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Operations Manual on the Rules and Regulations Governing Domestic Sludge and Septage



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**Department of Health
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TABLE OF CONTENTS

List of Annexes	v
List of Acronyms	vi
Definition of Terms.....	vii
1.0 INTRODUCTION	1
1.1 How to Use this Manual	2
1.2 Legal Basis	2
1.3 What is Septage Management?.....	2
1.4 The Role of Septic Tanks.....	3
1.5 Regulating Building and Construction of Septic Tanks	4
2.0 ROLES AND RESPONSIBILITIES	6
2.1 Service Providers	6
2.2 LGUs	6
2.3 Household/Building Owners.....	7
2.4 CHD Regional Offices	7
2.5 EMB Regional Offices	7
2.6 DA Regional Offices.....	8
3.0 ENVIRONMENTAL SANITATION CLEARANCE	9
3.1 General Guidelines	9
3.2 Mobile Service Providers	9
3.3 Stationary Service Providers.....	10
4.0 COLLECTION AND TRANSPORTATION	12
4.1 Collection	12
4.2 Transportation of Sludge and Septage	12
4.3 Vehicle and Tank Maintenance.....	12
4.4 Accidental Spillage.....	13
5.0 TREATMENT AND DISPOSAL	14
5.1 General Provisions.....	14
5.2 Requirements for Treatment Facilities	14
5.3 Sludge and Septage Treatment Systems	14
5.4 Sludge and Septage Treatment Processes	15
5.5 Disposal of Treated Sludge and Septage	17
5.5.1 Disposal of Treated Domestic Sludge in Sanitary Landfills.....	17
5.5.2 Requirements for Land Application	18
6.0 MANIFEST SYSTEM.....	21
7.0 RECORDING AND REPORTING	22
8.0 TRAINING OF SERVICE PROVIDERS AND PERSONNEL	23

LIST OF ANNEXES

Annex A: Sample Septic Tank Permit Application Form	25
Annex B: Environmental Sanitation Clearance from DOH-CHD	26
Annex C: Sample Septage Ordinance – Dumaguete City	27
Annex D: Flow Chart for Securing Environmental Sanitation Clearance	38
Annex E: Environmental Sanitation Clearance Application Form	39
Annex F: Manifest Form.....	42
Annex G: Sample of Accidental Spillage Notification Form	43

LIST OF ACRONYMS

AITECH	-	Accreditation for Innovative Technology
CHD	-	Center for Health Development (Department of Health)
DA	-	Department of Agriculture
DENR	-	Department of Environment and Natural Resources
DOH	-	Department of Health
DOST	-	Department of Science and Technology
ECC	-	Environmental Compliance Certificate
EMB	-	Environmental Management Bureau (DENR)
ESC	-	Environmental Sanitation Clearance
FPA	-	Fertilizer and Pesticide Authority
IRR	-	Implementing Rules and Regulations
LGU	-	Local Government Unit
LLDA	-	Laguna Lake Development Authority
LTO	-	Land Transportation Office
NSSMP	-	National Sewerage and Septage Management Program
PD	-	Presidential Decree
RA	-	Republic Act
USAID	-	United States Agency for International Development
USEPA	-	United States Environmental Protection Agency
WDP	-	Wastewater Discharge Permit
WHO	-	World Health Organization

DEFINITION OF TERMS

Baffle – a wall or screen used to deflect, check, or regulate the flow of sewage and septