQMA
DOH				
To prepare regulations on the design and construction of septic tanks and on the operation of sewage treatment plants of private and public sewage systems	PD 856 (Sanitation Code), CWA	Rules and regulations have been issued	Weak enforcement; Inadequate manpower and technical capacity of DOH staff to provide technical assistance to LGUs in enforcement (monitoring and regulation)	Strengthen technical capacity of DOH staff (sanitary engineers- national and regional levels)
To prepare guidelines on the collection, transport, treatment and disposal of sewage		The 'Operations Manual on the Rules and Regulations Governing Domestic Sludge and Septage' was published in January 2008.	-	-
On the preparation of the NSSMP, to provide specific health criteria and data	RA 9275 (CWA)	(Preparation of the NSSMP ongoing with World Bank-WSP and ADB assistance; for completion in September 2009.)	-	-
To closely supervise and monitor the operations of septic and sludge companies and require them to have proper facilities for the treatment and disposal of fecal sludge and sewage coming from septic tanks	SC ruling on Manila Bay clean up (December 2008)	Relevant rules on the grant of environmental sanitation clearance for desludging companies have been issued.	Weak enforcement; poor database	Strengthen monitoring system and regulation

Table 3.3.3: Gap analysis on implementation of agency mandates (4/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
MWSS				
To have jurisdiction, supervision and control over all waterworks and sewerage systems within Metro Manila, and some cities and towns of Cavite and Rizal provinces	RA 6234	MWSS has privatized the delivery of water supply, sewerage and sanitation services to MWCI and MWSI	MWSS should be more proactive in setting directions of investments based on environmental and health objectives	Support to MWSS-RO on strengthening regulatory capability, development of data base, planning and monitoring systems, tariff setting/rate rebasing, performance assessment/public audit
To contribute to public health and safety through the maintenance and improvement of the urban environment and securing a sanitary environment		Coverage targets for sewerage and sanitation reflected in Concession Agreement and updated in rate rebasing exercise every 5 years	Weak/unclear coordination arrangement among MWSS, DENR-EMB, LLDA, MMDA, PRRC, concerned LGUs in e.g., planning and prioritization of investments.	Strengthen institutional coordination/ partnership among concerned agencies and institutions (GEF-MTSP is providing assistance to strengthen partnership.)
To secure environmental conservation to preserve the quality of human life and ecological systems, and prevent ecological deterioration and pollution		Same as above	Same as above	
To install, operate and maintain adequate sewerage treatment facilities in strategic places under its jurisdiction and increase their capacities	SC ruling on Manila Bay clean up (December 2008)	MWSS, through MWCI and MWSI, is providing the facilities. Sewerage coverage in the East Zone is expected to reach 30% in 2010 using combined sewerage-drainage system. Sanitation coverage is 95%. Sewerage coverage in West Zone is about 9% using separate system; sanitation coverage is currently at 36%.	A large gap towards universal sewerage coverage has still to be filled.	To improve coverage and services.

Table 3.3.3: Gap analysis on implementation of agency mandates (5/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
LGUs				
To review/approve plans and specifications for excreta disposal systems for every new house/building prior to construction or issuance of building permit. The city/ municipal building official shall refer all applications for Sanitary (Plumbing) permit to the local health officer for inspection of sanitary facilities, prior to the issuance of occupancy permit.	Sanitation Code and Building Code	LGU building officials are carrying out their duties in checking the sewerage/sanitation facilities of all building plan applications.	Some private homes, commercial and industrial establishments are built not according to the approved plans. This resulted in non-compliance of their sewerage/sanitation facilities.	Strict enforcement is necessary to ensure all buildings are built according to approved building plans and building permits. A detailed inventory survey to verify the compliance status of sewerage/sanitation facilities is necessary.
To issue ordinances in providing land for sewage and/or septage treatment facilities and for right of way/access to these sites	CWA	Being done in most cases but land provided is limited in size	High acquisition cost of land	Explore options for acquisition of land
To enforce laws on sanitation	RA 7160 (Local Government Code)	Generally minimum effort in enforcement due to budgetary constraints	Weak enforcement in general	Improve capacity on enforcement, monitoring, regulation (consider Marikina experience); develop case studies or templates for strengthening enforcement
MMDA				
To formulate and implement policies, standards, programs and projects for an integrated flood control, drainage and sewerage system	RA 7924	Nil on sewerage management because of the presence of concessionaires	-	-
To formulate and implement policies, rules and regulations, standards, programs and projects for safeguarding of the health and sanitation of the region and for the enhancement of the ecological balance, and the prevention, control and abatement of environmental pollution		Identifies, constructs and operates sanitary landfills	Insufficient sanitary landfills.	Increase number of sanitary landfills Coordinate with LGUs and agree on payment schemes
To establish, operate and maintain an adequate and appropriate sanitary landfill and/or adequate solid waste and liquid disposal, as well as other alternative garbage disposal system such as re-use or recycling of wastes	SC ruling on Manila Bay clean up (December 2008)	Same as above	Same as above	Same as above

Table 3.3.3: Gap analysis on implementation of agency mandates (6/6)

Agency/mandate	Legal basis	Status	Issues/gaps	Recommendation(s)
PRRC				
Preparation of an updated and integrated master plan on the rehabilitation of the Pasig River, taking into account its potential for transportation, recreation, and tourism	EO 54 and 65	Existing master plan prepared in 1990.	Outdated master plan	Update master plan in coordination with WQMA action plan
Ensure that the required easements provided for in the Civil Code and other related laws are observed, applicable to all *esteros* (canals) and waterways that drain into the Pasig River		Clearing of areas of illegal squatters.	Inadequate funding; lack of relocation sites; stronger coordination needed with housing authority	Generate required funding; strengthen coordination with housing authority (Urban renewal programs in riverbanks funded by ODA; World Bank preparing project for PRRC.)
Integrate and coordinate all programs related to the rehabilitation of Pasig River		Coordination being done through its Board with interagency representation.	Possible overlapping functions with MMDA on dredging and clearing up activities.	Strengthen partnership with other concerned agencies.
Abate dumping of untreated industrial wastewater and sewage into the river		Nil	Overlapping functions with LLDA, EMB	Clarify responsibilities vis-a-vis LLDA, EMB and other concerned agencies
Relocate settlers and squatters, and other unauthorized or unlawful occupants along its banks		Clearing of areas of illegal squatters.	Inadequate funding; lack of relocation sites; stronger coordination needed with housing authority	Generate required funding; strengthen coordination with housing authority (Urban renewal programs in riverbanks funded by ODA; World Bank preparing project for PRRC.)
Undertake civil works for the purpose, such as dredging, clearing of structures, cleaning of the river and all *esteros* and waterways that drain into it		(Ongoing project with Belgian funding.)	Funding for subsequent programs needed	Generate/mobilize funding

4 SEWERAGE AND SANITATION MASTER PLANS, STUDIES AND PROJECTS

4.1 Pre-1997 Master Plans and Studies

From 1969 to 1997, at least five (5) Sewerage and Sanitation Master Plans have been prepared for Metro Manila. However, not all of them fully implemented. Among the major constraints were the huge capital investment required for proposed conventional sewerage systems, traffic disruption during construction, unavailability of land, low priority given to wastewater management by the government and the apparent unwillingness of consumers to pay for the service. A summary of the past master plans are as follows:

4.1.1 Master Plan by Black & Veatch in 1969

Black & Veatch in 1969 commenced a two-year Master Plan study. The Pasig River was even then measured with BOD concentrations of 2.5 to 10 mg/l and reported as "black and gaseous". A centralized concept for a separate sewerage system for Metro Manila was proposed. Consideration was given to a combined sewerage system but not ultimately recommended due to the extent of the existing sewerage system, high intensity rainfall in Manila and the consequent increased cost of a combined system.

Collection of wastewater was done by interceptor sewers (including the one proposed to be along the Pasig River bed). Ultimate disposal was via three disposal points in the Manila Bay. Inland treatment was not considered due to the negligible assimilative capacity of the streams. Sanitation was not considered in this master plan. The plan was not implemented due to its high implementation cost.

4.1.2 Master Plan by James Montgomery/Kampsax Kruger/DCCD in 1979

The next Master Plan was prepared by James Montgomery/Kampsax Kruger/DCCD in 1979. The 1969 plan was quickly discarded due to inaccuracies in its cost estimations. A sewerage expansion program involving rehabilitation of existing facilities and a monitoring system called METROSS (Metro Manila Sewerage and Sanitation) was proposed that would employ combined sewers with secondary treatment of sewage and four outfalls into the Manila Bay. A sanitation program comprising minor drainage projects for the depressed areas (PROGRESS) and a septic tank desludging program (STAMP) was part of this master plan. Part of PROGRESS and STAMP were implemented as a component of METROSS I.

4.1.3 WSSSMP in 1988

In 1988, the national government formulated the 1988-2000 Water Supply, Sewerage and Sanitation Master Plan[45] (WSSSMP) for the Philippines. This plan emphasized the commitment of the national government to fulfill the basic needs of the population, especially in depressed areas. WSSSMP was the result of an extensive interagency undertaking that involved DPWH, DILG, NEDA, MWSS, LWUA and NWRB. WSSSMP set the framework and agenda for organized, unified action by policy makers and program implementers, at all levels of the government, to execute and manage water supply, sewerage and sanitation programs and projects throughout the country.

[45] 1988-2000 Water Supply, Sewerage and Sanitation Master Plan (WSSSMP) of the Philippines

For Metro Manila, there are two stages for sewerage development:

(a) First stage, 1988-1992, PhP1.4 billion

METROSS I (PhP300 million):

- Construction of sewer line
- Construction of minor drainage
- Rehabilitation of existing sewer lines
- Installation of new house sewer connections

METROSS II (PhP1.1 billion):

- Construction of 6 km new double barrel outfall to the Manila Bay
- Construction of 80 km trunk sewer and interceptors
- Construction of 400 km sewer mains and laterals
- Construction of several sewerage lift stations
- Installation of new house sewer connections
- Construction of primary sewer treatment plant

(b) Second stage, 1993-2000, PhP6.4 billion

METROSS II (Continuation):

- Construction of 6 km new double barrel outfall to the Manila Bay
- Construction of 80 km trunk sewer and interceptors
- Construction of 400 km sewer mains and laterals
- Construction of several sewerage lift stations
- Installation of new house sewer connections
- Construction of primary sewer treatment plant

4.1.4 Water Supply and Sewerage Master Plan in 1996

In 1996, a Water Supply and Sewerage Master Plan for Metro Manila was prepared by Nippon Jogesuido Sekkei (NJS). The septage management plan in the master plan included desludging, collection and disposal of septage. Construction of 5 SpTPs were proposed to meet the sanitation target levels. Nevertheless, ocean dumping of septage was suggested as an intermediate solution until the SpTPs were available.

Medium-scale inland treatment systems were recommended with the effluent quantity target to be less than 30 mg BOD/L. An Interceptor System (first stage of combined) was recommended to help reduce cost. 10 sewerage systems were evaluated and prioritized to 2015. The target was around 30% of Metro Manila Region. Emphasis was placed on low cost technologies.

4.2 Post-1997 Master Plans and Studies

4.2.1 West Zone Sewerage Master Plan in 2000

A West Zone Sewerage Master Plan for MWSI by Philaqua Consultants, Inc. was proposed in October 2000. For the Sewerage Master Plan, the West Zone was delineated into small catchments in 11 cities and municipalities to correspond to contractual sewerage coverage. The master plan included four potential regional sewage treatment works and four regional sewerage catchments, all of which drain to the Manila Bay:

- A coastal site in Navotas to Caloocan A City area;
- Existing Dagat-Dagatan site
- A coastal site adjacent to the City of Manila; and
- A coastal site in Pasay City to Paranaque area, drainage by gravity.

Muntinlupa, where natural catchment flows drain inland to the Laguna de Bay, and Caloocan B City, where the natural catchment flows drain northwest and subsequently towards the coast adjacent to Metro Manila, were not included. Coast sites for the STPs were proposed on existing or reclaimed land. This master plan has never been formally presented to MWSS.

4.2.2 East Concession Sewerage Master Plan and MWSS Master Plan in 2005

The East Concession Sewerage Master Plan (funded under the Manila Third Sewerage Project) Master Plan was prepared to comply with the 1997 Concession Agreement targets. 2003 Rate Rebasing targets for sewerage and sanitation for the East Zone, in particular with the service targets for 2010. The plan was completed in early 2005. The use of combined sewerage was emphasized with the use of the drains whenever possible.

In this master plan, 11 catchments were delineated and separate and combined systems were prepared for each of these catchments. In some alternatives, catchments were combined, reducing the number from eleven to seven.

The recommended strategy called for the ultimate development of seven combined catchment systems, through an extended implementation schedule. Minimal tariff impact was the major reason for this recommendation.

Also in 2005, the MWSS Master Plan on Sewerage and Sanitation was prepared by Sinclair Knight Merz (SKM) in association with DCCD Engineering Corporation. It has a planning period of 2005 to 2025 with an estimated total capital cost of about PhP58.8 billion for the recommended investments. The breakdown is as follows:

Table 4.2.1: Capital cost for proposed investments under the 2005 MWSS Master Plan

Component	Capital Cost (In Billion PhP)
Sanitation	7.14
Sewerage	51.66
Total	**58.80**

The target of each city and municipality set in the 2003 rate rebasing have been used as the basis for planning sewerage and sanitation activities up to 2022 and are reflected in the time

horizons of 2005, 2010, 2015, and 2020. Logical extensions were used thereafter for 2020 and 2025, when the existing concession agreements no longer valid.

Table 4.2.2: Summary of proposed capital investment costs for sanitation

(Million PhP)

	2005	2010	2015	2020	2025	Total (million PhP)	With 30% contingencies
MWCI							
o Rizal							
SpTP (m^3/d)			800		800		
Land (ha)			4.00				
Amount (million PhP)			973		941	1,914	2,488
MWSI							
o Dagat-dagatan							
SpTP (m^3/d)		400	200	200	200		
Amount (million PhP)		470	235	235	235	1,176	1,529
o Paranaque							
SpTP (m^3/d)		200	200		100		
Land (ha)		3.00					
Amount (million PhP)		475	235		118	828	1,076
Sub-total (SpTP)		946	1,443	235	1,294	3,918	5,093
MWCI							
o Vacuum Tankers							
5 m^3				31	5		
10 m^3			2	110	33		
Amount (million PhP)			9	606	166	781	1,015
MWSI							
o Vacuum Tankers							
5 m^3		6	5	4	11		
10 m^3		40	42	20	54		
Amount (million PhP)		201	206	104	282	794	1,032
Sub-total (Tankers)		201	215	710	448	1,574	2,046
Total		1,147	1,659	945	1,742	5,492	7,139
Grand Total (with 30% contingencies)						7,139	
Cost of sludge disposal (million PhP)							
MWCI		6.77	9.73	12.90	16.12		
MWSI		6.28	8.43	6.40	8.05		
Total		13.05	18.16	19.30	24.17		

Source: Water Supply, Sewerage and Sanitation Master Plan for Metro Manila, MWSS, 2005.

Table 4.2.3: Summary of proposed capital investment costs for sewerage

Total summary of facilities	2010	2015	2020	2025	TOTAL
(1) Trunk Main Areas, (m), (0250mm-0135mm)	7,235	14,418	34,062	44,192	99,907
(2) Reticulation Areas, (ha.).*includes existing sewered area					
Total sewered area (ha.)	1,613	704	4,389	5,051	11,757
(3) UASB-SBR Capacity, (MLD)	48	36	228	300	612
Total Costs in P million					
(1) STP Area & Land Cost					
(a) Required STP Area (ha)	2.46	1.88	12.51	17.19	34.04
(b) STP Land Cost	465	498	1,565	2,508	5,036
(2) STP Cost	1,618	867	5,735	7,329	15,549
(3) Sewer Trunks Costs	117	386	931	1,715	3,148
(4) Reticulation Costs	1,075	1,197	6,705	7,026	16,003
Total Cost of Facilities & Land (million PhP)	3,276	2,948	14,936	18,577	39,736
30% Contingency					***51,657***
Total Cost per Hectare (million PhP)					**4.39**

Source: Water Supply, Sewerage and Sanitation Master Plan for Metro Manila, MWSS, 2005.

The sixteen new sewerage systems proposed under the 2005 Master Plan for the twenty-year period beginning in 2005 has the following highlights:

- Sewage reticulation covers a total area of 11,757 hectares at a cost of PhP16 billion in 2025;
- By 2025, a total of 99.9 km of new trunk mains with 250 to 1350 diameter is installed at a cost of PhP3.15 billion;
- Sixteen new UASB-SBR STPs are proposed with a combined capacity of 612 MLD and total cost of PhP15.55 billion;
- A total land area of 34.04 hectares is required for the sixteen STPs, with a land cost of PhP5.0 billion;
- The total cost of the new systems including land costs and a 30% contingency is PhP51.66 billion; and
- A unit cost of sewerage development of PhP4.4 million per ha, including land or PhP3.84 million per ha, excluding land.

The percentage distribution of the capital costs for the proposed investments is as follows:

- Reticulation system - 40.3%,
- Trunk mains – 7.9%,
- STP – 39.1%,
- Land – 12.7%.

A list of the specific projects proposed is presented in **Table 4.2.4**. These projects were conceived on the basis of the facilities needed to achieve the concessionaires' sewerage coverage targets under the concession agreements and rate rebasing exercises.

A notable feature of these projects is the adoption of the combined sewerage and drainage system. Some elements of these projects are also common e.g. a reticulation STED covering

a specific area, upflow anaerobic sludge blanket (UASB) and sequencing batch reactor (SBR) sewage treatment plant to accommodate effluent coming out of the reticulation STED, and sewer trunk mains linking these two components.

Table 4.2.4: Proposed projects in the 2005 MWSS Master Plan

Location	2010-2015	2015-2020	2020-2025
Muntinlupa	500 ha of additional STED reticulation to feed existing 40 MLD UASB-SBR STP	Expansion of UASB-SBR STP by 20 MLD to support expansion of STED reticulation by 40 ha	Expansion of STED reticulation by 170 ha
Pasig	Additional 61 ha of STED reticulation	STP up by 50% to 12 MLD; add'l 61 ha of reticulation	STP expanded by 22-34 MLD; expansion to 375 ha reticulation area; 5.5 km trunk main
San Juan	5 MLD UASB-SBR to be constructed	Add'l 58 ha of combined drainage; 71 ha of STED reticulation; STP No. 1 expanded by 5 MLD; STP 2 developed, a 6 MLD UASB-SBR STP	Add'l 135 ha of combined drainage and STED sewerage
East Manila	80 ha STED reticulation, leading subsequently to a 30 MLD UASB-SBR STP	Expansion to 399 ha STED reticulation and to 60 MLD STP; 4 km trunk main	Further expansion of about 147 ha of STED sewerage
Pasay	-	230 ha STED reticulation; 15 MLD UASB-SBR treatment plant; 3.3 km trunk main	Additional 425 ha STED reticulation; 4.4 km trunk main; expansion of treatment plant by 27 MLD
Caloocan B (Novaliches)	-	36 MLD UASB-SBR STP; a 629 ha STED reticulation area; 7.8 km trunk main	-
Navotas	-	17 MLD UASB-SBR STP; 425 ha STED reticulation area; 3.1 km trunk main	-
Malabon	-	93 MLD STP; 368 & 624 has reticulation areas in Malabon and Caloocan, respectively; 6.7 km trunk main	-
Valenzuela	-	1,011 ha of STED reticulation; 32 MLD STP; 7.8 km of trunk main	-
Quezon City	-	-	541 ha STED reticulation; 32 MLD UASB-SBR STP; 3.3 km trunk main
Taguig-Pateros	-	-	400 ha of combined drainage; MTSP STP plant near the Tipas River expanded by 26 MLD; 14.9km of trunk main
Marikina	-	-	Combined drainage with 17 MLD UASB-SBR STP to treat sewerage flow from 320 ha w/ 3.2 km trunk main
Paranaque	-	-	32 MLD UASB-SBR STP; 961 ha of STED reticulation; 9.4 km of sewer trunk mains
Las Pinas	-	-	1,250 ha of STED reticulation; 80 MLD UASB-SBR treatment plant; 4.8 km trunk main

Source: SKM, Water Supply, Sewerage and Sanitation Master Plan for Metro Manila, November 2005.

4.2.3 MWCI and MWSI Business Plans and Yokohama Study in 2008

(a) MWCI and MWSI Business Plans

Both MWCI and MWSI prepared their business plans in 2008 as inputs to the rate rebasing exercises. Targets are shown in **Table 4.2.5**.

Table 4.2.5: Sewerage and sanitation targets

Concessionaire	2006 Status	2011	2016	2021
MWCI[a] (expressed in households)				
Sewerage	67,815	144,300	154,775	278,175
Sanitation	162,069	814,700	1,026,400	1,034,700
MWSI[b]				
Sewerage	9%	13%	29%	39%
Sanitation	28%	43%	50%	55%

Source: [a]2008 MWCI Business Plan; [b]2008 MWSI Business Plan;

The proposed strategies and projects are discussed in Chapter 4.3. For MWSI, sewerage and sanitation projects reflected in the business plan are only up to 2012.

(b) Study by the City of Yokohama

In 2007, through the Japan Bank for International Cooperation (JBIC), MMDA has requested for technical guidance from the City of Yokohama, Japan. The City of Yokohama, being the sister city of Metro Manila, has responded to the request and conducted a study on the sewerage and sanitation sector in Metro Manila. The study was completed in February 2008.

The study identified the following main sewerage and sanitation management issues in Metro Manila:

- Government investment in sewerage and sanitation sector is too little to cater for its huge population size;
- No clear distinction of responsibilities among the agencies handling flood control, sewerage/sanitation management and environmental improvement;
- Unavailability of basic data for sewerage planning;
- Inadequate maintenance (desludging) of household septic tanks and accessibility problems of these septic tanks;
- River pollution due to insufficient STPs, inadequate maintenance of septic tanks, which resulted in direct discharge of wastewaters into river systems;
- Difficulty to secure sizable land for STP construction.

In addressing the above issues, the following recommendations were made in the study:

Hard component – Shimanto-gawa System

In view of the constraints in acquiring sizable land with affordable cost for STP construction, it was recommended that rather than providing STP for wastewater treatment, it would be more cost effective to directly purify water in rivers. As the main output of the study, it was recommended to apply the **Shimanto-gawa system** to purify water in creeks before being discharged into the Marikina River (main river) (see **Figure 4.2.1**). According to the recommendation, the facility is a simple structure that can be constructed in creeks with light on-site works and most of the construction materials can be locally sourced. For installation of such facility, the first stage is to install a facility using the contact aeration method that removes biochemical oxygen demand (BOD) and suspended solid (SS) (see **Figure 4.2.2**). The second stage is to improve the facility in stages, converting it to the Shimanto-gawa system that removes nitrogen and phosphorus (see **Photo 4.2.1** and **Figure 4.2.3**). The facility should be placed at the downstream end of creeks. A screen to remove garbage and over flow weir is necessary.

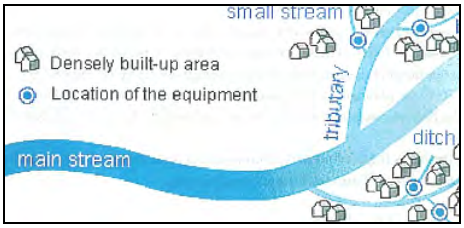
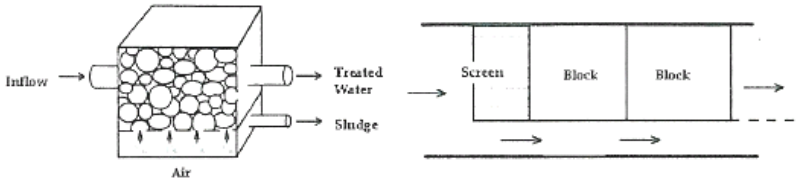


Figure 4.2.1: Proposed river purification concept

Source: Study on Wastewater Management Know-How Transfer to the MMDA, City of Yokohama, March 2008.



(a) cross-section of the equipment (b) layout of the equipment

Figure 4.2.2: Concept of first stage treatment

Source: Study on Wastewater Management Know-How Transfer to the MMDA, City of Yokohama, March 2008.

Photo 4.2.1: Example of Shimanto-gawa system

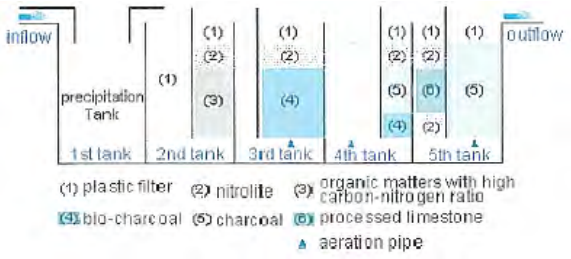


Figure 4.2.3: Concept of Shimanto-gawa system

Source: Study on Wastewater Management Know-How Transfer to the MMDA, City of Yokohama, March 2008.

It must be noted that the aforementioned Shimanto-gawa system was recommended as a short-term measure. Since purification of river system will not improve living environment of local residents, as a long-term measure, it was recommended that **STPs** should be constructed for each *barangay* and **separate sewer-storm pipe networks** should be provided in the long run. It further recommended that:

- In order to downsize the size of STPs, the existing septic tanks should continue to be regularly maintained; and
- Construction of separate sewer-storm pipe networks inside the existing drainage will solve the problems of excavations and traffic congestion during civil works.

Soft components

The study also made the following soft components recommendations:

- Public funding for sewerage project should be increased;
- Development of institutional and legal framework for promotion of overall urban planning is necessary;
- Setting up of relevant regulations to ensure proper operation and maintenance of sewerage and sanitation facilities, monitoring and enforcement is necessary.

From the available information, it can be seen that this is a very small scale study. Although the above issues and recommendation were presented, there were no descriptions/elaborations on any of the above issues and recommendations. From the limited available information, the following evaluations and conclusions can be made from the study:

- The study has drawn attention from MMDA and MWSS (MWCI/MWSI) on the importance of close coordination among them in provision and maintenance of drainage system as part of the overall efforts to improve sewerage system in Metro Manila;
- In sewerage and sanitation management, it should be viewed from a wider perspective including water quality control, drainage improvement, solid waste management as well as city planning as a whole;
- The present investment in sewerage and sanitation sector in Metro Manila is not sufficient, hence new sources of fund are necessary;
- The existing legal and institutional frameworks are still insufficient in dealing with sewerage and sanitation sector in Metro Manila, particularly strengthening of monitoring and enforcement mechanism is necessary;
- Although in short-term combined sewage-storm system could improve the sewerage environment in Metro Manila to a certain extent, in long run, separate sewage-storm system would still be desirable;
- With respect to the proposed Shimanto-gawa system, although the treatment equipment itself is different from the existing treatment plants being constructed by the concessionaires, the concept is basically same as the existing combined sewerage-drainage system being adopted by both concessionaires. The concessionaires are applying the concept of ‘interceptor’ whereby sewage/storm water are being collected by the existing drains then intercepted to the STPs before being discharged into the rivers. This is similar to the concept introduced by the Yokohama study that sewage/storm water should be treated at the downstream most of the creek for each sub-catchment before being discharged into the main rivers.

Concerning the appropriateness of the Shimanto-gawa system for application in Metro Manila, the existing application of the system in Kubokawa town in Japan where land uses consist mainly of agriculture and all households are provided with individual Jokasou treatment system, the system is thus sufficient to purify the river water, however for the case of Metro Manila, considering the huge amount of pollution load from wastewater discharge, the existing water quality of rivers as well as its high population density, it is deemed that the capacity of the system is not likely to be sufficient to cater for Metro Manila. On the other hand, the existing treatment systems being applied have been approved by MWSS, hence it is deemed that the existing systems should be continued rather than changing to other new system. Besides, in term of operation, the usage of Shimanto-gawa system requires not only technical knowledge for the maintenance of the system, but close cooperation from the local residents is indispensable. Considering that at the present moment it is still difficult to get any close cooperation from local residents on the operation and maintenance of the system, it is deemed that the existing concept applied by both concessionaires is more appropriate.

4.2.4 MWSI Master Plan in 2009

MWSI updated its 2005 Master Plan in January 2009 (by Original Engineering Consultants, OEC). At the time of preparing this report, this master plan has not been finalized, presented to and approved by MWSS. The new master plan retained the sewerage and sanitation targets set in the 2008 Business Plan (see **Table 4.2.5**). The proposed strategies and projects under this master plan are discussed in Section 4.3.

4.2.5 Comparison between the MWSS Master Plan (2005) and the Latest MWCI/MWSI Business Plans and Master Plans

In developing the MWSS Master Plan (2005), the 2003 rate rebasing targets for sewerage and sanitation were considered. On the other hand, the 2008 Business Plans, as supporting reports for the 2008 rate rebasing, took into consideration the new targets for sewerage and sanitation (see Chapter 5).

For MWCI, the 2008 targets for sewerage saw the inclusion of Marikina, Cainta and Taytay as part of the service area. There was a significant increase in coverage for Quezon City, with the 2021 target increasing from 17% to 85%. On the other hand, there were notable decreases in sewerage coverage targets for San Juan and Mandaluyong.

For sanitation in the MWCI area, there was a general decrease in sanitation targets – this was primarily driven by the increase in coverage targets for sewerage which in some situations will render unnecessary the sanitation services.

For MWSI, the overall targets for sewerage increased from 21% to 29% for 2016 and from 31% to 39% for 2021. The sanitation services targets for MWCI also increased, from 39% to 50% for 2016 and from 27% to 55% for 2021.

Looking at the scale of investments, there is a significant increase in the 2008 MWCI business plan as compared to what is proposed under the MWSS Master Plan (2005). In the 2005 master plan, the proposed new investments for the east concession area was placed at around PhP5.4 billion excluding 2025 investments, while in the 2008 Business Plan, it is around PhP16.30 billion. The accelerated master plan investments of more than PhP33 billion is more than six-fold the investments under the MWSS Master Plan (2005).

For MWSI, the proposed investments under the MWSS Master Plan (2005) is around PhP25.7 billion (2025 investments excluded). Under the 2009 MWSI Master Plan, investment is around PhP23.79 billion so there is a slight decrease in the cost of proposed investments under the new plan. However, as per discussions with MWSI officials, investments are now estimated to reach PhP50 billion, and will be twice the cost of the program set in the 2005 and 2008 MPs.

4.3 Ongoing Projects

From the start of the concession period (1997), there were two major sewerage and sanitation projects implemented by MWSS, MWCI and MWSI i.e. the Manila Second Sewerage Project (MSSP), 1997-2005 and the Manila Third Sewerage Project (MTSP), 2005-2010.

4.3.1 Manila Second Sewerage Project (MSSP), 2001-2005

Under MSSP[46], ocean dumping of septage was piloted from October 2001 to July 2002. After completion of the trial, and during the evaluation period of the project, a complaint was lodged by a Philippine-based NGO to the Inspection Panel (IP). After investigation by the IP, it was concluded that improved septage management should be expanded in Metro Manila and ocean disposal should not be continued. It was further recommended that the *lahar*-affected area north of the city be studied for suitability as a treated septage disposal site. MSSP was completed in June 2005 with the following major accomplishments[47]:

(a) East Zone (MWCI)

Construction of barge loading station at Napindan

Sea disposal was a temporary solution, as the use of loading station had never been envisaged as permanent. The original design of the station was revised by MWCI, which prepared a new one but retained the original transfer capacity of 500 m^3/day. Construction was completed in June 2001. It was used intermittently for trials until June 2002 (about 27,000 m^3 were dumped). After the Philippines Coast Guard (PCG) refused in August 2002 to issue further permits for disposal, trials were interrupted and MWCI started disposal at three volcanic *lahar* sites in the areas affected by the eruption of Mt. Pinatubo in 2001. The loading station was used as a parking lot for the vacuum trucks. Full scale dumping has never been carried out.

Rehabilitation of the Ayala Sewerage System and Treatment Plant

Rehabilitation was completed in December 2003. The plant treats nearly 40,000 m^3/day of sewage (against 10 to 25,000 m^3 before). The network was extended by the installation of 1,500 individual connections and some outlying networks were also rehabilitated.

Construction of 26 communal sanitation systems

After inclusion in the project in November 2002, 26 community schemes were constructed and one rehabilitated in the eastern service area, benefiting a population of about 200,000. Virtually all communities were willing to pay or were already paying the surcharge of 50 percent over the water tariff. Since the beneficiaries are connected to a treatment plant, they are listed as having individual connections. By the end of the project, this sub-component

[46] Implementation Completion Report, Manila Second Sewerage Project, World Bank, 2006.
[47] Ibid.

was one of the two largest in term of investment.

(b) West Zone (MWSI)

Construction of barge loading stations at Estero de Vitas and Paranaque

The station at Estero de Vitas with a transfer capacity of 500 m^3/day was completed in September 2002, but has never been used for shipment of septage to sea, after PCG refused to issue further permits. It is also currently used as parking space for the vacuum trucks. The Paranaque station was not constructed as a result of the cessation of disposal at sea.

Construction of a septage treatment plant and rehabilitation of the sewerage treatment plant at Dagat-Dagatan

In 1999, MWSI revised the design of the septage treatment plant and decided to rehabilitate/upgrade the existing pump station and sewerage treatment plant. After delays in implementation due to procurement problems, the septage plant was completed in early 2005. It operates 16 hours/day with a capacity of 250 m^3/per 8 hours and serves also as a pilot for permanent treatment on a larger scale under the MTSP. MWSI also disposed septage in *lahar* areas on an experimental basis. The existing sewage treatment plant was rehabilitated in June 2005 to satisfy the BOD treatment demands of approximately 60,000 people.

Rehabilitation of the Manila Central Sewerage System.

This was the single largest component of the project covering the rehabilitation of the network and the installation of 10,000 individual connections. Implementation suffered major delays also due to procurement problems. With respect to the connections, only 237 were installed, although the surveys conducted prior to June 2001 indicated that 12,000-13,000 customers were interested. Following the large tariff increases following MWSI's financial difficulties, most potential customers lost interest.

MSSP was succeeded by the ongoing Manila Third Sewerage Project (MTSP) which was approved by World Bank in 2005.

4.3.2 Manila Third Sewerage Project (MTSP), 2006-2010[48]

In order to improve and expand the sewerage and sanitation projects developed under the MSSP, MWSS and MWCI conceptualized the Manila Third Sewerage Project (MTSP) for the East Zone concession area. The objectives of the MTSP included the reduction of pollution of waterways within Metro Manila and the Manila Bay, reduction of the health hazards from sewage exposure, and the gradual improvement in the sewerage services through expansion of the septage management program. The project has a general implementation timeframe of 2005-2010.

The main components as discussed hereunder:

(a) Taguig Sewerage System

This component originally involved four flood control retention ponds near Laguna Lake, which were constructed by the Department of Public Works and Highways (DPWH). These retention ponds were proposed to be converted into STPs to allow proper treatment during dry season before discharge to Laguna Lake.

[48] 2005 Sewerage and Sanitation Master Plan for Metro Manila

Another component of the Taguig Sewerage System is the upgrading and rehabilitation of the drainage system. This was included to facilitate the use of a combined sewerage system in this area. Interceptor sewers are to be installed for affected communities.

To date, the use of retention ponds as a treatment facility is not being pursued anymore. Instead, a centralized secondary sewage treatment plant will be developed – a 40 MLD sewage treatment plant is presently being bided out.

(b) Riverbanks Sewage Treatment Plants

This project originally involved three underground treatment plants located along the banks of the Pasig River. Specific locations were narrowed down to Barangay Poblacion in Makati, Barangay Ilaya in Mandaluyong and Barangay Pineda/Capitolyo in Pasig.

Wastewater from drainage lines will be collected by interceptors and to be treated in the STPs before discharging to the Pasig River. As such, improvement of the drainage outfalls and lines may be included in the component.

The project in Barangay Ilaya in Mandaluyong was later cancelled.

(c) Septage Treatment Plants

To accomplish the new targets for sanitation, construction of two SpTPs was proposed to service the North and South portions of the east concession area. The North SpTP located in San Mateo, with a capacity of 586 m^3/d will serve Quezon City, Marikina and San Juan. Southwards, a SpTP at FTI, Taguig City with a capacity of 814 m^3/d will serve the areas of Mandaluyong, Pasig, Makati, Pateros, Taguig, including some towns of Rizal province. The FTI Septage Treatment Plant has also the capability to treat 2 MLD of sewage flows from the FTI complex.

Collection of septage from the individual septic tanks in the service area is to be facilitated by the acquisition of truck-mounted vacuum tankers.

These completed septage treatment plants are also discussed in Section 2.3.

(d) Sanitation of Low-income Communities

This originally involved the construction of CSTs or STPs, as appropriate, and shallow, small bore sewer lines to serve some low-income communities in the East Zone that have inadequate sanitation facilities.

It has now been reduced to a single site, at Pinagsama, Taguig. A STP will be constructed for the covered communities using combined systems with drainage upgrading for the conveyance of sewage. The feasibility of separate systems was also considered but found to be impractical and expensive.

(e) Quezon City-Marikina Sewerage

This component includes the construction of a STP along the Marikina River in front of Sitio Olandes Resettlement Site is to be constructed under the MTSP. The main drainage collector pipes, which collect combined sewage and drainage from some communities in Quezon City and Marikina, will be connected to the STP to treat the dry weather drainage/sewage flow. The treatment plant aims to reduce the sewage load that discharges to the Marikina River.

A low-lift station will be constructed to carry flows from the Sitio Olandes to the proposed STP. To fully utilise the combined sewerage system for the service area of the treatment plant, the drainage system for the Camp Atienza, Sitio Olandes, Industrial Valley, Cinco Hermanos and Blue Ridge basins will be upgraded.

(f) Upgrade of Existing Sanitation Systems

Originally, upgrades of CST sanitation systems into STPs for the East Zone were proposed, specifically those located at East Avenue, Road 5 and Matiwasay St. A separate sewer system at East and West Kamias is to be laid for the conveyance of the sewer flows to the East Avenue Regional STP. The project also aims to transfer CST flows to nearby STPs for full treatment. Flows from Mapagmahal and Anonas CST are to be transferred to East Avenue STP, Matiwasay CST flows to UP STP and Scout Santiago to Heroes Hill STP.

At present, only two sites will be pursued under this component: the East Ave STP and the Project 6 STP.

Status of MTSP

MTSP is now in its fourth year of implementation. The status of project components is presented in **Table 4.3.1**.

Table 4.3.1: Status of MTSP (as of May 2009) (1/2)

MTSP Activities	Status	Concession zone	Remarks
1. Taguig Sewerage System	– STP being bided out. Detailed engineering for sewer system and drainage rehabilitation is on-going.	East	– Phase 1 system will have a capacity of 40 MLD.
2. Riverbanks Sewerage System			
Pineda-Kapitolyo STP (Pasig)	– Completed in December 2008 – Inauguration in May 2009 – Under commissioning	East	– 5 MLD; serves Brgys. Pineda and Kapitolyo in Pasig (30,000 population)
Poblacion STP (Makati)	– Construction in progress – Completion in 2010	East	– 11MLD; Brgys. Poblacion & Olympia
3. Septage Treatment Plants (North and South)			
Taguig SpTP (South)	– Completed in April 2007 – Commissioned in May 2007	East	– Septage treatment capacity: 814 MLD – Additional sewage treatment capacity of 2,000 MLD – Population covered: 86,000 of Makati, Mandaluyong, Pasig , Taguig, San Juan and Pateros

Table 4.3.1: Status of MTSP (as of May 2009) (2/2)

MTSP Activities	Status	Concession zone	Remarks
San Mateo SpTP (North)	– Completed in May 2007	East	– Capacity: 586 MLD – Population served: 167,000 homes in San Mateo, Rodriguez town, Marikina City and some areas in Quezon City.
4. Sanitation for low-Income – Pinagsama STP(Taguig)	– Construction in progress – 50% completed	East	– 7 MLD; – Brgy. Signal Village (40,000 population)
5. Quezon City-Marikina-Sewerage System – Olandes STP (Marikina)	– Construction in progress – 43% completed – Completed in June 2009 – Inauguration in July 2009	East	– 10 MLD; Brgys. Olandes, Libis, St. Ignatius, Industrial Valley, Blue Ridge (40,000 population)
6. Upgrades of Existing Sanitation Systems			
East Avenue STP (Quezon City)	– Ongoing site preparations – Target completion: 2010	East	– Located inside DENR Forestry Compound – 17 MLD; – 10 QC brgys
Project 6 STP (Quezon City)	– Site preparations in progress – Target completion: 2010	East	– 4 MLD; – Project 6 (10,700 population)

Photo 4.3.1: The Olandes STP is presently under construction.


Photo 4.3.2: Ongoing construction works for the 10,000 m^3/day Olandes Sewage Treatment Plant along the Marikina. River. The project is one of the components of the MTSP.

Photo 4.3.3 Construction of the Olandes STP.

Photo 4.3.4 External view of the completed Capitolyo/Pineda STP.

Photo 4.3.5: Completed Capitolyo/Pineda Sewage Treatment Plant along the Pasig River. The project is one of the components of the MTSP. A basketball court was constructed on top of the underground STP.

Photo 4.3.6 Capitolyo/Pineda STP

4.4 Projects in Pipeline

4.4.1 Global Environment Facility - Manila Third Sewerage Project (GEF-MTSP)

The inclusion of this project in this report is in view of that it has several components related to the sewerage and sanitation program of MWSS and its two concessionaires.

The project complements the on-going Manila Third Sewerage Project. The GEF-MTSP Project Components 1 through 4 aim to identify impediments to cooperation among sector agencies, and to non-conventional investments in sewerage and sanitation. Components 5 and 6 would assist MWSS in pursuing higher investments in sewerage and sanitation by its concessionaires and in piloting suitable technology for septage disposal. Component 7 provides technical assistance to help with project management, monitoring, evaluation and dissemination.

(a) Component 1: Partnership Strengthening

The component would:

- strengthen the partnerships among the agencies responsible for water pollution control to improve coordination and effectiveness, through carrying out studies of successful

pollution control and wastewater management partnership models worldwide, and identifying and carrying out measures for improving existing administrative, institutional, and regulatory practices;

- establish an integrated partnership information center in DENR to consolidate existing data concerning wastewater sector which would then be disseminated to stakeholders in the said sector;
- integrate water quality monitoring systems of the agencies responsible for water pollution control; and
- expand the public assessment of water services to include sewerage and sanitation services.

(b) Component 2: Planning and Policy Development

This component would:

- update the sewerage and sanitation master plans and applicable standards for MWSS' jurisdiction areas to be used in the rate rebasing 2013;
- refine policies and procedures including guidelines for regulating the providers of septic tank desludging; and
- develop procedures and standards for implementing the Clean Water Act and the Sanitation Code.

(c) Component 3: Innovative Financing

This component helps the government in developing and testing innovative financing arrangements for the sewerage and sanitation sector to attract private sector investment in the sewerage and sanitation sector, including provision for technical assistance.

(d) Component 4: Use of Market-based Incentives

This component assists LLDA in improving its environmental user fees system and implementing market-based incentives in such systems through provision of technical assistance.

(e) Component 5: Rate Rebasing

The component provides technical assistance and training to MWSS and the other relevant government agencies for the preparation and negotiations of 2007/08 rate rebasing in the water and wastewater sector.

(f) Component 6: Joint Sewage and Septage Treatment Plant

This pilot upgrades a selected sewage treatment plant in Quezon City to a combined septage and sewage treatment plant, including the first year trial operation of the combined septage and sewage treatment plant.

(g) Component 7: Project Management

This component provides technical assistance and operating support to assist DENR in implementing, coordinating, monitoring, evaluating, and supervising the project and disseminating the project's results and outcomes.

4.4.2 Proposed Projects of MWCI and MWSI

MWCI and MWSI have developed their respective master plans and business plans to provide them with a roadmap to future projects. MWSS also has a master plan prepared in late 2005, from which the concessionaires' plans are broadly based on the MWSS Master Plan (2005).

(a) MWCI

The 2008 Rate Rebasing submission (2008 Business Plan) of MWCI basically adopts the MWCI Sewerage Master Plan (2005) for the East Zone, which essentially lays the groundwork for achieving sewer services coverage of 55% by 2022, as specified in the concession agreement. Over a 5-year period i.e. 2008-2013, the following projects will be implemented by MWCI:

- Reliability program for operating wastewater systems/plants;
- The construction of combined sewerage treatment schemes;
- Each of the 7 catchment areas in the East Zone will be provided with a sewage treatment plant that will treat combined sewage-drainage flows;
- Pilot projects for combined systems under the MTSP.

In the MWCI estimates, the cost of sewerage and sanitation projects at PhP7.5 billion over the 5-year period, and PhP23 billion up to 2022. Of this PhP23 billion program, PhP16.3 billion is allocated to the so-called "Master Plan" investments, which are actually projects set to be implemented after the MTSP. Out of this, an estimated PhP9.3 billion of projects has no identified funding source.

Table 4.4.1: Proposed MWCI sewerage and sanitation program based on the 2008 MWCI Business Plan (1/2)

Project	Project cost in million PhP	Target completion	Status
Wastewater Reliability Projects	**2,002**		
Improvement of WWTPs	675	Continuous to 2022	Ongoing
Improvement of existing sewer network	494	Continuous to 2022	Ongoing
Upgrade of CSTs	388	Up to 2012	Ongoing
IEC	-		Ongoing
ROW	25	2013	Ongoing
Replacement of Vacuum Tankers	420	Continuous up to 2020	Ongoing
Wastewater Expansion Projects	**20,562**		
Takeover of Private Systems	299		Ongoing
PRRP SpTP	740		
MTSP			
Riverbanks	293	2010	Ongoing
Marikina QC	255	2009	Ongoing
Taguig Sewerage	627	2010	Ongoing
Sanitation for Low Income	431	2010	Ongoing
Septage Treatment	64	2009	Ongoing
Sewerage Equipment, CST Upgrades, IEC, Consultancy	1,557	2010	Ongoing

Table 4.4.1: Proposed MWCI sewerage and sanitation program based on the 2008 MWCI Business Plan (2/2)

Project	Project cost in million PhP	Target completion	Status
Master Plan	16,298		
QC East and QC North	4,589	2019	Proposed
Pasig North and Pasig South	158	2022	Proposed
QC South and QC Central	4,586	2022	Proposed
Makati and West Taguig	39	2022	Proposed
Pateros Catchment	1,139	2022	Proposed
Marikina Catchment	2,661	2012	Committed (internal funds)
Land Purchase	2858		
TOTAL Proposed (Uncommitted)	10,511		

Source: 2008 MWCI Business Plan

New Sewerage Master Plan for MWCI

MWCI is proposing to develop a new master plan that will involve accelerated and expanded investments. It particularly calls for the 100% coverage of the San Juan, Marikina, and Pasig River basins with combined sewage-drainage treatment systems by 2018.

> *The ultimate plan is to utilize a combined sewer-drainage system to treat wastewater from the catchment areas and significantly reduce pollution loading into the three rivers. Five catchment areas will be utilized, with 29 sub-catchments and 29 wastewater treatment plants. The accelerated sewerage master plan is estimated to cost around PhP33 billion up to year 2018. This total cost includes the construction of treatment plants and drainage interceptor systems.*
>
> *Reference: MWCI, Accelerating Sewerage Provision in the East Zone of Metro Manila*

(b) MWSI

Based on the September 2008 MWSI Business Plan that includes only a short-term investment plan (2008-2012), MWSI intends to improve the current 9% sewerage coverage to 13% in Year 2011, with an ultimate 39% target in 2021. In this connection, the concessionaire will pursue the following projects over the 5-year business plan period:

- Enhancement of the treatment capability of the Central Manila Sewerage System. This will involve provision of secondary treatment facilities at two pumping stations (Luneta and Sta. Cruz), and a wastewater reuse system at one of these pump stations.
- Provision of treatment facility for 5 communal septic tanks in Quezon City. One of the CST will be converted into a combined sewage and septage treatment plant, while the other remaining CSTs will be converted to Jokasou secondary treatment systems.
- Construction of a new septage treatment plant at the south of concession area with a capacity of 250 m^3 per day. This will be located in Paranaque City.
- Repair of defective sewer network. This involves repair of defective sewer lines identified under the MSSP.
- Procurement of additional desludging equipment (vacuum tankers).

- Upgrading of sewer maintenance capability. Involves procurement of additional sewer cleaning equipment.
- Desludging re-fleeting program.
- Implementation of combined sewerage systems. This will involve investments in the San Juan basin, including treatment systems with a capacity of around 73,000 m^3/day.
- Installation of 4,000 additional sewer connections.

The source of funding for capital expenditures has not been identified yet for this set of priority projects. The estimated cost for this 5-year program (1998-2012) is PhP5,010 million, with the following breakdown:

Treatment Plants and Facilities:	PhP	1,485 million
Sewer Lines:	PhP	3,057 million
Septage Treatment Plants and Facilities:	PhP	321 million
Septage Trucks:	PhP	147 million
Total:	**PhP**	**5,010 million**

Table 4.4.2: Proposed implementation schedule of priority projects for the West Zone (MWSI)

Project Components	2009	2010	2011	2012
Additional Sewer Service Connections				
Luneta Treatment Plant				
– Phase 1 – Recycling System				
– Phase 2 – Treatment Plant				
Sat. Cruz Treatment Plant				
South Septage Treatment Plant				
San Juan River Basin Project				
– Upgrading of 5 communal septic tanks in Proj 7 & 8 QC				
– Construction of 19 WTP				

Source: MWSI powerpoint presentation, April 2009.

Based on the MWSI Sewerage and Sanitation Improvement Project Master Plan Report[49], MWSI will embark on a number of sewerage projects in 12 local government units (LGUs) in its service area. This involves development of combined sewerage systems, improvement and expansion of its existing separate systems, installation of a number of Jokasou systems which are typically small treatment systems for decentralized systems, and development of new septage treatment plants and related acquisition of septage collection equipment.

Total investments from 2009 to 2021 will cost around PhP23 billion, as shown in **Table 4.4.3**.

[49] OEC, January 2009.

Table 4.4.3: Proposed MWSI sewerage and sanitation program based on January 2009 OEC master plan report

Project location and components	Treatment capacity (m^3/day)	Project cost in million PhP	Target completion
Caloocan			
Dagat-dagatan STP	130,000	6,539	2021
Combined Sewer, Caloocan	N/A	6	2021
Force Main, Caloocan	N/A	27	2021
Jokasou	6,500	420	2011
Dagat-dagatan STP		4	2011
QC			
South combined	6,500	2	2011
San Juan	71,864	4,171	2016
Tullahan River right	26,000	1,308	2016
Tullahan River left	39,000	1,962	2016
Jokasou	6,500	420	2011
Combined Sewer	N/A	20	2015-2016
Four Communal Plants	1,690	296	2011
Valenzuela			
Tullahan River right	26,000	1,308	2016
Do	13,000	654	2016
Combined Sewer	N/A	8	2016
Jokasou	6,500	420	2016
Malabon			
Tullahan River right	26,000	1,308	2021
Jokasou	6,500	2	2017
Combined Sewer	N/A	112	2021
Navotas			
Navotas West	26,000	1,308	2016
Combined Sewer		2	2016
Jokasou	1,300	112	2016
Manila			
Tondo Sea Outfall		20	2011
Rapid Filter	132,000	435	2011
MCS Expansion	13,000	30	2016
Pasay			
Combined Sewer		6	2014
Jokasou	1,950	150	2017
Paranaque			
Jokasou	780	81	2018
STP	1,560	78	2020
South SpSTP (Septage)	350	235	2016
Muntinlupa			
STP	30,000	1,509	2015
STP	6,000	302	2016
Las Pinas			
Jokasou	1,300	150	2016
Kawit			
SpTP (Septage)	350	235	2016, 2021
Cavite City			
Jokasou	1,950	150	2016, 2021
TOTAL		23,790	
Total less year YR 2009, 2010, 2011		**20,373**	

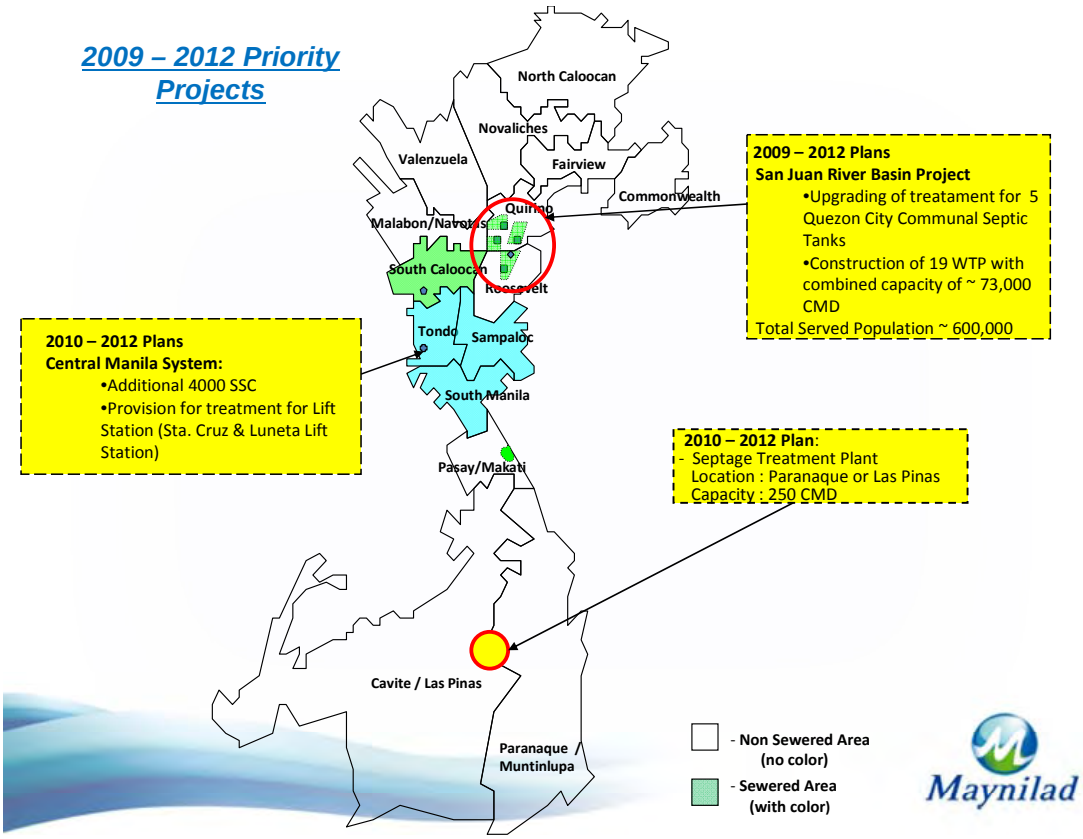


Figure 4.4.1: Location of Priority Projects for the West Zone
(Source: MWSI, 2009)

4.5 Possible Projects for ODA Funding

A review of the proposed projects of both MWSI and MWSI is made in this section to evaluate a possible ODA program package for MWSS and its two concessionaires. All projects listed in the previous sections were considered, except for specific projects which are soon to be, or are already being implemented by either of the concessionaires. Projects of very small capacities were also excluded in this evaluation, unless collectively, the total capacity is significant.

4.5.1 Impact on Pollution

The list of projects identified in the 2008 Business Plans of both MWCI and MWSI, as well as sewerage projects outlined in the MWSI Master Plan (2009) were reviewed with respect: (1) coverage area vis-à-vis pollution load indicators, and (2) individual and collective project impact on the pollution loading. Please refer to **Table 4.5.1**.

As seen in **Table 4.5.1**, there are some projects outside the "major pollution load" areas. There is a 36 MLD MWSI project for the Pasong Diablo/Magdaong/Sucat Basin (Muntinlupa) which, as discussed in Chapter 2.4, still has a relatively low BOD load volume and low BOD load density. It is noted however, that the basin's BOD generation is projected to increase significantly in future, and that there is a proposed 300 MLD water treatment plant (sourced from the Laguna de Bay) which may be near points of wastewater discharges from this basin. The project therefore may be desirable.

In term of pollution reduction impact, implementation of the MWSI Paranaque STP 1.5 MLD may not be justified as it is projected to have minimal effect on the pollution loading at less than 1%.

While not reflected in **Table 4.5.1**, it is noted that there are a number of Jokasou (small wastewater treatment plants) projects listed in the 2009 MWSI master plan. These projects are deemed not to have significant impact on water quality unless complemented by other STP projects. Thus, implementation of Jokasou projects in Pasay, Paranaque, Las Pinas, and Cavite may have to be reviewed.

For MWSI, there are also projects for the Manila Central System, with renewed initiatives to increase household connections to the existing separate system. In term of treatment, there are proposals to install rapid filter systems at several of the pumping stations to ensure that effluent are within Class SC standards (100 mg/l BOD). However, this strategy has to be reviewed in light of the Supreme Court ruling that Class SB standards should be attained for the Manila Bay.

Moreover, treatment capacity should match the new connection rate so there will be a net reduction in the BOD discharges from the Manila Central System.

Table 4.5.1: Evaluation of projects vis-à-vis pollution loading (1/3)

Zone / Major Basin/Project Name	Pollution load indicators[50]				BOD Pollution Loading (tons-BOD/day)			Reduction Potential (tons-BOD /day)	Year 2025 % Reduction due to Interventions
	High BOD Load volume	High BOD Load Density	Potential High Load (future)	Directly discharges to very polluted river sections	Yr 2010	Year 2025			
						Without Project	With Project		
I WEST ZONE (MWSI)					**554**	**597.8**	**476.3**	**121.5**	
1.1 Pasong Diablo/Magdaong/Sucat Basin	No	No	**Yes**	Discharges to lake section which will be tapped as water source	28.2	28	16		
Muntinlupa STP (36 MLD) / WP-31 & WP3								7	25%
1.2 Paranaque Basin	No	No	**Yes**	**Yes**	59.1	81	80.5		
Paranaque STP (1.5 MLD) / WP-2								0.5	0.62%
1.3 South Manila Basin (Part)	No	**Yes**	No	No	68.6	74.2	71.30		
Central Manila MS Expansion (13 MLD) / WP-25								2.90	3.91%
1.4 North Manila Basin	**Yes**	**Yes**	Presently high load	No	100.5	109.9	74.3		
Filter / WP-24								35.6	32%
1.5 Tullahan Basin[51]	No	No	No	**Yes**	66.8	66.1	21.70		
Dagat-dagatan (capacity for confirmation) / WP-1								12.4	19%
Tullahan River right (26 MLD) / WP-8								5.8	9%
Tullahan River left (39 MLD) / WP-9								8.8	13%

[50] Based on Top 3 critical basins
[51] Refers to basin within the MWSS area, not in top three

Table 4.5.1: Evaluation of projects vis-à-vis pollution loading (2/3)

Zone / Major Basin/Project Name	Pollution load indicators				BOD Pollution Loading (tons-BOD/day)			Reduction Potential (tons-BOD /day)	Year 2025 % Reduction due to Interventions
	High BOD Load Volume	High BOD Load Density	Potential High BOD Load Volume (future)	Directly discharges to very polluted river sections	**Yr 2010**	**Year 2025**			
						Without Project	**With Project**		
Tullahan River right (Valenzuela) (26 MLD) / WP-13								5.8	9%
Tullahan River right (Malabon) (26 MLD) / WP-17								5.8	9%
Navotas West (26 MLD) / WP-20								5.8	9%
1.6 Meycauayan Basin[52]	No	No	No	**Yes**	111.9	111.1	111.1		
1.7 San Juan Basin (Part)	**Yes**	**Yes**	Presently high load	**Yes**	68.8	65.6	34.5		
San Juan Proj (72 MLD) / WP-7								28	43%
South Combi (6.5 MLD) / WP-6								2.5	4%
4 communal plant (1.6 MLD) / WP-12								0.6	1%
1.8 Marikina-Antipolo Basin (Part)	**Yes**	No	Presently high load	**Yes**	14	16	16		
1.9 Cavite Basin	No	No	**Yes**		36.1	45.9	45.9		

[52] Refers to basin within the MWSS area only

Table 4.5.1: Evaluation of projects vis-à-vis pollution loading (3/3)

Zone / Major Basin/Project Name	Pollution load indicators				BOD Pollution Loading (tons-BOD/day)			Reduction Potential (tons-BOD /day)	Year 2025 % Reduction due to Interventions
	High BOD Load volume	High BOD Load Density	Potential High Load (future)	Directly discharges to very polluted river sections	**Yr 2010**	**Year 2025**			
						Without Project	**With Project**		
II EAST ZONE (MWCI)					**363.7**	**470.1**	**380**		
2.1 San Juan Basin	**Yes**	**Yes**	Presently high load	Yes	61.1	47.4	27.1		
QC North / EP-16 (Part)								5.6	12%
QC South and Central / EP-18								14.7	31%
2.2 Marikina-Antipolo Basin	**Yes**	**Yes**	Presently high load	**Yes**	146.5	187.6	140.3		
QC East / EP-16 (Part)								7.5	4%
Pasig North and South / EP-17								39.8	21%
2.3 South Manila Basin	No	**Yes**	No	**Yes**	30.6	21.2	14.5		
Makati and West Taguig / EP-19								6.7	32%
2.4 Taguig Basin	No	**Yes**	No		50.9	53.1	37.3		
Pateros / EP-20								15.8	30%
2.5 Upper Marikina Basin	**Yes**	No	Presently high load	No	40.9	77.8	77.8	0	
2.6 South Rizal Basin	**Yes**	No	Presently high load	No	33.7	83	83	0	
III TOTAL MWSS SERVICE AREA					**917.7**	**1,067.90**	**851.3**		
notes: several "ongoing/firm" MWCI projects are excluded in the table. Table excludes (for MWSI) listing of associated sewer projects									

Note: The project names listed above are according to those contained in the concessionaires' business plans.

4.5.2 Program Cost

(a) MWCI

Excluding the MTSP and the Marikina projects which are already being implemented, and the wastewater reliability projects, an ODA package for MWCI will amount to PhP10.51 billion (see **Table 4.5.2**). This assessment is mainly based on the 2008 MWCI Business Plan.

This requirement may in fact increase considering the accelerated master plan of MWCI for sewerage and sanitation. The total cost of projects under that plan is estimated at PhP33 billion, which will cover up to 2018 investment.

Table 4.5.2: Proposed MWCI sewerage and sanitation program

Project	Phase 1 cost (up to 2011) in million PhP	Phase 2 cost (2012-2017) in million PhP	Phase 3 cost (2018-2021) in million PhP	Total project cost in million PhP	Target completion	Status
Master Plan						
QC East and QC North	-	3,093	1,496	4,589	2019	Proposed
Pasig North and Pasig South	-	-	158	158	2022	Proposed
QC South and QC Central	-	278	4,308	4,586	2022	Proposed
Makati and West Taguig	-	-	39	39	2022	Proposed
Pateros Catchment	-	-	1,139	1,139	2022	Proposed
Marikina Catchment	1,949	712	-	2,661	2012	Committed (internal funds)
Land Purchase	141	2,717	-	2,858		
Sub-total	**2.090**	**6,800**	**7,140**	**16,030**		
TOTAL Proposed (Uncommitted, excludes Land Purchase)				**10,511**		

Reference: 2008 MWCI Business Plan
Note: The project names listed above are according to those contained in the concessionaires' business plans.

(b) MWSI

Based on the above discussions, the more seemingly viable MWSI projects are listed in **Table 4.5.3**. While there are minor changes from the 2009 master plan investment program, the assessment is that all projects therein will require further investigation through full-blown feasibility studies. The concerns discussed in the previous sections can be looked at during these studies.

The total investment program as shown will cost around PhP23.179 billion. Assuming that an ODA package can only be approved and implemented by 2012, and following the project schedules in the MP, the requirement for financing will be around PhP19.815 billion. If the ODA package will be

limited to a first phase covering, say 6 years (2012-2017) the funding requirement will be around PhP10,544 million.

The above assessment is based on the 2009 master plan investment program, and the initial project assessment done under this study (see previous section). The actual project investment up to 2021 may in fact be increased to around PhP50 billion, as per recent discussions with MWSI. However, the projects are still being reviewed at this point of time.

Table 4.5.3: Short-listed MWSI projects

Project location and components	Treatment capacity (m^3/day)	Phase 1 Cost (up to 2011) in million PhP	Phase 2 Cost (2012-2017) in million PhP	Phase 3 Cost (2018-2021) in million PhP	Total Project Cost in million PhP	Target completion
Caloocan						
Dagat-dagatan STP	130,000			6,539	6,539	2021
Combined Sewer, Caloocan	N/A			6	6	2021
Force Main, Caloocan	N/A			27	27	2021
Jokasou	6,500	420			420	2011
Dagat-dagatan STP		4			4	2011
QC						
South combined	6,500	2			2	2011
San Juan	71,864	1,602	1,294	1,275	4,171	2016
Tullahan River right	26,000		1,308		1,308	2016
Tullahan River left	39,000		1,962		1,962	2016
Jokasou	6,500	420			420	2011
Combined Sewer	N/A		20		20	2015-2016
Four Communal Plants	1,690	296			296	2011
Valenzuela						
Tullahan River right	26,000		1,308		1,308	2016
Do	13,000		654		654	2016
Combined Sewer	N/A		8		8	2016
Jokasou	6,500		420		420	2016
Malabon						
Tullahan River right	26,000			1,308	1,308	2021
Jokasou	6,500		112		112	2017
Combined Sewer	N/A			6	6	2021
Navotas						
Navotas West	26,000		1,308		1,308	2016
Combined Sewer			2		2	2016
Jokaso	1,300		112		112	2016
Manila						
Tondo Sea Outfall		20			20	2011
Rapid Filter	132,000	435			435	2011
MCS Expansion	13,000		30		30	2016
Paranaque						
SpTP (Septage)	350	135	100		235	2011, with expansion by 2016
Muntinlupa						
STP	30,000	30	1,479		1,509	2015
STP	6,000		302		302	2016
Kawit						
SpTP (Septage)	350				235	2016, 2021
TOTAL		**3,364**	**10,544**	**9,271**	**23,179**	

Reference: January 2009 OEC Master Plan Report

Note: The project names listed above are according to those contained in the concessionaires' business plans.

4.6 Conclusions

(a) Master Plans

Several master plans were prepared since 1969, but some of them have not been fully implemented. For example, combined sewerage has been considered since the 1969 Master Plan but has not really been adopted until now. Under the master plans, legal and administrative gaps in existing laws and policies have been indicated but did not trigger any pressure to policy makers to institute changes.

The present master plans (since 1997) prepared by MWSS and its two concessionaires have all been driven by the concession targets in terms of sewerage and sanitation coverage. Development goals in terms of health and environment (water quality improvement) have been considered in the development of strategies in these master plans, but there are no specific targets for health and environmental improvement for which the package of projects are based on.

The recommendation is to institutionalize the preparation/updating of the sewerage and sanitation master plan every five years, before the preparation of the concessionaires business plans which are to be submitted to MWSS for rate rebasing exercises. The link of development goals and investments should be strengthened, with due consideration to the concession agreements. There should also be coordination with DENR-EMB and LLDA in the preparation of these master plans, considering that the fulfilment of the development goals can also be done by measures/projects which will be undertaken by other agencies like PRRC, LLDA, and the private sector.

(b) Projects for ODA Funding

As discussed above, there is a huge requirement for project funding. An ODA package can be prepared to cover investments in the near future. Based on the available project lists in the business plans and the MWSI Master Plan (2009), a minimum of PhP20 billion will be required for projects up to 2018. However, based on recent discussions with MWCI and MWSI, their financing requirements may have to be substantially increased.

5 SEWERAGE SERVICE CONCESSIONS

5.1 Scope of Service

5.1.1 Mandates under the Concession Agreement

The Concession Agreements (CA) between MWSS and two private entities, Manila Water Company, Inc. (MWCI) and Maynilad Water Services, Inc. (MWSI), which were signed in 1997, mandate the concessionaires MWCI and MWSI to **operate, maintain, renew and, as appropriate, decommission water and sewerage system facilities** in their respective service areas.

The CA enumerates the obligations of the concessionaires regarding the provision of water and sewerage services. Under the obligations on water services, the concessionaires are expected to increase water connections to meet service coverage targets under the CA, provide uninterrupted 24 hours of water supply, facilitate connections to the water main, and ensure that drinking water quality is within established health and safety standards. Under the obligations on sewerage services, the CA specifies that concessionaires shall:

- Offer to supply sewerage services to all customers in the service area who have sewerage connections, and to meet the sewerage coverage target percentages of the population in specific municipalities/cities with water connections;
- Make necessary connections to a public sewer for those who request such service;
- Comply with all national and local laws and standards relating to treated wastewater in the service area; and,
- Provide septic and sanitation cleaning services in the service area every 5-7 years[53].

The CA specifies water, sewerage and sanitation service coverage targets within the 25-year concession period. These targets may be reviewed, renegotiated and revised during the rate rebasing periods, which are scheduled every 5 years i.e. 2003, 2008, 2013, and 2018.

5.1.2 Sewerage and Sanitation Coverage Targets

There has been a significant scale-down of sewerage coverage targets in the subsequent rate rebasing exercises from the original targets set forth in the 1997 Concession Agreements. The downgrade was due to tariff impact and technical issues, especially availability of land and the traffic congestion the laying out of sewer systems would entail. To offset this downgrade, sanitation coverage targets have been scaled up, at least for MWCI.

(a) MWCI

Under the original 1997 Concession Agreement targets, the MWCI service area known as the East Zone, was conceived to have 100% sewer connection in Mandaluyong, parts of Makati, San Juan and Taguig, and almost 100% in parts of Quezon City and in Pateros by 2021 from almost nil (except Makati, where 22% were already connected to sewerage facilities) as of 2001 (see **Table 5.1.1**). During the 2003 rate rebasing exercise, however, these targets were scaled down as the concessionaire realized that land was not sufficiently available – hence expensive, potentially accounting for up to 40% of project cost – for the construction of sewers and treatment plants to meet the targets. It would also make it unaffordable for households to connect to the sewer system, adversely affecting the coverage targets as originally conceived. Moreover, the laying out of separate sewer lines would

[53] The frequency of 5-7 years is specified in the Concession Agreement. The Sanitation Code, however, requires households to de-sludge every 3-5 years.

create intolerable traffic situation.

Table 5.1.1: MWCI sewerage targets in selected major cities and municipalities of the East Zone[54]

(% of water served population)

City/Municipality	1997 Concession Agreement			2003 Rate Rebasing			2008 Rate Rebasing		
	2011	2016	2021	2011	2016	2021	2011	2016	2021
Quezon City	83	87	98	20	16	17	20	20	85
Mandaluyong	100	100	100	4	10	15	3	3	3
Makati	100	100	100	38	28	23	26	25	24
Marikina	0	0	0	0	0	0	8	9	13
Pasig	68	68	68	10	12	14	11	10	9
Pateros	100	100	99	0	0	0	0	0	0
San Juan	100	100	100	0	18	41	0	0	0
Taguig	75	84	100	25	26	20	37	21	19
Antipolo	0	0	0	0	0	0	0	0	0
Cainta	0	0	0	0	0	0	9	8	8
Taytay	0	0	0	0	0	0	8	7	4

Sources: MWSS, East Concession Area Master Plan Update, February 2005; Manila Water, 2008 Rate Rebasing Approved Business Plan, January 2008; consultant's estimates

In order to reduce the cost of investment in sewerage system, not only did MWCI reduce the sewerage coverage targets but also proposed – and the MWSS accepted – a change in project design from separate sewer systems to a combined system using existing drainage facilities to convey effluent towards sewage collection and treatment plants. In contrast, sanitation coverage targets were raised during the 2003 rate rebasing exercise to partly compensate the lowered sewerage targets.

During the 2008 rate rebasing period, there appears to be an upward re-adjustment in the sewerage coverage targets, with the average set at 55% by 2022. It seems that MWCI is re-focusing on sewerage as the concessionaire has already attained its water supply coverage and non-revenue water (NRW) reduction targets. The approval of its proposal to reduce the charge for end-users with sewer connections and to raise the environmental charge, as well as the extension of the concession period makes MWCI more confident of achieving a generally higher sewerage coverage target than approved under the 2003 rate rebasing.

The sanitation coverage targets for the East Zone was scaled up during the 2003 rate rebasing period to partly offset the reduction in the sewer connection targets (**Table 5.1.2**). The sanitation program essentially involves the cleaning up of septic tanks every 5-7 years and the construction of septage treatment plants (SpTP) for the treatment of the sludge. The lower sanitation coverage targets under the 1997 CA presumed that a larger proportion of the population would be directly connected to the sewer system, an expectation that was eventually scaled down.

In the 2008 rate rebasing period, the sanitation coverage targets were again generally lowered in some areas where the sewerage coverage targets were raised, although the overall sanitation targets were still higher than those reflected in the original 1997 CA.

It should be noted that in some instances, the total of sewerage and sanitation coverage exceeds 100%. This is in large partly due to the fact that MWCI will continue its desludging services for the existing septic tanks despite some of these areas already covered by the combined sewerage system.

[54] Sewerage coverage = (Number of population covered by sewerage services ÷ Number of water-served population) x 100%

Table 5.1.2: MWCI sanitation targets in selected major cities and municipalities of the East Zone[55]

(% of water served population)

City/Municipality	1997 Concession Agreement			2003 Rate Rebasing			2008 Rate Rebasing		
	2011	2016	2021	2011	2016	2021	2011	2016	2021
Quezon City	16	12	2	80	84	83	74	80	16
Mandaluyong	0	0	0	96	90	85	97	97	97
Makati	0	0	0	62	72	77	71	75	77
Marikina	73	64	60	100	100	100	92	91	87
Pasig	32	27	25	90	88	86	89	90	90
Pateros	0	0	0	100	100	100	97	100	100
San Juan	0	0	0	100	82	59	100	100	100
Taguig	0	0	0	75	74	80	66	36	33
Antipolo	63	50	44	100	100	100	85	55	42
Cainta	34	28	27	100	100	100	91	92	92
Taytay	70	60	54	100	100	100	92	96	40

Sources: MWSS, East Concession Area Master Plan Update, February 2005; Manila Water, 2008 Rate Rebasing Approved Business Plan, January 2008; consultant's estimates

(b) MWSI

Under the 1997 CA, MWSI was supposed to raise sewerage coverage in the West Zone to 66% by 2021 from the actual level of 16% in 2001 (**Table 5.1.3**)[56]. Attainment of the sewerage targets, however, was suspended during the period between 2003 and 2007; 2003 was supposed to be a rate rebasing period.

It should be recalled that MWSI failed to pay its concession fees starting 2001, eventually undergoing debt and capital restructuring in mid-2005. MWSI accumulated debts amounting to roughly US$488 million in concession fees to MWSS, guaranty payments, bridge loan facilities, etc. at the time of its debt and capital restructuring. Consequently, the concessionaire's sewerage program was put on hold during this critical period[57] and the sewerage service coverage in Metro Manila fell to 9-10% by 2007. The court-supervised Debt and Capital Restructuring Agreement (DCRA) was eventually completed by the new owners of MWSI and replaced by a Transitional and Clarificatory Agreement (TCA), which triggered the implementation of MWSI's rate rebasing for 2008.

Under the 2008 rate rebasing period, the concessionaire was allowed to maintain status quo in its sewerage coverage target, i.e. keep the existing coverage of 9% during 2008-2012, even as it reflected a lower overall (including Cavite areas) coverage target of 39% by 2021 in its proposed 2008 Business Plan. Nevertheless, sanitation coverage targets were raised significantly, reaching 55% by 2021, or double the original figure under the 1997 CA.

[55] Sanitation coverage = (Number of population with septic tanks provided by desludging services ÷ Number of water served population) x 100

[56] Unfortunately, a table similar to those presented for MWCI, i.e., Table 5.1.1 and Table 5.1.2, could not be constructed because MWSI targets as presented in the latest MWSI Business Plan (and also the MWSI Master Plan prepared in 2009) do not provide a comparable breakdown by municipalities and cities.

[57] The original intention was to postpone the implementation of the sewerage program to 2006 due to the failure of MWSI to get approval of the full amount of tariff adjustment requested from MWSS-RO, and also pending court decision on the concessionaire's proposal to make sewer connection mandatory. This was, however, overtaken by MWSI's debt and capital restructuring, so the sewerage program was never implemented till the 2008 rate rebasing.

Table 5.1.3: MWSI sewerage and sanitation service coverage summary

(% of water served population)

Service obligation	2006	2011	2016	2021
SEWERAGE				
1997 Concession Agreement	20 (Target)	21	31	66
Rehabilitation Period	-	-	-	-
2008 Business Plan	10 (Actual)	13	29	39
SANITATION				
1997 Concession Agreement	46 (Target)	43	39	27
Rehabilitation Period	-	43	39	27
2008 Business Plan	22 (Actual)	43	50	55

Source: MWSS Regulatory Office, Evaluation Results on the 2008 Rate Rebasing Exercise for Maynilad Water Services, Inc., March 2009; Maynilad Water Services, Inc., Business Plan Updated September 2008, Second Rate Rebasing.

5.1.3 Sewerage and Sanitation Programs and Projects

The programs and projects for implementation by the concessionaires over the rate rebasing period, which are also part of the respective business plans, support the sewerage and sanitation coverage targets for the corresponding concession service areas. These programs and projects are also consistent with the thrusts identified in the MWSS and the concessionaires' master plans for sewerage and sanitation.

The medium-term thrusts of the MWSS Master Plan included:

- Focus on low-cost sewerage, notably combined drainage and septic tank effluent disposal (STED) system;
- Priority for the implementation of Manila Third Sewerage Project (MTSP) components – the Taguig Sewerage System; the three Riverbank STPs (Mandaluyong, Pasig and Makati); and the Quezon City-Marikina Sewerage System – and sewerage projects in Muntinlupa, Pasig, San Juan and East Manila.

(a) MWCI

For the 2008 rate rebasing period, MWCI has opted to adopt the key program thrusts identified in the East Concession Area Master Plan prepared in 2005, which involves the implementation of the following:

- Construction of combined treatment schemes;
- Establishment of sewage treatment plants in seven catchment areas, which will treat combined sewage-drainage flows;
- Development of pilot projects for combined systems under the Manila Third Sewerage Project (MTSP).

(b) MWSI

MWSI appears to have a relatively modest sewerage and sanitation program for the 5-year rate rebasing period starting 2008, given that it plans to only maintain its sewerage service coverage of 9% during the period. The projects consist of:

- Enhancement of the treatment capability of the Central Manila Sewerage System;

- Treatment facility for the five communal septic tanks in Quezon City;
- Additional septage treatment plant in the southern part of Metro Manila with 250 cubic meter per day capacity.

5.1.4 Broad Sewerage and Sanitation Thrusts of the 2013-2018 Business Plans

The Business Plans covering the period 2013-2018 are now being drafted, or at least conceptualized.

Interviews with MWCI indicated that there are still no clear directions for its sewerage program beyond 2012, because the key elements for achieving 100% sewerage coverage by 2021 have already been identified and incorporated in the 2008 Business Plan. MWCI, however, admitted that actually, sewerage coverage will reach only 85% at the end of the original concession period because new areas were added to its concession zone where wastewater projects have yet to be identified. If only the areas as conceived under the 1997 CA are considered, the coverage would be 100%.

Hence, the plan for 2013-2018 could focus on these new expansion areas, and/or other areas that may be added to the East Zone in the future, although at this point MWCI could not give any definite assurance this will be part of the next plan. Another possibility mentioned is some limited upgrading from combined system to separate sewer system.

For MWSI, the key features of its 2013-2018 Plan are the upward revision of its sewerage target to 66% by 2021 (vs. a more timid 39% under the 2008 Business Plan). The company intends to spend PhP50.8 billion up to 2021 (PhP78 billion up to 2026/27) for a number of key sewerage and sanitation projects to meet this target. The wastewater program will adopt the combined, decentralized system of drainage also acting as sewer pipes, conveying dry weather flow to wastewater treatment plants located in each catchment area.

Another major feature of the next Business Plan of MWSI is the extension of the concession period and its impact on project timetables and sewerage coverage targets. The concessionaire revealed that it will be able to achieve 100% sewerage coverage target at the end of this extended period, i.e. by 2036. Programs and projects identified for implementation under the current Business Plan will not be affected by this change. Rather, more projects will be implemented beyond 2012, which would require more significant levels of financing.

5.2 Performance

5.2.1 Trends in Performance Indicators

The performance of MWCI had been on track with its revised sewerage targets for 2003-2008, but offsetting adjustments in sanitation targets as a result of the scale-down in sewerage targets failed to occur. MWSI, in contrast, lagged behind as its sewerage program was suspended pending resolution of legal and other issues during the concessionaire's financial rehabilitation phase.

(a) MWCI

Manila Water appears to have significantly increased its sewerage and sanitation service coverage from 2001 to 2006, raising its sewerage coverage from 2% to 8% (**Table 5.2.1**) and its sanitation coverage from 1% to 19% (**Table 5.2.2**). Compared to targets set under the 1997 CA for 2001 and under the 2003 rate rebasing for 2006, the actual performance was generally on target for sewerage but below expectations for sanitation. The overall sewerage coverage targets were estimated by the consultant at 1.3% for 2001 and 9% for 2006 (available MWCI documents do not provide figures on overall percentages). The overall sanitation coverage targets were estimated at 48% for 2001 and 91% for 2006.

The 2003 rate rebasing converted much of the concessionaire's contractual requirement under the 1997 CA from sewerage into sanitation, with a population of almost 300,000 (9% of those with water service connection) targeted to be provided with sewerage services and nearly 3 million (91%) with sanitation coverage in 2006. Under the 1997 CA original targets, sewerage connections were set at 18% while sanitation services coverage was at least 72% for 2006. In short, MWCI met its scaled-down commitments on sewerage coverage, but the offsetting increase in sanitation failed to materialize.

Table 5.2.1: MWCI sewerage coverage, selected major cities and municipalities: actual vs. target

(% of water served population)

City/municipality	2001		2006	
	Actual	Target*	Actual	Target*
Quezon City	0	0	20**	13
Mandaluyong	0	0	0.5	0.5
Makati	22	22	25**	40
Marikina	0	0	0	0
Pasig	1	0	8	9
Pateros	0	0	0	0
San Juan	0	0	0	0
Taguig	0	0	15	0
Antipolo	1	0	0	0
Cainta	0	0	0	0
Taytay	0	0	0	0
Overall* **	**2**	**1.3**	**8**	**9**

** 2001 target based on 1997 Concession Agreement; 2006 target based on 2003 Rate Rebasing*

*** For Quezon City and Makati, MWCI reflected only the accomplishment for its portion, whereas the 2006 target includes targets for both MWCI and MWSI in these areas*

**** Refers to overall results for the entire East Zone, not just for the cities and municipalities in the preceding rows.*

Sources: MWSS, East Concession Area Master Plan Update, February 2005; Manila Water, 2008 Rate Rebasing Approved Business Plan, January 2008; consultant's estimates.

Table 5.2.2: MWCI sanitation coverage, selected major cities and municipalities: actual vs. target

(% of water served population)

City/municipality	2001		2006	
	Actual	Target*	Actual	Target*
Quezon City	3	24	30**	87
Mandaluyong	0	0	20	99.5
Makati	0	0	25**	60
Marikina	-	63	30	100
Pasig	1	83	20	91
Pateros	-	0	15	100
San Juan	0	0	40	100
Taguig	0	0	10	95
Antipolo	0.5	57	20	100
Cainta	0.2	38	10	100
Taytay	0	82	15	100
Overall* **	**1**	**48**	**19**	**91**

** 2001 target based on 1997 Concession Agreement; 2006 target based on 2003 Rate Rebasing*

*** For Quezon City and Makati, MWCI reflected only its accomplishment of its portion, whereas the 2006 target includes figures for both MWCI and MWSI in these areas*

**** Refers to overall results for the entire East Zone, not just for the cities and municipalities in the preceding rows.*

Sources: MWSS, East Concession Area Master Plan Update, February 2005; Manila Water, 2008 Rate Rebasing Approved Business Plan, January 2008.

(b) MWSI

MWSI reported an increase of 541 in sewerage service connections between 1997 and 2006, resulting in 51,346 sewer connections as of end-2006. Correction and clearing of billing files, including disconnection of some water accounts, brought the total number of billed sewer services down to 50,184 in 2007. In terms of percentage of water service connections the sewer coverage dropped from 16% in 2001 to 10% in 2007, as water service connections, the denominator, increased (**Table 5.2.3**).

In short, MWSI was unable to meet its sewerage service coverage target under the CA after 2001, although in 2001 it appears that the concessionaire was on target. The slippage after 2001 was due largely to the suspension of the sewerage program in the West Zone during MWSI's financial rehabilitation phase covering 2001 to 2007, and pending further legislation/clarification of related issues, notably for a possible mandate to households to connect to sewer lines (but which did not prosper). The suspension of major investment in sewerage was also to temper water tariff increase due to the high cost of investment in sewerage facilities. The existing sewer facilities, in fact, can still absorb more than 38,000 in new sewer connections.

Despite the drop in sewerage service connections, there was no compensatory increase in sanitation service coverage. Nonetheless, they rose from 4% in 2001 to 36% in 2007 (see **Table 5.2.4**). Under the 1997 CA, however, the MWSI concession service area was supposed to have 46% sanitation service coverage by 2006.

The concessionaire pointed to delays in the delivery of barge loading facilities and vacuum trucks, not to mention the temporary disposal of collected septage into the Dagat-dagatan Sewage Treatment Plant after the Philippine Coast Guard refused to issue a dumping permit into the Manila Bay. This eventually slowed the septage disposal, as the Dagat-dagatan facility approached full capacity levels.

Table 5.2.3: Actual MWSI sewerage service coverage, selected cities and municipalities

(% of water served population)

City/municipality	2001		2006	2007
	Actual	Target*		
Manila	55	n/a	41	41
Quezon City	3	n/a	3	3
Caloocan	1	n/a	1	1
Malabon	2	n/a	2	1
Navotas	15	n/a	9	10
Valenzuela	0	n/a	0	0
Las Pinas	0	n/a	0	0
Makati	10	n/a	9	10
Muntinlupa	0	n/a	0	0
Paranaque	0	n/a	0	0
Pasay City		n/a		
Cavite	0	n/a	0	0
Overall	**16**	**16**	**10**	**10**

** Based on the 1997 Concession Agreement*
n/a: not available
Source: MWSI, Business Plan Updated September 2008; MWSS Regulatory Office (MWSS-RO), Evaluation Results on the 2008 Rate Rebasing Exercise for Maynilad Water Services, Inc., March 2009

Table 5.2.4: Actual MWSI sanitation service coverage, selected cities and municipalities

(% of water served population)

City/municipality	2001		2006	2007
	Actual	Target*		
Manila	2	n/a	15	15
Quezon City	7	n/a	39	40
Caloocan	10	n/a	28	51
Malabon	0	n/a	33	43
Navotas	0	n/a	5	18
Valenzuela	0	n/a	33	46
Las Pinas	0	n/a	31	48
Makati	0	n/a	16	16
Muntinlupa	0	n/a	3	11
Paranaque	0	n/a	35	61
Pasay City	0	n/a	18	36
Cavite	0	n/a	9	23
Overall	**4**	**43**	**26**	**36**

** Based on the 1997 Concession Agreement*

Source: MWSI, Business Plan Updated September 2008; MWSS Regulatory Office (MWSS-RO), Evaluation Results on the 2008 Rate Rebasing Exercise for Maynilad Water Services, Inc., March 2009

5.2.2 Programs and Projects Implemented

The projects implemented since the start of the concession period provided support to the sewerage and sanitation services targets of the two private concessionaires. Essentially, most of the major projects were undertaken under the Manila Second Sewerage Project (MSSP) and the Manila Third Sewerage Project (MTSP).

(a) MWCI

Manila Water has implemented or is implementing the following projects:

- The Manila Second Sewerage Project (MSSP) – The project, originally worth US$57 million but was later reduced to US$36 million, signified the resumption of assistance by the World Bank (WB) to the MWSS for the improvement of the general environmental conditions in Metro Manila in 1996. The initiative actually started under a joint financing with Asian Development Bank (ADB) in 1980 to improve the sewerage services in Metro Manila, but some of the project's components were not completed while others failed to achieve their anticipated impact due to the economic difficulties faced by the Philippines in the first half of the decade of the 80's. As far as MWCI is concerned, its component of MSSP includes the construction of a package of STP's in the East Zone – Karangalan Village (Pasig City); Coronado Bliss and Mandaluyong Medium-Rise Housing (Mandaluyong); Magallanes STP, Guadalupe Bliss and Tejeros Bliss (Makati); Taguig.

  MWCI was supposed to develop 26 on-site STP's under the MSSP Community Sanitation Project (MCSP), but was able to proceed with only six STP's as the affected communities, despite due consultation, reneged on the agreements on easements of the lots for the STP's and sewer charging due to issues on the latter (sewer charging). The concessionaire was also supposed to install 10,000 new sewer service connections over a 4-year period under its commitment with the MSSP, but was able to connect only less than 1,000 also as a result of sewer charges and the people's failure to perceive benefits from the connection. The MSSP included a septage sea disposal trial, where 5,000 septic tanks were emptied from May 2001 to June 2002 without deleterious effect to nature and society. But full operation of the septage sea disposal component did not push through due to social pressures from local government units (LGUs) and a non-governmental organization (NGO). Septage disposal alternatives have been explored, even as land-based

septage treatment plants are being implemented.

Implementation of the MWCI portion of the MSSP was originally set for the 1996-2000 period, but was extended to June 2003 with the amendment of the loan agreement in 1998. An 18-month extension from June 2003 to December 2004 was granted again in 2003. In November 2004, a 5-month extension to May 2005 was requested, with a few STP projects being completed, specifically the upgrade of A. Luna, Palosapis and Heroes' Hills STP and the construction of Belarmino and Fisheries' STP.

- Pasig River Rehabilitation Project (PRRP) Sanitation Component – This is part of a US$175 million ADB loan aimed at enhancing water quality of the Pasig River to Class C standards by 2014. The implementation of the component started in 2005. The sanitation component involves the provision of septic tank maintenance services through the procurement of 36 vacuum tankers and the construction of 600 m^3 per day septage treatment plant.

- Manila Third Sewerage Project (MTSP) – This is a PhP3.6 billion (US$75 million) World Bank-funded project designed to improve and expand the sewerage and sanitation projects developed in MSSP for the East Zone concession area. This project commenced in 2006 under the 2003 rate rebasing with the development of STP's in San Mateo and Taguig, but most of its components, including pilot projects on combined sewage-drainage treatment systems will be fully developed during the 2008 rate rebasing.

The components covered by MTSP consist of Taguig Sewerage System (1,766 hectares); Riverbank STP's in Mandaluyong (2.33 MLD), Pasig (3.95 MLD), and Makati (5.35 MLD); Quezon City-Marikina sewerage system; sewerage for low-income communities at the Manggahan Floodway East Bank; Muntinlupa sewerage; and the Pasig catchment. As indicated in its 2008 Business Plan, the Riverbanks Sewerage System, procurement of truck-mounted tankers and the Septage Treatment Plants in San Mateo (North) and Taguig (South) are already on-going. MWCI expects to complete all components of MTSP by 2010.

Based on the assessment of the MWSS rate rebasing consultants in January 2008, "*Manila Water is on the whole amongst the top performing water businesses in the Philippines. When comparing MWCI with an International Water Utility, the overall ranking will be with the good performers.*" The consultants concurred with the MWSS-RO finding that MWCI has fully delivered on most of the obligations required of the concession agreement and as adjusted in the last rebasing and in many areas outperformed. However, the consultants also noted that there were two areas that MWCI underperformed, which were its obligations under the provision of sewerage services, and the additional capital expenditures (CAPEX) deployed to mitigate the negative impact on water services due to cancellation of the Wawa Project.

In another ADB report[58], noted Manila Water's success in addressing sewerage and sanitation problems in Metro Manila's East Zone. The report mentioned innovative approaches, specifically providing more affordable (in fact free) septic tank desludging services then treating septage by "*dewatering and enzyme bio-augmentation for sewage-septage co-treatment*," and recycling solids in controlled areas laden with volcanic ash outside the metro. The report also discussed about the creation of a combined system that captures both sewage flows and drainage or stormwater for treatment at the communal plants. MWCI's megacity solutions to sewerage and sanitation could be one of the models.

The United States Agency for International Development (USAID) prepared case studies of financially successful water and sewerage utilities among developing countries[59], and included MWCI among the

[58] Melissa Alipalo, Communications Specialist, ADB, "Manila Water's Neo-Way with Sanitation: Desludge and Dilute, Connect and Treat, Put Waste to Use," August 2007

[59] USAID, "Case Studies of Bankable Water and Sewerage Utilities,"

eight best practice utilities. The study identified effective and transparent regulatory framework (the concession agreement), coordinated technical assistance from international community (World Bank and IFC support), public outreach/participation, instilling business culture within organization (presence of objective measures of performance), and insulation of business decision from political process as among the key features contributing to MWCI's success (established a management and planning process with flexibility to plan and act on customer needs).

(b) MWSI

The investment projects undertaken by MWSI were mostly parts of the implementation of the MSSP. The most notable project is the rehabilitation of the Central Manila Sewerage System (CMSS) in 2004 under World Bank's MSSP 4. This was CMSS' third rehabilitation since it was built in 1902. The facility serves 70% of the total area of the city of Manila and has around 47,000 sewer service connections. Specifically, the Tondo Sewage Pumping and seven lift stations were rehabilitated. The rehabilitation project also committed to install 10,000 sewer connections, but only 730 had been installed as of late 2005.

The other projects implemented by MWSI are as follows:

- The rehabilitation of the Dagat-dagatan Sewage Treatment Plant in 2004-2005, which addressed its problems on non-compliance with effluent standards;
- The construction of a 450 m^3 per day septage treatment plant in Dagat-dagatan in 2004-2005 under the auspices of MSSP 2. The STP is Certified ISO 9001: 200 (Quality Management System) and ISO 14001: 2004, and has been recognized by the LLDA for consistently meeting effluent standards.

Desludging activities in the southern part of Metro Manila was slow to progress as there was no septage treatment facility in the south. Septage collected from households is transported to the Dagat-dagatan Septage Treatment Plant, which is in the north. The delay in the implementation of the MSSP also limited the capacity to MWSI to expand its sanitation service coverage, especially the acquisition of mobile dewatering units (MDUs).

MWSI also attempted regulated sea disposal of collected septage in the latter part of 2002, but the Philippine Coast Guard refused to issue a dumping permit despite the issuance of an Environmental Clearance Certificate (ECC) by the Department of Environment and Natural Resources (DENR). Hence, the collected septage was temporarily disposed at the non-operational aerated pond at the Dagat-dagatan Sewage Treatment Plant in Caloocan, which neared maximum capacity in 2004 and resulted in the decline in the number of septic tanks desludged during that year.

Admittedly, MWSI's capacity to implement sewerage and sanitation projects was impaired not just by delays in MSSP implementation, but also by its financial difficulties and the unwillingness of households to connect to sewer lines due to perceived high sewerage service tariffs. As already mentioned, the company delayed the execution of its wastewater program during its financial rehabilitation phase, although some MSSP-related projects did push through in the mid-2000's.

Nonetheless, a new private group has taken over Maynilad and paid the concessionaire's debt in full, allowing it to exit the rehabilitation phase well ahead of the 2013 deadline. Asian Development Bank (ADB) has recognized Maynilad's rebidding process as "*successful*," and that the company "*has successfully entered its second decade.*" Hence, it is now ready to finally implement rate rebasing, which was not undertaken in 2003, which partly involves the pursuit of a number of capital expenditures in sewerage and sanitation.

5.2.3 Investment programs and projects for the rest of the concession period

Both concessionaires plan to pursue combined systems for sewerage projects in an effort to meet their respective sewerage coverage targets by the end of the concession period. MWCI and MWSI have developed their respective master plans to provide them with a roadmap to future projects. Details of the projects under these master plans are discussed in Chapter 4.

(a) MWCI

The 2008 rate rebasing adopts the sewerage master plan for the East Zone, which essentially lays the groundwork for achieving sewer services coverage of 55% by 2022, as specified in the concession agreement. Over a 5-year period, i.e., 2008-2013, the following projects will be implemented by MWCI:

- The construction of combined sewerage treatment schemes;
- Each of the seven catchment areas in the East Zone will be provided with a sewage treatment plant that will treat combined sewage-drainage flows;
- Pilot projects for combined systems under the MTSP.

MWCI estimates the cost of wastewater investment at PhP7.5 billion over the 5-year period, PhP23 billion up to 2022.

(b) MWSI

MWSI intends to maintain the current 9% sewerage coverage into the future. In this connection, the concessionaire will pursue the following projects over the 5-year Business Plan period:

- Enhancement of the treatment capability of the Central Manila Sewerage System;
- Provision of treatment facility for five communal septic tanks in Quezon City;
- Additional septage treatment plant in the south of the concession area with a capacity of 250 m^3 per day;
- Repair of defective sewer network;
- Additional desludging equipment;
- Effective desludging re-fleeting program;
- Implementation of combined systems;
- Additional sewer connections.

The cost of MWSI's wastewater program is estimated at PhP5 billion over a 5-year period, according to its 2008 Business Plan updated September 2008. Up to 2021, MWSI's draft plan for the extension of concession period provides for an investment of PhP50.8 billion, as the concessionaire strives to catch up with its sewerage and sanitation coverage backlogs under the concession agreement.

5.3 Funding/Financial Status

5.3.1 Funding Requirements of Projects

The funding requirements as discussed here are based on the 2008 business plans of the two concessionaires, the 2009 MWCI master plan, and discussions with officials of the two concessionaires. In Chapter 4, an evaluation of the projects was made on the basis of project impact. The capital expenditure requirements are discussed in more detail hereunder.

The capital expenditures on sewerage and sanitation over the next five years, i.e., 2008-2012, are found in the Business Plans submitted by the two concessionaires to MWSS-RO in support of their 2008 rate rebasing.

MWCI expects to spend about PhP7.5 billion on wastewater projects during the 5-year period, and have also estimated that it would spend PhP23 billion up to 2022[60].

The projects covered by the 2008 rate rebasing, i.e., those identified for 2008-2012 implementation, are already funded. All of the projects under the MTSP are funded by the World Bank. The reliability and take-over projects are internally funded. The projects listed under the Master Plan – specifically the Marikina River Catchment Area and land acquisition – may be financed through internal CAPEX, although MWCI is keeping its options open for a possible ODA financing.

Beyond 2012, most are still without funding commitments. The list of projects and their estimated costs is found on **Table 5.3.1** below.

Table 5.3.1: MWCI wastewater capital expenditures

(In Million Pesos)

Program/project	2008-2022	2008-2012	2013-2022
Sewerage reliability – improvement/upgrade of existing WWTP's, sewer network, communal septic tanks; etc.	2,002	828	1,174
Sanitation reliability – replacement of vacuum desludging tankers	420	99	313
Takeover of private systems	299	188	111
Pasig River Rehabilitation Project (PRRP) – Pinugay STP	740	390	350
Manila Third Sewerage Project (MTSP)	3,226	3,226	-
Riverbanks Sewerage System	293	293	-
Marikina-QC Sewerage System	255	255	-
Taguig Sewerage System	627	627	-
Sanitation for low-income (Pinagsama & Manggahan)	431	431	-
Septage Treatment Plants	64	64	-
Sewerage equip., CST upgrades, IEC, consultancy	1,557	1,557	-
Master Plan for Sewerage and Sanitation	16,298	2,801	9,497
QC East & QC North Catchment Area	4,589	-	4,589
Pasig North & Pasig South Catchment Area	158	-	158
QC South & QC Central Catchment Area	4,856	-	4,856
Makati and West Taguig Catchment Area	39	-	39
Pateros Catchment Area	1,139	-	1,139
Marikina River Basin Catchment Area	2,858	2,661	-
Land Purchase – WW	2,856	141	2,715
TOTAL	**22,985**	**7,532**	**15,453**

Source: MWCI, 2008 Rate Rebasing Approved Business Plan, January 2008

[60] Latest information provided by MWCI (as of 3 June 2009), however, indicated a budgetary requirement of ₱37 billion for the wastewater Master Plan projects, namely Marikina River (₱6.3 billion), San Juan River (₱12.7 billion), Pasig River 1 (₱4.5 billion), Pasig River 2 (₱5.6 billion), Laguna Lake (₱3.9 billion) and land acquisition (₱4.2 billion), which is expected to even be raised to ₱50 billion.

MWSI provided some details of its capital investment in its 2008 Business Plan, but only for 2008-2012. Investment in wastewater program amounts to PhP5 billion over the 5-year period, as seen in **Table 5.3.2**. This "*modest*" 5-year budget is likely to be internally funded, in large part through tariff increase, as the company is still in the process of re-building its financial capacity (hence may have difficulty securing huge loans) after just completing its financial restructuring program.

Table 5.3.2: MWSI capital investment plan: wastewater program

(Million Pesos)

Description	2008-12	2008	2009	2010	2011	2012
Sewerage						
Treatment plants and facilities	1,485	-	84	387	679	335
Sewer lines	3,057	42	258	260	1,254	1,244
Sanitation						
Treatment plants & facilities	321	-	-	221	101	-
Trucks	147	25	59	-	17	46
TOTAL	**5,010**	**67**	**401**	**868**	**2,050**	**1,626**

Source: MWSI, Business Plan Updated September 2008

MWSI indicated that it would invest PhP50.8 billion up to 2021 in an effort to raise its sewerage coverage target to a revised 66% by 2021, which is presented in the draft plan it recently submitted to MWSS in support of its proposal for term extension. Note that under the 2008 Business Plan, the target is only 39% for 2021.

MWSI Master Plan, which was completed only in January 2009, nonetheless could provide some idea of the line-up of wastewater projects the company intends to implement during the remaining years of the concession period (**Table 5.3.3**). The levels of investment specified in the Plan, however, are subject to updating, given the latest figure of PhP50.8 billion up to 2021 given by MWSI during an interview.

Projects for implementation beyond 2012 are still unfunded, and MWSI has expressed preference for tapping ODAs for these projects.

Table 5.3.3: MWSI: wastewater projects under the 2009 master plan (1/2)

District	Project description	Cost (mil. PhP)	Construction period
Caloocan	Jokasou (650m^3/d x 10)	420	2010-2011
	Dagat-dagatan STP (130,000 m^3), combined sewer, force main	6,572	2018-2021
Quezon	San Juan Project, South combined connection	4,173	2009-2021
	Four communal plants (1,690 m^3/d), Jokasou (650 m^3 x 10)	716	2009-2011
	Tullahan River Right and Left (65,000 m^3/d)	3,270	2014-2016
	Combined sewer	20	2015-2016
Valenzuela	Tullahan River Right (39,000 m^3/d), combined sewer	1,970	2014-2016
	Jokasou (650 m^3/d x 10)	420	2015-2016
Malabon	Jokasou (650 m^3/d x 2)	112	2016-2017
	Tullahan River Left (13,000 m^3/d x 2), combined sewer	1,314	2019-2021
Navotas	Navotas West (26,000 m^3/d), combined sewer, Jokasou (650 m^3 x 2)	1,422	2014-2016
Manila	Tondo Sea Outfall (232,885 m^3/d), rapid filter (66,000m^3/d x 2)	455	2009-2011
	MCS expansion (13,000 m^3/d)	30	2014-2016

Table 5.3.3: MWSI: wastewater projects under the 2009 master plan (2/2)

District	Project description	Cost (mil. PhP)	Construction period
Pasay	Combined sewer	6	2010-2014
	Jokasou (650 m^3/d x 3)	150	2016-2017
Paranaque	South SpSTP (350 m^3/d)	235	2009-2011, 2014-2016
	Jokasou (780 m^3/d x 1)	81	2017-2018
	STP (1,560 m^3/d)	78	2018-2020
Muntinlupa	2 STP's (30,000 m^3/d, ₱1,509M; 2,000 m^3/d, ₱302M)	1,811	2014-2016
Las Pinas	Jokasou (650 m^3/d x 2)	150	2015-2016
Kawit	SpSTP (350m^3/d)	235	2013-2016, 2019-2021
Cavite City	Jokasou (650 m^3/d x 3)	150	2014-2016, 2020-2021
	Sub-Total	**23,679**	
	Sanitation projects – 3 septage treatment plants: North; South First Stage and Final Stage; Cavite First Stage and Final Stage	280	2009-2011, 2013-2016, 2019-2021
	Grand Total	**23,959**	

Source: OEC, Maynilad Water Services, Inc. Sewerage and Sanitation Improvement Project Master Plan, January 2009.

5.3.2 Financial Capacity of Concessionaires

The Asian Development Bank (ADB), in a report released in May 2008, cited the East Zone concession of the Manila Water Co., Inc. as "*successfully run*," earning a net profit of PhP2.4 billion as of December 2007 despite the lapse of its 6-year income tax holiday[61].

As further proof of MWCI's financial capability, it is presently implementing major projects funded by the ADB (Pasig River Rehabilitation Project, PRRP – Sanitation Component) and World Bank (Manila Third Sewerage Project). The executing agency for the PRRP is the Pasig River Rehabilitation Commission, but with the sanitation component (procurement of vacuum trucks for cleaning up septic tanks and the construction of a septage treatment plant) being implemented by the MWSS through MWCI, the concessionaire for the East Zone, which has committed full sanitation coverage in the project's target area. Financing for the MTSP is disbursed directly to MWCI through Land Bank of the Philippines. The loan was supposed to be coursed through MWSS as the project's executing agency, but the agency's financial capacity was weak at the time of the conceptualization of project financing, affected by the non-payment by MWSI of its concession fees.

As of end-2008, the East Zone concessionaire had long-term debt amounting to the peso equivalent of PhP15.4 billion, which are mostly ODA and concessional financing for its projects in water supply, sewerage and sanitation.

Indicators pertaining to MWCI's recent financial performance are presented in **Table 5.3.4** below.

[61] ADB, "Maynilad on the Mend," May 2008, p. 14.

Table 5.3.4: MWCI: Key financial performance indicators

	2008	2007
Revenue (million PhP)	8,914	7,332
% growth rate	*21.6*	*18.1*
Net income (million PhP)	2,788	2,597
% growth rate	*7.4*	*5.4*
Profit margin (%)	31.3	35.4
Interest coverage ratio	7.2	7.8
Debt service coverage ratio	6.0	7.2
Current ratio	2.0	0.9
Quick ratio	0.9	0.3

Source: SGV & Co., consolidated financial statements of Manila Water Co., Inc., as at December 31, 2008 and 2007

MWSI recently completed its financial rehabilitation after its new owners, DM Consunji Holdings, Inc. and Metro Pacific Investments Corp. (DMCI-MPIC), decided to pre-pay the company's outstanding obligations amounting to about US$240 million under the debt and capital restructuring agreement (DCRA). The court approved the rehabilitation exit plan in December 2007, or six years ahead of its 2013 deadline. DMCI-MPIC won the bid to acquire 84% of MWSI's shares in January 2007.

The completion of the DCRA enabled MWSI to embark on a PhP20.7 billion capital investment plan over five years, i.e., 2008-2012, which includes PhP5 billion for wastewater program. The planned investment is incorporated into the concessionaire's talks with MWSS-RO on 2nd rate rebasing. Implementation of the MWSI Business Plan, however, has been delayed by one year due to the delay in the full implementation of its approved tariff increases.

The key towards improving MWSI's profitability would be the reduction of the concessionaire's non-revenue water (NRW). NRW reached 70% at the time of the bidding for re-privatization of MWSI, higher than its 70% rate in 1997 when the concession started. The company is targeting to reduce NRW to 40% by 2012. It was down slightly to 66% in 2007.

As can be seen in **Table 5.3.5**, MWSI posted significant recovery in revenues, profit and profitability during the past 2 years. However, it still needs to further improve on its liquidity and solvency positions.

Table 5.3.5: MWSI: Key financial performance indicators

	2008	2007
Revenue (mil. PhP)	8,245	5,790
% growth rate	*42.4*	*13.2*
Net income (mil. PhP)	1,994	1,255
% growth rate	*58.9*	*25.0*
Profit margin (%)	24.2	21.7
Interest coverage ratio	3.4	2.3
Debt service coverage ratio	1.2	0.8
Current ratio	1.1	0.3
Quick ratio	0.2	0.1

Source: SGV & Co., consolidated financial statements of Manila Water Co., Inc., as at December 31, 2008 and 2007

5.3.3 Sources of Funding

The possible sources of funding for projects of concessionaires would be as follows:

- Internal cash generation/equity;
- Commercial loan;
- Concessional loan or official development assistance (ODA).

Internally-funded capital expenditures are resorted to if the concessionaire has sufficient cash to finance the project or the financial requirement of the project is relatively small and quick-gestating enough to be funded by cash. MWCI is inclined to use internally-generated funds for some of its sewerage projects under the 2008 Business Plan, including the Marikina River Basin Catchment Area System, although still open to other sources of financing.

Commercial loan is another source the concessionaires could also tap for the projects, but this will require compliance with highly prudent measures of financial capacity, and proof that the project funded is commercially viable. This includes other non-concessional facilities of donor agencies or their affiliates that focus on private sector financing.

The cost of funds will be market-based (higher). While a number of private banks have expressed interest in financing water projects – for example, the water revolving fund being administered by the DBP is a joint private-concessional (USAID) facility for water projects of creditworthy water service providers outside the MWSS franchise area – it is uncertain whether banks would care to fund sewerage projects where the service providers are encountering willingness-to-pay problems. In fact, there appears to have been no major wastewater projects financed by commercial loans so far.

MWSS-RO added that for sewerage and sanitation, financing should have significant grant element to keep development costs down. This can help minimize tariff adjustments, notably for sewerage where households' willingness to pay is relatively low. In short, sources of funding for wastewater projects would need to be non-commercial.

During interviews, both concessionaires have actually expressed preference for tapping official development assistance (ODA) for their wastewater programs. This is because of the generally lower interest rates and longer maturities than obtaining with commercial loans. The three major sewerage and sanitation projects implemented during the concession period – the MSSP, PRRP and MTSP – are all ODA-supported. There are also pilot projects, such as a combined sewerage and septage facility in Pasig City, that were funded through foreign grants.

Concessionaires being private entities, however, have no direct access to ODA financing. They tap these funds indirectly through MWSS (the project's executing agency with either MWCI or MWSI or both as its "agents" assigned to undertake the project in behalf of the EA under the concession agreement); or, through a special funding facility in specified government financial institution (GFI), like Land Bank or DBP, created and financed by the donor agency for the sole purpose of supporting the project.

Under the concession agreements, the ownership of the projects implemented by the concessionaires reverts to MWSS upon expiration of the concession period (*Sections 6.15 and 16.12 of the CA*), although the concessionaires shall operate, maintain, renew and repair these facilities during the concession period. Hence, the ODA financing goes to the development of assets that are technically owned by a government entity, in this case MWSS.

The concessionaires preferred to deal directly with the funding agencies rather than through government to speed up decision-making process especially on day-to-day issues affecting project

implementation. The pros and cons of ODA financing through MWSS or a GFI are listed on **Table 5.3.6**.

Table 5.3.6: ODA financing through MWSS Vs. GFI's: advantages and disadvantages

Through…	Advantages	Disadvantages
MWSS	• Can negotiate for loan directly with donor agencies/MFIs • Debt service risk reduced as government guarantees the loan • Loan terms are more concessional – low interest rate, longer maturity	• Subject to borrowing ceilings under its charter • Slower decision-making process • Government guarantee on foreign loans subject to a ceiling
GFI's	• Faster, less bureaucratic decision-making on changes in project implementation • More flexibility in project implementation • Greater efficiency and financial viability of project	• Subject to GFI's semi-commercial borrowing terms – max. maturity of $\leq$ 10 years , with add-on interest from the donor agency's rate (spread) • Relatively more stringent borrowing requirements, such as need for collateral, prudent assessment of financial capacity of borrower, etc.

The projects identified in the 2008 Business Plan of MWCI are mostly with funding already, although for some of those obtained from the updated East Zone Master Plan and with accelerated implementation, the company indicated that it is also considering other options for financing apart from internal capital expenditure (capex).

MWSI mentioned that projects identified in its master plan for implementation beyond the current business plan period, i.e. beyond 2012 have no clear sources of financing yet. They prefer ODA financing for these projects.

5.3.4 Cost Recovery/Rate Rebasing

MWSI noted that water concession is a good business because the concessionaire is assured that costs incurred are recovered and also of getting reasonable return on investment. There are risks, however, of tariff adjustments being put on hold or delayed due to political pressure and of low sewer connection due to high sewerage charges.

(a) Rate Rebasing Formula

Under the concession agreements, concessionaires are assured of the recovery of their operating expenses, capital expenditures efficiently and prudently incurred, taxes paid, debt service paid on MWSS and concessionaire's loans, at the same time earning a pre-agreed return known as the appropriate discount rate (ADR). This cost recovery measure is done through rate rebasing, an exercise done every five years. Investments in sewerage and sanitation facilities are covered by rate rebasing.

The object of rate rebasing is to determine the allowable increase in basic average tariff that will ensure that the so-called rate adjustment limit (RAL) is not exceeded, defined as:

$$RAL = C \pm E \pm R$$

Where C is the inflation rate (the change in the consumer price index)

E is extraordinary price adjustment, where the Concession Agreement has identified 10 grounds for allowing E:

1. Amendment to service obligations
2. Changes to the concessionaires' legal obligations
3. Breaches of the Concession Agreement
4. Treatment of grants or subsidized loan
5. A material change in the calculation of the consumer price index (CPI)
6. Outstanding penalties
7. Material inaccuracies in bidding assumptions
8. Cost overruns in the Umiray-Angat Tunnel Project (UATP)
9. Delays in the completion of the UATP
10. Force majeure

R is rate rebasing, which is conducted every five years, with the first completed in 2003 and the second set for 2008 (although for MWSI, there is a one-year delay in implementation to 2009 due to the suspension of its tariff adjustment).

C is allowed almost automatically and is adjustment is performed annually. E needs to be justified in terms of the presence of any or a combination of the 10 grounds.

R is the tariff adjustment component – either upwards or downwards – needed to bring the value of the basic tariffs back to their levels in 1997. In determining the allowable rate rebasing, the MWSS-RO looks at the present value (at 1997 prices) of the net cash flow per volume of water billed (a) from the start of the concession period to the rate rebasing year; and, (b) from the scheduled start of implementation of the rebased tariff (charging year) to the end of the concession period (2022), based on the evaluation of the business plan submitted by the concessionaire. Present value is estimated using the appropriate discount rate (ADR), a pre-agreed figure between the MWSS and the concessionaire for discounting the streams of cash flows of the concessionaire during the life of the concession. The ADR is negotiated between the concessionaire and MWSS-RO, although it is usually between 9% and 10%. The sum of (a) and (b) should be equal to zero. If it is more than zero, the basic average tariff is adjusted downwards by the amount of the excess. If it is less than zero, it is rebased upwards by the amount of the deficiency.

In short, R is the increase or decrease in tariff that would make NPV of net cash flows = 0 (revenue neutral) at a pre-set ADR.

(b) Other Sewerage-Related Fees

On top of the adjustment in R, the cost of wastewater projects is also recovered through the environmental charge, which is equivalent to a fixed percentage of basic average tariff and is imposed on all water connections, and the sewerage connection charge, which is a fixed lump sum plus 50% of the basic water tariff applicable only to sewer-connected end-users.

Essentially, therefore, sewerage and sanitation investments are recovered through a combination of tariff adjustment (R), environmental charge and sewer connection charge.

(c) Tariff Structure

In summary, the water tariff consists of the following items:

- Basic charge, which is the figure subject to rate rebasing and where the C (inflationary) and E (extraordinary) adjustments also apply;

- Foreign currency differential adjustment (FCDA) – a certain percentage of the basic charge revised and adjusted quarterly depending on the fluctuation of the foreign exchange rate;
- Environmental/sanitation charge – a specified percentage of the basic charge;
- Sewerage charge – a percentage of the basic charge for those with sewer connections only;
- Maintenance service charge – flat fee depending on meter size, the larger the meter the higher the charge;
- Value added tax (VAT) – 12% of the amount of all the preceding charges (basic, FCDA, environmental, sewerage and maintenance service).

Basic charges differ for each group of end-users, i.e., residential (the lowest charges), semi-business, business group 1 and business group 2 (the highest charges; the volume of water usage; and the concession area. A flat fee applies to minimum monthly usage, i.e., 10 m^3 or, with progressively higher per cubic meter charge for incremental blocks of 10 to 20 m^3 beyond the minimum usage in the case of residential and semi-business, and for incremental blocks of 100 m^3, 200 m^3 and 500 m^3 for business groups 1 and 2.

The flat, subsidized fee corresponding to the minimum monthly usage of 10 m^3 or less coupled with the progressively higher basic charge as a household consumes more water represent the socialized element of the pricing. The flat fee is arbitrarily limited to not more than 5% of the monthly income of the poorest families, the poor being defined as those with monthly income below the so-called poverty threshold or the income just sufficient to cover the family's basic needs.

Water charge is the sum of the basic charge and FCDA. The latest (2009) charges in the various components of water tariff are presented in **Table 5.3.7** below.

Table 5.3.7: Water tariff structure: 2009

(Philippine Pesos)

	MWCI	MWSI
BASIC CHARGES		
Minimum monthly flat rate (1st 10 m^3 or less)		
Residential	77.60	77.62
Semi-Business	77.60	130.38
Business Group 1	352.88	352.76
Business Group 2	381.60	381.71
Next consumption blocks (Rate per m^3)		
Residential	9.47-32.82	9.48-32.21
Semi-Business	15.85-34.21	15.91-34.22
Business Group 1	35.31-39.30	35.44-39.48
Business Group 2	38.39-46.57	38.41-46.57
Currency exchange rate adjustment (CERA)*	N.A.	1.00 per m^3
FCDA (% of basic charge)	1.03%	-1.85%
Special transitory mechanism (STM - % of basic charge)*	N.A.	8.99%
Environmental charge (EC - % of water charge)	12%	10%
Sewerage charge – for customers connected to sewer lines (% of water charge)		
Residential and semi-business	40%	50%
Business groups 1 and 2	45%	50%
Maintenance service charge (fixed charge depending on the size of the meter)	1.50-50.00	1.50-50.00
VAT (% of all the charges above)	12%	12%

** Charged to MWSI customers only, as agreed upon between MWSI and MWSS*
Source: Public announcements of MWCI and MWSI

Hence, a residential user with a monthly consumption of 30 m^3 with ¾" meter would have a monthly bill as follows:

Table 5.3.8: Monthly charge for water tariff structure
(For consumption of 30 m^3 with ¾")

	With MWCI	With MWSI
NO SEWER CONNECTION:		
Minimum charge	77.60	77.62
Next 20 m^3	274.20	275.00
Basic charge	351.80	352.62
CERA	-	30.00
FCDA	3.62	(6.52)
STM	-	31.70
Water charge	355.42	407.80
Environmental charge	42.65	40.78
Maintenance service charge	3.00	3.00
VAT	48.13	54.19
WATER TARIFF	**449.20**	**505.77**
Additional charges if connected to sewer line:		
Sewerage charge	142.17	203.90
Additional VAT	17.06	24.47
WATER TARIFF (with sewer connection)	658.43	734.14

5.3.5 Rationalization of Sewerage Charges

There is a risk of non-recovery due to the following factors: prohibitive cost of sewer service connection, such that the target number of connections might not be achieved, resulting in below-target revenue; and, the tariff adjustment might not be granted, such as in the populist posturing by the President to put adjustments on hold (political/regulatory risk).

For the first risk, the measures being considered to address this are two-fold: (a) a shift in the tariff structure for sewerage; and (b) extension of the concession period.

(a) Shift in Sewerage Tariff Structure

To encourage more sewerage connections as well as improve revenues from sewerage services during the 2008-2012 period, both concessionaires have proposed the rationalization of sewerage and environmental charges, which MWSS approved, at least for MWCI so far (**Table 5.3.9**).

Table 5.3.9: MWCI: Rationalization of sewerage and environmental charges
(% of Basic Water Rate)

	2008	2009	2010	2011	2012
Environmental charges	12	14	16	18	20
Separate sewer network charges					
Residential	40	30	20	10	0
Commercial	45	40	35	30	30
Combined sewer system	0	0	0	0	0

Source: MWCI, 2008 Rate Rebasing (January 2008)

For MWSI, the timetable is delayed to 2010, or until the approved tariff increase is fully implemented. Nonetheless, the proposed shift is as follows: for separate sewerage system, from 50% that it is presently to 20% after four years of implementation of rationalization; for sanitation (environmental) charge, from 10% to 20%.

Both concessionaires will also capitalize and no longer charge one-time sewer connection fee, which is as high as PhP60,000 for MWSI.

Sewer charge applies only to those with connection to separate sewer system. Significantly, therefore, lowering the charges would increase the connections. At the same time, the concessionaires are assured of higher revenues even with minimal increase in separate sewer connections as the environmental/sanitation charge, which is imposed on all households and commercial establishments with water connections, will roughly double in four years.

(b) Extension of Concession Period

To minimize the impact of tariff increases as a result of the implementation of sewerage and sanitation programs and projects, the concessionaires have proposed the extension of the concession period. This way, the increase in tariffs for the recovery of project costs will be lower as it will be spread out over a longer period of time. Consequently, the payment of project financing will be more affordable and acceptable to customers.

The proposed 15-year extension of concession period by MWCI has been endorsed by MWSS and it is pending for Letter of Undertaking/Letter of Acknowledgement from the Department of Finance. This assures 100% sewerage and sanitation coverage in the East Zone as early as three years before the original termination of the concession agreement, or by 2018, with another 18 years to recover the cost of these investments.

In the case of MWSI, the proposed extension of the concession period is being worked out and is expected to be approved and implemented in the next rate rebasing phase, which is 2013. The target is for MWSI's West Zone to have 100% sewerage by 2036, the end of the extended concession period, from 66% in 2021 (the original terminal year of the concession agreement).

(c) Political Risk

As far as the political risk is concerned, the concessionaires, notably MWSI, have been assured that the required level of tariff adjustment will be granted after the presidential elections in May 2010. Hence, the needed tariff increase is eventually given by the government, although possibly delayed.

5.4 Conclusions and Recommendations

Conclusions:

- Under the concession agreements, concessionaires are mandated to meet specific sewerage and sanitation service targets: 55% of households with water connection by 2021 in MWCI's East Zone; 66% in MWSI's West Zone (based on latest submission by MWSI to MWSS, which is not yet reflected in the concessionaire's 2008 Business Plan)
- These targets are supported by projects, commonly combined systems in each of the catchment areas. MWCI, based on its 2008 rate rebasing submission, is estimated to spend at least PhP23 billion on these projects up to 2022; MWSI, based on latest information obtained from the company, will spend PhP50.8 billion up to 2021.
- The concessionaires expressed preference for ODA/concessional financing as funding sources for these projects. As much as possible, they would like to conclude loans directly with the bilateral

agencies/MFIs through GFI's such as Land Bank.

- Under the CA, efficient and prudent investments are recovered by the concessionaire through rate rebasing, which is done every five years. Three items are the sources of recovery for wastewater investments – sewerage charges for sewer-connected users, environmental charge and basic average tariff adjustments.
- The issue, however, is the willingness to pay for sewerage services by households. Hence, efforts are being done to rationalize the sewerage rate structure to make the cost of providing sewerage services affordable to households. Both concessionaires will reduce the sewer connection fee from up to 50% to as low as zero, while raising the environmental/sanitation fee from 10% to 20% over a period of 4-5 years from 2008. They have also sought for a 15-year extension of the concession period to spread out tariff increases and hence reduce their impact on households.

Recommendations:

- The Master Plans particularly of MWCI and MWSI identify the sewerage projects for implementation in the future to meet the sewerage service coverage targets under the concession agreements. The mandates of the Clean Water Act and the Supreme Court decision on the Manila Bay cleanup exert even more pressure for the accelerated implementation of these projects. This presents an opportunity for donors like JICA to consider providing a number of options for financial assistance to MWSS and the concessionaires in the implementation of these projects, specifically those planned beyond 2012.
- Ways for possible extension of loans directly to concessionaires could be explored, such as in the case of MTSP, where World Bank extended the loan to MWCI through Land Bank of the Philippines.
- While efforts are being exerted to make charges related to the development of sewerage facilities more affordable to customers, demand-side initiatives need to also be underscored, such as highly creative information, education and values campaign, so households would appreciate the importance of a clean environment and be able to put a reasonable price tag on sewerage and sanitation services.

6 OVERALL EVALUATION AND RECOMMENDATIONS

Chapter 2 through Chapter 5 above presented the existing conditions, issues and needs of sewerage and sanitation sector in Metro Manila. This chapter summarizes the main issues of the sector, then proposes strategies to improve the sewerage and sanitation sector in Metro Manila.

6.1 Overriding Goals of Sewerage and Sanitation Sector in Metro Manila

In order to understand the sewerage and sanitation sector and to formulate long-term strategies for the sector in Metro Manila, it is vital to understand the overriding ultimate goal of the sector. **Table 6.1.1** below presents the higher level goals and sectoral goals of sewerage and sanitation sector in national and Metro Manila contexts. The detailed explanations of these goals are presented in the subsections below.

Table 6.1.1: Higher level goals and sectoral goals of sewerage and sanitation sector

Level of goals		Goal statements	Source of information
Higher level goal	National level	• To protect the water resources of the country through prevention, control and abatement of wastewater pollutions • Protection and promotion of the health of the Filipino people	• Philippine Clean Water Act 2004 (RA 9275)
	Metro Manila	• Improvement of water quality of the Manila Bay and its contributing river systems	• Manila Bay Coastal Strategy, 2001 • Operational Plan for the Manila Bay Coastal Strategy, 2005 • Supreme Court Decision, December 2008 (G.R. Nos. 171947-48)
Sectoral goal	National level	• Halving of population without access to sanitation by 2015	• Millennium Development Goal
	Metro Manila	• Provision of adequate, dependable and sanitary waste disposal at just and equitable rates • 100% sewerage coverage[62]	• MWSS

6.1.1 National Context

In order to understand the ultimate goal of sewerage and sanitation in Metro Manila, reference has been made to the MWSS Master Plan (2005) as well as other existing laws relating to sewerage and sanitation management in the Philippines. The national legislative framework governing sanitation and sewerage in the Philippines is principally governed by two (2) main laws, namely:

- PD 856 or the Code on Sanitation of the Philippines; and
- RA 9275 or the Philippine Clean Water Act (CWA).

The Code on Sanitation of the Philippines provides that the ultimate goal of the sewerage and sanitation sector in the Philippines is for **protection and promotion of the health of Philippine people**. While from a wider perspective, the CWA indicates that the country must pursue a policy of

[62] Based on the discussion with MWSS

economic growth in a manner consistent with the protection, preservation and revival of the quality of fresh, brackish and marine waters. And to achieve this, it is necessary to prevent, control and abate pollution of water resources. The provisions of CWA clearly indicated that the overriding goal of sewerage and sanitation sector in the Philippines is **to protect the water resources of the country through prevention, control and abatement of wastewater (including sewage and septage) pollutions**. This is further complemented by the Medium-Term Philippine Development Plan 2004-2010, under the strategy statement as follows: '*to ensure clean water resources for the entire country through full implementation of the Ecological Solid Waste Management Act and the Clean Water Act*'.

6.1.2 Metro Manila Context

In the context of Metro Manila, the first multi-sectoral movement to protect and rehabilitate the Manila Bay started in 2001 with the formulation of the Manila Bay Coastal Strategy (2001). The missions of the Strategy are mainly to rehabilitate, protect and maintain a healthy ecosystem in the Manila Bay, and to develop both terrestrial and water resources on a sustainable basis. The Strategy provides a comprehensive environmental management framework, targeted outcomes and a series of programs involving the participation of both government and non-government sectors. In this respect, sewerage and sanitation sector is being placed under the objective to reduce adverse impacts from land-based activities, with the action program to mitigate and manage direct and indirect discharges of wastewater contaminants. The Operational Plan for the Manila Bay Coastal Strategy (December 2005) sets a target to reduce 50% of discharges of raw sewage, septage and untreated and inadequately treated wastewater by 2015 to achieve the ultimate goal of water quality improvement as required by the CWA.

Further to the adoption of the above Strategy, a landmark decision by the Supreme Court in December 2008 on the clean-up, rehabilitation and preservation of the Manila Bay has further boosted the joint efforts from various agencies to prevent and control pollution loads in the Manila Bay. One of the main concerns of the court decision is the improvement of sewerage and sanitation conditions in Metro Manila and its surrounding regions. MWSS, DOH, LWUA and other concerned agencies have been directed by the court to take action in executing their mandates in sewerage and sanitation related services.

Considering the above inter-agency efforts toward protection and rehabilitation of the Manila Bay, the overall effort of the GOP it **to protect and rehabilitate the Manila Bay**, or in another word, **to reduce pollution loads to the Manila Bay so as to improve its water quality, with the ultimate goal of achieving Class SB water quality**.

6.2 Institutional Framework of Sewerage and Sanitation Sector in Metro Manila

In order to improve the sewerage and sanitation sector in Metro Manila, it is necessary to analyze the sector based on a holistic approach. Under Chapter 2 to Chapter 5, detailed evaluations were carried out for the existing sewerage and sanitation projects and programs in Metro Manila as well as the existing institutional framework of the sector. In order to identify the fundamental issues of the sector in a holistic way, this section reviews the overall institutional framework of the sewerage and sanitation sector in the context of Metro Manila.

Figure 6.2.1 summarizes the overall institutional framework of sewerage and sanitation sector in the context of Metro Manila. Structural wise, basically the institutional framework of the sector should be viewed at six levels as follows:

- Goal statement;

- Laws and regulations to achieve the goals;
- Oversight agencies responsible for coordination with implementation agencies to ensure all laws and regulations are appropriately implemented toward achieving the goals;
- Implementation agencies, including provision of sewerage and sanitation services, provision of supporting services, infrastructure and lands, monitoring and enforcement;
- Concessionaires for sewerage and sanitation services; and
- House owners.

The detailed descriptions of the above institutional framework are presented in the following subsections:

6.2.1 Goal Statement

As presented in **Table 6.1.1** above, the ultimate goals of sewerage and sanitation sector in Metro Manila as set by MWSS are:

- To provide adequate, dependable and sanitary waste disposal at just and equitable rates; and
- To achieve 100% sewerage coverage.

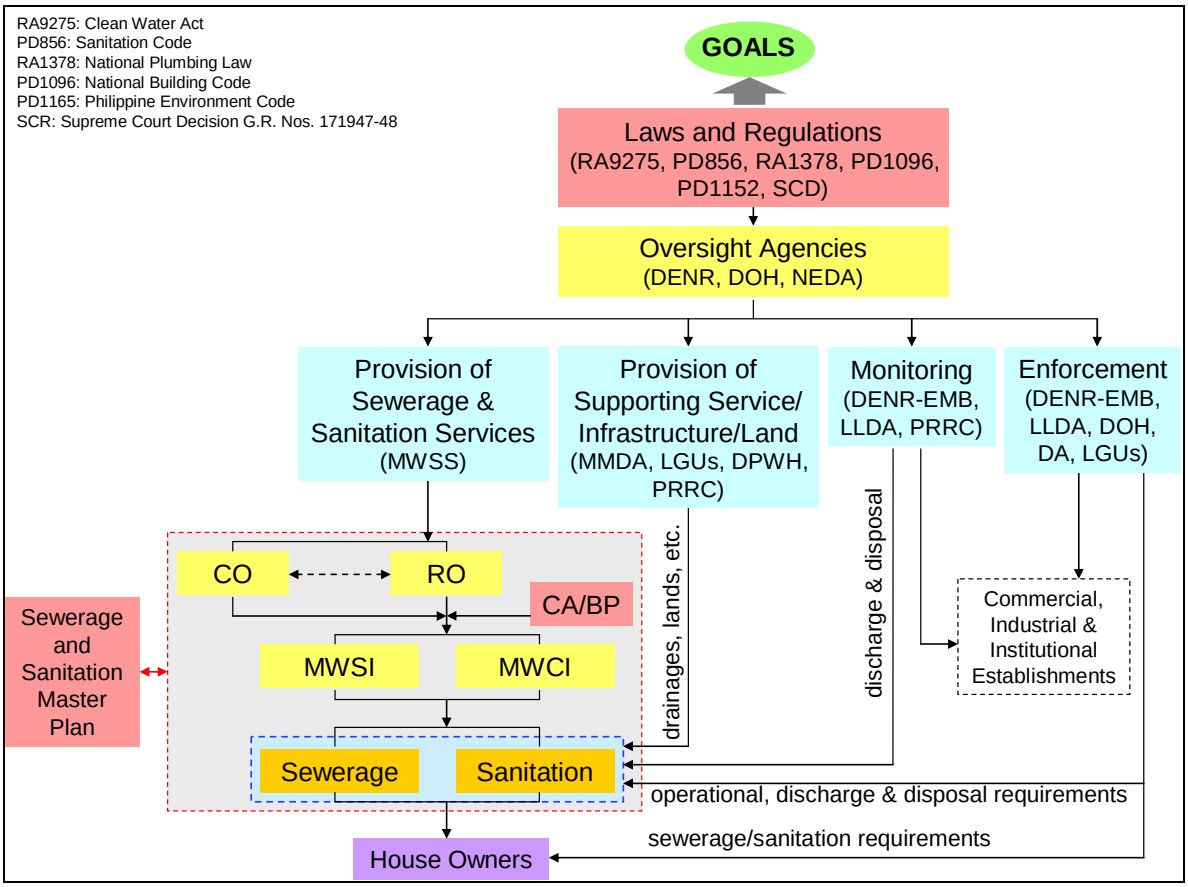


Figure 6.2.1: Institutional framework of sewerage and sanitation sector in Metro Manila

6.2.2 Laws and Regulations

In line with the above goals, various laws and regulations were issued by the GOP in support of the sanitation/sewerage sector. The main laws and regulations related to water quality management and sewerage and sanitation management are shown in **Table 6.2.1**.

Table 6.2.1: Major laws and legal requirements of sewerage and sanitation sector in Metro Manila

Law and legal requirements	Main functions/purposes
Clean Water Act, 2004 (RA 9275)	– Provides the policy and regulatory framework for comprehensive water quality management in the Philippines.
Code on Sanitation of the Philippines, 1975 (PD 856)	– Requires cities and municipalities to provide an adequate and efficient system of sewage collection, transport and disposal in their areas of jurisdiction; – Defines the structures relating to onsite sanitation facilities and scope of DOH's mandate on the supervision of septage management.
National Plumbing Law, 1955 (RA 1378)	– Provides guidelines on the design of plumbing systems and fixtures of dwelling units and their proper maintenance.
National Building Code, 1977 (PD 1096)	– Requires connection of buildings to sewerage systems.
Philippine Environment Code, 1978 (PD 1152)	– Requires wastewater from manufacturing plants, industries, communities and domestic sources to be either physically, biologically or chemically prior to disposal.
The Supreme Court Decision, 2008 (G.R. Nos. 171947-48)	– Orders the subject government agencies, led by DENR, to clean up and rehabilitate the Manila Bay.
An Act Creating the Metropolitan Waterworks and Sewerage System and Dissolving the National Waterworks and Sewerage Authority; and for Other Purposes, 1997 (RA 6234)	– Creating the Metropolitan Waterworks and Sewerage System
The Water Crisis Act, 1997 (RA 8041)	– Provides legal basis for the privatization of sewerage and sanitation services

6.2.3 Oversight Agencies

There are three main oversight agencies in the context of sewerage and sanitation management in Metro Manila, namely DENR, DOH and NEDA. DENR is the lead agency in environmental protection and management, DOH is the lead agency in pubic health management and promotion, while NEDA is responsible for evaluation and approval of major sewerage and sanitation projects, including ODA projects (see **Table 6.2.2**).

Table 6.2.2: Main government agencies of sewerage and sanitation sector in Metro Manila

Level of functions		Institution	Main responsibilities in relation to sewerage and sanitation sector in Metro Manila
Oversight		DENR	– As the lead agency in environmental protection and improvement of water quality in the Manila Bay and its contributing river systems.
		DOH	– As the lead agency in public health management and promotion.
		NEDA	– As the country's economic development and planning agency, NEDA is responsible for the evaluation and approval of sewerage and sanitation projects (including ODA projects).
Implementation	Sewerage and sanitation service provision	MWSS	– Provision of sewerage and sanitation services within its service area (including Metro Manila) through its concessionaires.
	Supporting service/ infrastructure/ land provision	MMDA	– Provision and maintenance of drainage systems in Metro Manila; – Provision of solid waste services in Metro Manila.
		LGUs	– Review/approval of sanitation plans for every new house/building prior to construction or issuance of building permit; – Provision of land and access to treatment facilities.
		DPWH	– Provision and maintenance of drainage systems in areas outside Metro Manila.
		PRRC	– Rehabilitation of the Pasig River and its tributaries, including preparation of master plans, coordinating with other implementing agencies, relocation of informal settlers and abate wastewater discharge to the Pasig River.
	Monitoring and enforcement	DENR-EMB	– Water quality and discharge/effluent monitoring and enforcement for areas outside LLDA jurisdiction.
		LLDA	– Water quality and discharge/effluent monitoring and enforcement for the Laguna de Bay Region.
		DOH	– Formulation of guidelines and standards for the collection, treatment and disposal of sewage and septage. – Regulation of septic tank desludging companies.
		DA	– Formulation of standard for the reuse of treated sludge for agriculture purposes and its enforcement (in collaboration with DOH).
		MMDA	– Prevention and abatement of solid waste disposals to the drainage systems and control/relocation of informal settlers.
		LGUs	– Enforcement of sewerage/sanitation requirements for all existing/new building and periodic desludging of septic tanks.
		PRRC	– Monitoring of water quality for the Pasig River.

6.2.4 Implementing Agencies

As shown in **Figure 6.2.1** above, there are four categories of implementing agencies i.e. (a) provision of sewerage and sanitation services, (b) provision of services, infrastructure and land, (c) monitoring, and (d) enforcement. The detailed descriptions are as follows:

(a) Provision of Sewerage and Sanitation Services

Republic Act No. 6234 (1971) created the Metropolitan Waterworks and Sewerage System, Under this law, MWSS is mandated to provide and maintain sewerage systems within Metro Manila and some cities and towns of the adjacent provinces of Cavite and Rizal, with a total service area of 1,914 sq. km. In 1997, the provision of water supply, sewerage and sanitation services was privatized and awarded to two concessionaires: MWCI for the East Zone and MWSI for the West Zone consistent with Republic Act No. 8041 (known as "The Water Crisis Act").

Currently MWSS has two main functions and these are reflected in the tasks of its two divisions: the Corporate Office (CO) and the Regulatory Office (RO). The main function of the RO is to monitor and/or enforce the awarded Concession Agreement (CA) with respect to service standards to customers, preparation of audited financial statements, ruling on cost allocation and others pertinent to the rate rebasing methodology, reviewing water supply and sewerage rates and implementing extraordinary price adjustments and other rate rebasing provisions, and prosecuting or defending proceedings before the Appeals Panel. On the other hand, the main functions of the CO are:

- To cooperate with the concessionaires in developing new raw water sources;
- To monitor, report and administer the MWSS loans and perform related functions in connection with ongoing projects; and
- To manage and/or dispose of retained assets.

The performance of the two concessionaires is monitored by MWSS through its RO. The concessionaires are bound by the CAs, with rate rebasing exercises every five years. For this purpose, the concessionaires are required to prepare and submit their 5-year business plans to MWSS. Subject to negotiations, the approved business plans serve as the supplementary documents to the original CA by incorporating the changes agreed by MWSS through the rate rebasing exercise, and thereafter, these business plans serve as the basis for their operation during the subject period.

As indicated in **Figure 6.2.1** above, in the context of sewerage and sanitation management, the scope of services of MWSS through MWCI and MWSI, can be divided into two components i.e. sewerage service and sanitation service. The detailed descriptions of these services are presented in Chapter 3 and Chapter 5. The overall planning and implementation framework of these sewerage and sanitation services are guided by the sewerage and sanitation master plan prepared by MWSS in 2005 ('Water Supply, Sewerage and Sanitation Master Plan for Metro Manila').

(b) Provision of Supporting Services, Infrastructures and Lands

With respect to the provision of supporting services, infrastructure and lands as indicated in **Figure 6.2.1** above, it refers to the other sectors that are not within the scope of MWSS' services but are very closely related to sewerage and sanitation sector that should not be neglected when dealing with the sector from a wider perspective. As indicated in the figure, there are four major agencies involved, namely MMDA, LGUs, DPWH and PRRC. The following summarizes the main functions of the said agencies in the context of sewerage and sanitation in Metro Manila.

MMDA: MMDA is responsible for the planning, provision and maintenance of drainage system in Metro Manila. Since combined system is being adopted by the concessionaires in the provision of sewerage system in Metro Manila, MWSS (MWCI and MWSI) needs to closely coordinate with MMDA to ensure drainage systems are being planned, designed, constructed and maintained in line with the sewerage system planned and implemented by MWCI and MWSI.

Another function of MMDA that is very important in sewerage and sanitation sector is its responsibility in the control and resettlement of informal settlers (in coordination with LGUs). The indiscriminate disposal of solid and liquid wastes by informal settlers is one of the major issues in sewerage and sanitation management in Metro Manila that must be addressed urgently.

LGUs: The most important role of LGUs in this respect is the quick resolution of right-of-way (ROW) issues and land acquisition issues for the sites of sewage and septage treatment plants and installation of sewer lines.

As mentioned above (under MMDA), the proliferation of informal settlers is one of the major issues in sewerage and sanitation management in Metro Manila. Although resettlement programs are being initiated by various agencies, including MMDA and PRRC, these agencies need o coordinate with the LGUs and the housing authority in the provision of land. LGUs are also responsible for maintenance of drainage systems.

DPWH: DPWH is responsible for the planning, provision and maintenance of drainage system in areas outside of Metro Manila. As the service area of MWSS covers part of Cavite and Rizal Provinces, DPWH's roles must not be neglected. The significance of DPWH in sewerage and sanitation sector is similar to MMDA as described above.

PRRC: As described in **Table 6.2.1**, the main responsibility of PRRC is for the rehabilitation of the Pasig River, which includes the preparation of master plans, coordinating with other implementing agencies, relocation of informal settlers and abate wastewater discharge to the Pasig River.

(c) Monitoring

When dealing with sewerage and sanitation sector in Metro Manila in a holistic way, besides the provision of sewerage and sanitation services, it is also important to look into the related monitoring function of DENR-EMB, LLDA and PRRC. Their main monitoring functions related to sewerage and sanitation management are summarized as follows:

DENR-EMB: Monitoring of water quality of water bodies and effluents from point sources.

LLDA: Monitoring of water quality of water bodies and effluents from point sources within the Laguna Lake region.

PRRC: Monitoring of water quality of the Pasig River and its tributaries.

(d) Enforcement

In order to ensure smooth implementation of various sewerage and sanitation projects and programs, the enforcement of specific laws of relevant agencies, namely DENR-EMB, LLDA, DOH, DA, MMDA and LGUs, are also essential. The detailed descriptions of these agencies are presented in Chapter 3, while their main scopes of enforcement in relation to sewerage and sanitation management are summarized as follows:

DENR-EMB: Enforcement related to effluents from point sources.

LLDA: Enforcement related to effluents from point sources within Laguna Lake region.

DOH: Enforcement related to the design of individual septic tanks, household connection to sewerage system, sewage/septage treatment plants as well as the method of disposal of sludge from septic tanks and other treatment plants.

DA: Enforcement related to the usage of bio-solids for agricultural purposes.

LGUs: Enforcement related to building, plumbing and sanitation standards of onsite sanitation facilities and DOH standards on septage management.

6.2.5 House Owners

As the scope of service by MWSS is limited to domestic wastewaters, house owners and some commercial establishments are the end users of the services. All house owners are required to comply with sewerage and sanitation requirements, mainly by DOH and LGUs.

6.3 Main of Issues

Based on the institutional framework presented in Section 6.2 as well as the findings from Chapter 2 to Chapter 5, the fundamental issues at each level/component of the overall institutional set up are presented in **Figure 6.3.1**. It is deemed that in order to improve the sector comprehensively, it is necessary to address these issues urgently.

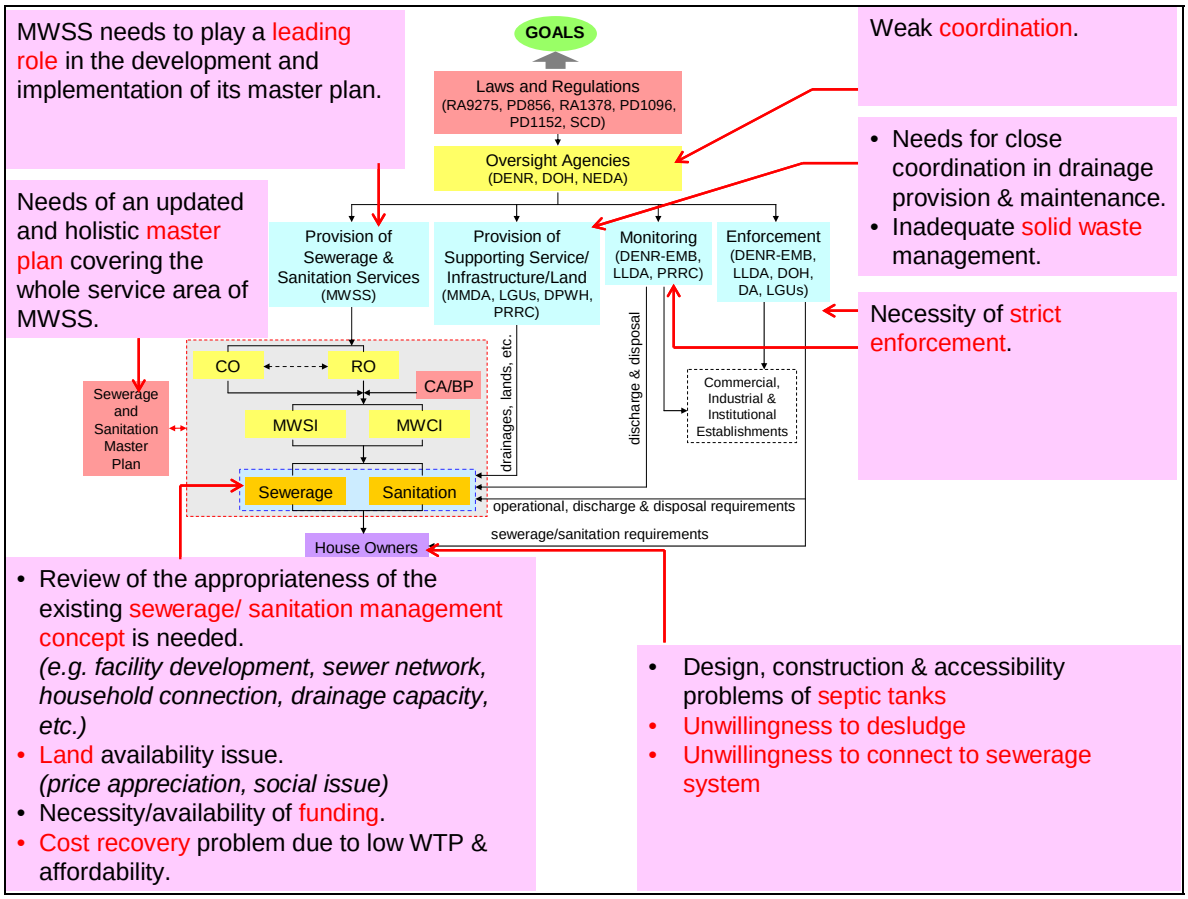


Figure 6.3.1: Main issues from a sector wide perspective

6.3.1 Oversight Agencies

As mentioned in the above section, from a wider perspective, the sewerage and sanitation sector in Metro Manila actually serves as part of the overall efforts in the promotion of health of the people, and protection of environment in general and protection of water quality of the Manila Bay, the Metro Manila rivers and the Laguna de Bay in particular. In this respect, among the important oversight agencies are DENR, DOH and NEDA. The major roles of each of these agencies are summarized in **Table 6.2.2** above.

Interviews with related government and non-governmental agencies as well as reviews of various reports found that there is still room for improvement in coordination among the agencies. For example, in response to the Supreme Court Decision in December 2008, all related agencies are taking concerted effort to improve water quality of the Manila Bay from the present Class SC level to Class SB level. However, it is deemed that further enhancement of the partnership among all related agencies is necessary to address the issue more effectively and more holistically. In this respect, the on-going GEF-MTSP project promotes partnership among various agencies to improve institutional/administrative practices and to promote data sharing toward better water pollution control.

6.3.2 Provision of Sewerage and Sanitation Services

As explained above, the operations of MWCI and MWSI are guided by CAs wherein coverage targets are reviewed and revised accordingly during rate rebasing every five years. MWSS is responsible to oversee and guide the operations of its concessionaires. It is thus deemed that it would be more ideal for MWSS to play a stronger role in directing the investments of the concessionaires where these investments can be more environmentally effective.

6.3.3 Sewerage and Sanitation Master Plan

This issue is closely related to the above discussions. It is deemed that in order to help MWSS to lead the concessionaires in the provision of sewerage and sanitation services, the existing sewerage and sanitation master plan should be updated periodically so as to serve as a useful guide for MWSS, particularly during rate rebasing negotiation exercises.

6.3.4 Sewerage and Sanitation Management by Concessionaires

There are several fundamental issues related to the sewerage and sanitation services being provided by MWCI and MWSI that need to be addressed.

(a) Review the appropriateness of the existing sewerage/ sanitation management concept

The services provided by the concessionaires can be divided into sewerage services and sanitation services. Although the above concept has been accepted by MWSS and it is widely recognized that the above services will, to a certain extent, reduce pollution loads from domestic wastewaters, it is believed that there is still room for further improvement. For instance, it is vital to ensure that the capacity of drainage systems can accommodate both storm water and wastewater.

With respect to sanitation service, CA stipulated that septic tank desludging should be done at least once every 5 to 7 years. In the actual operation, the concessionaires are facing various problems, such as inaccessibility of septic tanks, unwillingness of house owners to desludge their septic tanks, etc. As an immediate action, measures should be taken to achieve the aforementioned desludging requirement. After fulfilling the said requirement, subject to further study, it may be necessary increase the desludging frequency so as to further improve the effectiveness of the septic tanks.

(b) Land availability issue

The availability of land is another issue that must be addressed urgently. The concessionaires are facing the problems of securing sizable land for the construction of treatment plant at strategic locations (decided by sewerage design that mainly using gravity flow). The problem is not really that vacant lands are not available but high acquisition cost due to rapid appreciation of land values. There are also social issues like objections by the surrounding communities on the construction of treatment plant in their neighborhood.

(c) Necessity/availability of funding

Funding is another constraint in the provision of sewerage and sanitation services in Metro Manila. This is not only associated with the difficulties to secure funding at affordable interest rate but also closely related to the low willingness and affordability to pay for sewerage services by households. This eventually results to cost recovery problem.

6.3.5 Provision of Supporting Services, Land and Infrastructure

Sewerage and sanitation sector requires close coordination with other agencies. In this respect, among the major issues being identified are the coordination between concessionaires and MMDA/LGUs in drainage provision and maintenance. Another important issue to be addressed is solid waste management. The accumulation of solid wastes in waterways not only causes pollution to the water bodies, but also reduces the capacity of drainage system. This may eventually affect the effectiveness of combined sewerage system that being implemented in Metro Manila. Also, with

respect to land issues mentioned above, there is a need for close coordination between MWSS/concessionaires and LGUs to secure appropriate sizes of land at suitable locations with reasonable cost.

6.3.6 Monitoring and Enforcement

There are several issues in relation to monitoring and enforcement. One is the inadequate enforcement by LGUs with respect to ensuring household septic tanks are designed, constructed and maintained (desludged) in accordance with the building, plumbing and sanitation standards set by DOH. From previous studies and interviews with various agencies, it is found that prior to construction of any building, owners are required to submit building plans for LGU approval, which include the design of sanitation system. However, according to the officials from DOH, some of these structures are not constructed in accordance with the approved plans. Also, some of the house owners carried out their house extension construction without approval from LGU. These are among of the main reasons of defective and inaccessible septic tanks.

Besides LGUs, it is deemed that the enforcement function of DOH, especially with respect to regulating private septic tank desludging companies, should be further strengthened. Interviews with the officials of DOH as well as other related agencies revealed that there is an unknown number of private septic tank desludging companies operating in Metro Manila without any permits from either DOH or LGUs. Most likely, the collected sludge is illegally discharged into water bodies. In this respect, the on-going GEF-MTSP project attempts to refine policies and procedures of sewerage and sanitation management, including guidelines for regulating the providers of septic tank desludging and develop procedures and standards for implementing CWA and Sanitation Code.

6.3.7 House owners

The improvement of sewerage and sanitation management does not only rely on the provision of sewerage and sanitation services by the concessionaires but educating house owners on the importance of sanitation is also very important. For the case of Metro Manila, the biggest constraints are:

- Unwillingness of the some house owners to connect to the sewer lines which mainly due to the high connection fees and high surcharge for the service;
- Unwillingness of some house owners to desludge their septic tanks as scheduled, because of perceived inconveniences and possible indifference for environmental improvement; and
- Some of septic tanks are not constructed according to the guidelines of DOH which resulted in inaccessibility for desludging and possible leakages of sewage into the groundwater.

Although the above problems are closely related to the awareness of general public with respect to the importance of sewerage and sanitation management, compliance with sanitation regulations also relies on strict enforcements by the relevant agencies, particularly LGUs.

6.4 Recommendations

Considering the fundamental issues identified in the above section, **Figure 6.4.1** below presents the recommendations to address each issue. These recommendations are further elaborated in the following sub-sections:

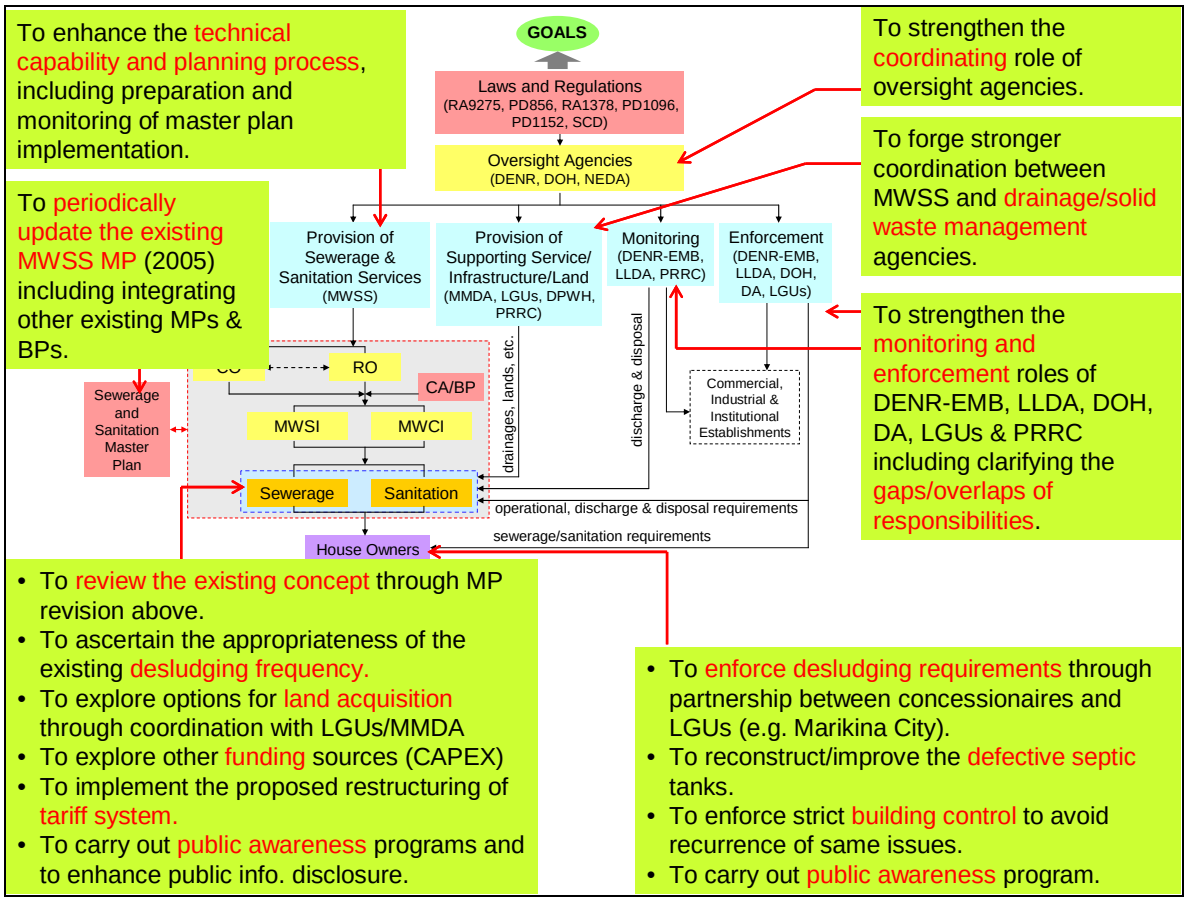


Figure 6.4.1: Fundamental recommendations

6.4.1 Oversight Agencies

It is deemed necessary to further enhance the coordinating role of DENR, DOH and NEDA. With respect to the Supreme Court Decision concerning the directive to improve the water quality of the Manila Bay from the present Class SC to Class SB, it is deemed necessary to undertake a comprehensive pollution load analysis for the Manila Bay basin then set pollution load reduction target for each responsible agency to achieve within a specific timeframe.

6.4.2 Provision of Sewerage and Sanitation Services

As mentioned, in order to help MWSS to lead the concessionaires in the provision of sewerage and sanitation services, the existing sewerage and sanitation master plan should be updated periodically so as to serve as a useful guide for MWSS, particularly during rate rebasing negotiation exercises. In this regard, subject to detailed investigation, it may be necessary to further enhance the technical capability of MWSS' staff in the rate rebasing negotiation as well as the periodic review and updating of its master plan.

6.4.3 Sewerage and Sanitation Master Plan

The individual master and business plans of MWCI and MWSI have superseded the current MWSS Master Plan (2005). Hence, it is deemed that the existing MWSS Master Plan (2005) should be updated periodically to reflect the new business plans prepared by both concessionaires and to take into consideration the changes of external factors such as the recent Supreme Court Decision. With respect to the proposed extension of concession period, it is recommended that the existing master plan should be updated to cover up to 2037 so that it can be served as a basis for negotiation with the concessionaires.

6.4.4 Sewerage and Sanitation Management by Concessionaires

In order to further improve the sewerage and sanitation services, it is recommended that the following aspects should be considered:

- Through update of master plan mentioned above, it is deemed necessary to reconfirm the comprehensiveness of the existing sewerage and sanitation management approach in Metro Manila. Among the aspects that should be considered include the appropriateness of the existing concept of combined system being adopted by both concessionaires as well as the capacity and maintenance of drainage systems.
- With respect to the problem of land availability, the concessionaire should coordinate with LGUs to explore options for land acquisition.
- In order to expedite the facility development, it is necessary to explore new funding mechanism and sources. As this is very closely related to the willingness-to-pay and structure of tariff system, it is necessary to explore mechanism to increase the level of willingness-to-pay of the general public. It is also important to enhance the awareness of general public concerning the importance of sewerage/sanitation service. And, new sources of funding, such as ODA, may be necessary to support the proposed accelerated facility development programs.

6.4.5 Provision of Supporting Services, Land and Infrastructure

It was mentioned above that the main issues with respect to the provision of supporting services, land and infrastructure are associated with the provision and maintenance of drainage systems. It is thus recommended that a coordination mechanism between the concessionaires and MMDA/LGUs be sought and worked out. This could be done through regular communications between the two organizations, joint master plans, information and database sharing and so on. Presently MWCI is undertaking a drainage improvement study for Taguig city, the study is deemed to be a good start in addressing this issue.

6.4.6 Monitoring and Enforcement

As mentioned above, the main issue is associated with the inadequacy in enforcement of sewerage and sanitation requirements such as the design and construction of septic tanks, desludging of septic tanks and connection to sewer lines. In this respect, it is necessary to strengthen the enforcement capability of relevant agencies. In doing this, firstly it is necessary to clarify the gaps and overlaps (if any) of the responsibility/jurisdiction among the agencies concerned, particular DENR-EMB, LLDA, DOH, DA and LGUs. After clarifying these gaps and overlaps, capability of these agencies in law enforcement should also be enhanced. Concerning this, as it may be related to financial, manpower and/or technical factors, detailed investigation on the scopes of technical development is necessary.

6.4.7 House owners

The issues at this level such as unwillingness to connect to sewer lines, unwillingness to desludge septic tanks as scheduled and defective septic tanks are closely related to the enforcement issues mentioned above. Hence, these issues can be solved gradually in line with the strengthening of enforcement capabilities of related agencies mentioned above.

On the other hand, some public in general in Metro Manila still lacks awareness concerning the importance of sewerage and sanitation service. It is thus recommended that more public awareness programs should be carried out concurrent with the strengthening of enforcement mentioned above.

6.5 Existing Programs/Projects and Remaining Issues to be Addressed

Section 6.3 (**Figure 6.3.1**) and Section 6.4 (**Figure 6.4.1**) above presented the overview of main issues and recommendations. It must be noted that presently there are several programs and projects being implemented by the GOP, MWSS, MWCI and MWSI, with or without foreign assistance. Among the notable projects is the MTSP by the World Bank. Besides, the on-going GEF-MTSP project is the major soft component project being implemented. It focuses mainly on the promotion of partnership among agencies involving in sewerage and sanitation sector in Metro Manila. The details are presented under Section 4.4.1 of this report. From DENR, it is understood that Components 1 to 4 and 6 (see Section 4.4.1 for details) are presently being bided out.

Hence, some of the issues identified in Sections 6.3 above have been or are being addressed (fully or partially) by several on-going and upcoming programs/projects. It is thus important to identify the existing programs/projects then determine the outstanding issues that need to be addressed or further improved. **Table 6.5.1** below summarizes the issues and recommendations presented under Sections 6.3 and 6.4 above, and compares with the existing/on-going programs/projects. Based on this comparison, remaining issues are identified and recommendations against the remaining issues are made.

Table 6.5.1: Identification of fundamental needs (1/2)

Subcomponent of sewerage and sanitation sector	Main issues	Ongoing/upcoming programs/projects		Remaining issues to be address	Recommendation for (further) improvement	Key agency	Pre-conditions for future project implementation	Other Important remarks
		Agency	Project description					
Oversight agencies	There is room for further improvement in coordination among all related agencies toward achieving the higher goals of water quality improvements (environmental protection) and promotion of public health.	GEF/WB	Strengthening partnership among various agencies to improve institutional/administrative practices and to promote data sharing toward better water pollution control.	– Reevaluation upon completion of the existing project.	– Reevaluation upon completion of the existing project.	-	-	-
Provision of sewerage and sanitation services	MWSS needs to play a more active role as the lead agency in sewerage and sanitation management by guiding its concessionaires to achieve the higher goals of the sector, particularly during negotiation process of rate rebasing exercise.	GEF/WB	Training for MWSS for the preparation and negotiations of 2007/08 rate rebasing.	– Subject to detailed investigation, there could be room for further improvement.	– Subject to detailed investigation, a full-fledged technical cooperation project may be necessary to address any aspect(s) not covered by the said GEF-MTSP project (if any).	MWSS (RO & CO)	– It is necessary to involve both RO and CO of MWSS. – The proposed master plan updating exercise below should be implemented concurrently.	– It is necessary to closely coordinate with the GEF-MTSP project so as to avoid any duplication of work. – If the aforementioned technical cooperation project is to be implemented, it should be started as soon as possible before the upcoming rate rebasing exercise in 2012.
Sewerage and sanitation master plan	Necessity for periodic updating of the existing MWSS Master Plan.	-	-	– Necessity for periodic updating of the existing MWSS Master Plan.	– In line with the proposed extension of concession period, the master plan should cover up to 2037.	MWSS, MWCI, MWSI	– Full commitment from MWCI and MWSI as well as DENR-EMB, LLDA, DOH and LGUs is necessary in order to produce a master plan that is agreeable to all parties. – The update of master plan should be carried out as part of, or concurrent with, the above technical cooperation project so as to develop the technical capability of MWSS in periodically updating of its master plan and to ensure smooth implementation of its master plan.	– The master plan should be updated every five years before the rate rebasing exercise, so that it can be used by MWSS as the base for negotiation with concessionaires. – It should be updated to cover up to 2037. – The proposed Manila Fourth Sewerage Project (MFSP) may also require a new master plan, hence it is necessary to coordinate with the World Bank so as to avoid any duplication of work.
Sewerage and sanitation management	– High land acquisition cost for STP construction; – Objections of local communities on STP construction; – Difficulty to acquire sizable land as STP site.	-	-	– Need to explore land acquisition options.	– Close coordination with LGUs is necessary.	MWSS, MWCI, MWSI, LGUs	-	-
	Necessity of additional funding to expedite facility development.	WB MWCI, MWSI	MTSP and the upcoming MFSP that mainly provide funds for facility development/ rehabilitation. Internally funded facility development projects.	– Additional funding is necessary to further expedite the facility development.	– New sources of funding are urgently needed so as to further expedite the facility development in major pollution load areas.	MWSS, MWCI, MWSI	– Project feasibility studies should be done by the concessionaires. – If Japanese ODA is to be used, MWSS must confirm that all ownership of all facilities is under MWSS.	– As East Zone is being strongly supported by the World Bank, it is deemed that new funds should be focusing more on West Zone. – Close coordination with other international agencies, particularly the World Bank, is necessary. – Should focus on projects in major pollution load areas (see **Table 6.5.3**).
		GEF/WB	Developing and testing innovative financing arrangements to attract private sector investments.	– Subject to reevaluation upon completion of the existing project.				

Table 6.5.1: Identification of fundamental needs (2/2)

Subcomponent of sewerage and sanitation sector	Main issues	Ongoing/upcoming programs/projects		Remaining issues to be address	Recommendation for (further) improvement	Key agency	Pre-conditions for future project implementation	Other Important remarks
Sewerage and sanitation management	Investment cost recovery problem due to low willingness and affordability to pay for sewerage service.	MWCI/ MWSI	Restructure the tariff system to standardize sewerage/ sanitation charge for all households with water supply so as to avoid addition charge to sewered households (pending for MWSS approval).	– Affordability of lower income families and equitability issues should be carefully considered prior to implementation.	– Tariff system should be restructured gradually in line with sewerage development progress. – Strict legal requirement and enforcement on compulsory sewerage connection are necessary.	MWSS, MWCI, MWSI	– Affordability of lower income families and equitability issues should be carefully considered prior to implementation. – A thorough review of the sufficiency of legal provisions is necessary.	– The concept of Marikina's *Todo Sipsip* program should be referred to.
		USAID	Public awareness programs.	– Similar programs should be gradually expanded to cover all LGUs.				
Provision of supporting service, infrastructure and land	Enhancement of inter-agency coordination on drainage provision and maintenance.	MWCI	Taguig drainage improvement study.	– Subject to the outcome of the study.	– Enhancement of coordination between MWCI/MWSI and MMDA/LGUs with respect to drainage provision and maintenance.	MWSS, MWCI, MWSI, MMDA, LGUs	– Full commitment from all parties in terms of data sharing must be ensured.	-
Monitoring and enforcement	Needs for improvement in monitoring and enforcement by related agencies (e.g. DENR, LLDA, PRRC, DOH, DA, LGUs). There may be gaps and/or overlaps of responsibilities among them.	GEF/WB	Strengthening partnership among various agencies to improve institutional/administrative practices and to promote data sharing toward better water pollution control.	– Enforcement capabilities of DOH and LGUs, which are the main enforcement agencies in sewerage and sanitation sector, are not emphasized.	– It is necessary to strengthen the enforcement role of DOH and LGUs in sewerage and sanitation sector.	DOH, LGUs	– Manpower and financial commitments from both DOH and LGUs are essential.	– The concept of Marikina's *Todo Sipsip* program should be referred to. – A thorough review of the sufficiency of legal provisions is necessary. – It should be carried out as pilot project at selected LGU(s). Subject to its outcome, replication could be made at other LGUs at later stage.
		JICA	Strengthening the monitoring roles of DENR in water quality control.	– This project confined to DENR-EMB, while other agencies are not addressed.				
House owner	Design, construction & accessibility problems of existing septic tanks. Unwillingness of house owners to desludge their septic tank according to schedule.	Marikina LGU	*Todo Sipsip* program that makes compulsory for all households to desludge their septic tanks according to schedule and to improve their defective septic tanks.	– Similar programs should be implemented in other LGUs.	– Strengthening of enforcement by LGUs. The *Todo Sipsip* program should be referred to.	LGUs	– Involvement of Marikina LGU to share their experience in the *Todo Sipsip* program would be useful. – Manpower and financial commitment from relevant LGUs is essential.	– A thorough review of the sufficiency of legal provisions is necessary. – It should be carried out as pilot project at selected LGU(s). Subject to its outcome, replication could be made at other LGUs at later stage.
	Unwillingness to connect to sewerage system due to additional charge.	MWCI/ MWSI	Restructure the tariff system to standardize sewerage/ sanitation charge for all households with water supply so as to avoid addition charge to sewered households (pending for MWSS approval).	– Affordability of lower income families and equitability issues should be carefully considered prior to implementation.	– Strict legal requirement and enforcement on compulsory sewerage connection are necessary. – Tariff system should be restructured gradually. – Strengthening of enforcement capabilities of LGUs. The *Todo Sipsip* program should be referred to.	As above	As above	As above

From the above table, considering that some of the recommendations could be consolidated for proposal, the recommendations have been streamlined into the following list to highlight the fundamental needs of sewerage and sanitation sector in Metro Manila that urgently require foreign assistance, and **Table 6.5.2** presents their prioritization.

(a) To explore new sources of funding for facilities development, particularly for the major pollution load areas;
(b) To further enhance the technical capability of MWSS in preparation and monitoring of master plan (subjects to detailed investigation);
(c) To update the existing MWSS Master Plan (2005) by consolidating the existing master plans and business plans of both concessionaires, and to update it to cover up to 2037;
(d) To enhance the coordination between MWSS (MWCI/MWSI) and MMDA/LGUs in drainage provision and maintenance; and
(e) To strengthen the enforcement of DOH and LGUs with respect to sewerage and sanitation management.

Table 6.5.2: List of fundamental needs of sewerage and sanitation sector in Metro Manila and their prioritization

No.	Fundamental needs	Counterpart agencies	Existing projects	Is addition program/project necessary?	Prioritization
(a)	To provide funding for facility development				
	– Projects in major pollution load areas (see **Table 6.5.3**)	MWSS (MWCI/MWSI)	WB	Yes	**1**
	– Projects outside of the major pollution load areas			Yes	**3**
(b)	To enhance the technical capability of MWSS in preparation and monitoring of master plan	MWSS (RO & CO)	GEF/WB	Yes	**2***
(c)	To update the existing MWSS Master Plan (2005)	MWSS (MWCI/MWSI)	GEF/WB	Yes	
(d)	To strengthen enforcement in sewerage and sanitation sector	DOH, LGUs	GEF/WB, JICA	Yes	**4**
(e)	To promote partnership in drainage provision and maintenance	MWSS (MWCI/MWSI), MMDA	-	Yes	**5**

*It is recommended that (b) and (c) above should be carried out in one package or be carried out concurrently.

With respect to the (a) above, in view of the huge investment requirement for the entire Metro Manila and MWSS service area, it is deemed important to prioritize projects within the major pollution load areas as identified in this report, particularly at the North Manila Basin, South Manila Basin and San Juan Basin in West Zone, and Taguig Basin, Marikina-Antipolo Basin and San Juan Basin in East Zone (refer to Section 2.4.2).

Under Section 2.4.2 of this report, pollution load assessment has been undertaken for the entire MWSS service area and the aforementioned major pollution load areas have been identified. In the present Survey, pollution load assessment was carried out based on the concept of 'BOD load density' (which could reflect the concentration of BOD sources) rather than 'BOD load volume' (which reflects the total BOD load) that being used in the MWCI Master Plan (2004) and MWSS Master Plan (2005). Although different approach has been used in this Survey, findings are generally in line with previous studies and the identified major pollution load areas are also similar (see **Table 2.4.17**).

From the assessment, it is found that if all the projects in the major pollution load areas proposed by both concessionaires are implemented on schedule, it is possible to reduce over 200 tons/day of BOD load by 2025 (without project: 1,067.9 tons/day; with projects: 851.4 tons/day) (see **Table 4.5.1**). The lists of urgent projects are presented in **Table 4.5.2 and Table 4.5.3** of Chapter 4. **Table 6.5.3** below summarizes the major proposed projects (by the concessionaires) within the abovementioned major pollution load areas that require funding urgently.

Table 6.5.3: List of major proposed projects within major pollution load areas

Zone/Major Basin/Project Name		BOD pollution loading (tons-BOD/day)			Reduction potential (tons-BOD/ day)	%
		2010	Year 2025			
			without project	with project		
West Zone						
1	**South Manila Basin**	**68.6**	**74.2**	**71.30**		
	Central Manila MS Expansion (13 MLD)					
2	**North Manila Basin**	**100.5**	**109.9**	**74.3**		
	Filter				36	**32%**
3	**San Juan Basin**	**68.8**	**65.6**	**34.5**		
	San Juan Project (72 MLD)				28	**43%**
	South Combined System (6.5 MLD)				3	**4%**
	4 communal plant (1.6 MLD)				1	**1%**
4	**Tullahan Basin**	**66.8**	**66.1**	**21.7**		
	Dagat-dagatan (capacity for confirmation)				12	**19%**
	Tullahan River right (26 MLD)				6	**9%**
	Tullahan River left (39 MLD)				9	**13%**
	Tullahan River right (Valenzuela) (26 MLD)				6	**9%**
	Tullahan River right (Malabon) (26 MLD)				6	**9%**
	Navotas West (26 MLD)				6	**9%**
East Zone						
1	**San Juan Basin**	**61.1**	**47.4**	**27.1**		
	QC North				5.6	**12%**
	QC South and Central				14.7	**31%**
2	**Marikina-Antipolo Basin**	**146.5**	**187.6**	**140.3**		
	QC East				7.5	**4%**
	Pasig North and South				39.8	**21%**
3	**South Manila Basin**	**30.6**	**21.2**	**14.5**		
	Makati and West Taguig				6.7	**32%**
4	**Taguig Basin**	**50.9**	**53.1**	**37.3**		
	Pateros				15.8	**30%**

*The project names listed above are according to those contained in the concessionaires' business plans.
Note: Please refer to **Table 4.5.2** and **Table 4.5.3** for further details.

While implementing the abovementioned urgent projects within the major pollution load areas, it is deemed important to update the existing MWSS Master Plan (2005) so that long-term (up to 2037) plan can be formulated. After the long-term master plan is completed, further consideration should be taken on funding the projects outside the major pollution load areas, phase by phase, in line with the overall sewerage and sanitation strategies.

Besides the abovementioned hard components, it is also deemed that complementary soft component projects should be implemented i.e. strengthening of enforcement by DOH and LGUs, and promoting partnership between MWSS (MWCI/MWSI) and MMDA/LGUs in drainage provision and maintenance. Although in the table above, these two components are prioritized as numbers 4 and 5, it is recommended that, if possible, they should be carried out as soon as possible, concurrent with the implementation of hard component projects. Without these complementary soft component projects,

it is deemed that hard component projects would not be able to fully achieve their anticipated results.

6.6 Conclusion

Metro Manila has a long history of sewerage and sanitation services. The first recorded effort was from the Spanish Law on Waters in 1871 and the first sewerage system was constructed in 1904, which covered an area of about 1,800 hectares. The first comprehensive sewerage master plan was prepared in 1969, which entitled *Sewerage Master Plan for a Sewerage System for the Manila Metropolitan Area*, prepared by Black and Veatch. Unfortunately, this master plan has never been implemented, then it eventually superseded by another master plan prepared in 1979. The latest comprehensive sewerage and sanitation master plan with full coverage of the whole Metro Manila is the *Sewerage and Sanitation Master Plan* (2005).

MWSS, a Philippine government owned and controlled corporation, was established in 1971. It is responsible for the provision of water supply, sewerage and sanitation services in Metro Manila. In line with the rapid growth of the metropolis and the needs for expansion and improvement of water, sewerage and sanitation services, in 1997, MWSS signed 25-year concession contracts with MWCI and MWSI to handover the operation of water supply and sewerage/sanitation services.

Since the privatization of sewerage service in 1997, steady improvements have been evidenced in sewerage and sanitation sector in Metro Manila. This is particularly prominent at the East Zone, whereby sewerage and sanitation coverage has reached 8% and 19% respectively in 2007 (2% and 1% respectively in 2001). On the other hand, at the West Zone, the provision of sewerage and sanitation services has reached 10% and 36% respectively in 2007 (16%[63] and 4% respectively in 2001).

Although the above achievements can be attributed mainly to the continuous efforts and commitments from the GOP in improving sewerage and sanitation conditions of Metro Manila, it is worth mentioning the assistance provided by various international agencies, particularly the World Bank and ADB that have made very significant contributions to the sewerage and sanitation sector in Metro Manila through the financing of METROSS I, MSSP and MTSP projects. Besides, USAID, GTZ and JICA have also made indispensable contributions to various projects directly or indirectly related to sewerage and sanitation improvement in Metro Manila.

Two extremely important milestones in term of legal reform in sewerage and sanitation sector in the Philippines are the enactment of CWA in 2004 and the Supreme Court Decision in December 2008 concerning clean-up, rehabilitation and preservation of the Manila Bay. The aforementioned two developments are the most recent catalysts to the efforts in sewerage and sanitation improvements in Metro Manila. The Supreme Court Decision to improve the present Class SC water quality of the Manila Bay to Class SB has further boosted the joint effort from various agencies to prevent, reduce and control pollution loads to the Manila Bay, and one of the main sectors of concern is the improvement of sewerage and sanitation conditions in Metro Manila and its surrounding regions.

The pollution of the Manila Bay and its contributing river systems has reached a worrying level. To some extent, it is threatening the health of some 15 million people in Metro Manila and the MWSS service area. This issue has drawn serious attention from the GOP as well as the public in general. This is best demonstrated by the landmark lawsuit and Supreme Court Decision mentioned above. As mentioned in Chapter 2, the present pollution load from MWSS service area that discharging into the Manila Bay is estimated to be about 900 tons/day. If the sewerage and sanitation services are maintained as per status quo, by 2025, the pollution load is possible to increase up to over 1,070 tons/day. However, if all proposed sewerage and sanitation projects by the concessionaires are implemented on schedule, it is possible to cut down the pollution load to about 600 tons/day by 2025.

[63] Please refer to Section 5.2 for the reason of dropping in sewerage coverage.

On a whole, although significant achievements in sewerage and sanitation improvement in Metro Manila have been accomplished in the last decade, there is still room for further improvement in the sector. This is particularly true when the targets of achieving 100% sewerage coverage in Metro Manila and the Supreme Court Decision to improve the water quality of the Manila Bay to Class SB level are considered. It can thus be concluded that on top of the existing programs and projects being undertaken by GOP as well as the international agencies to improve the sewerage and sanitation sectors in Metro Manila, more programs and projects should be introduced not only to expedite the facility development (hard components) but soft components projects like enhancing technical capabilities of various agencies are also required.

In Section 6.5 of this report, major issues of sewerage and sanitation sector in Metro Manila have been identified, and recommendations have been made against them. However, it must be highlighted that this Survey is only a very preliminary study to identify the issues and needs of the sewerage and sanitation sector in Metro Manila. The recommendations in this report shall serve as a guide for consideration for further implementation of any sewerage and sanitation projects in Metro Manila either by the local agencies or through assistance from international agencies. Prior to project implementation, it is important that further study should be conducted for confirmation of detailed technical requirements.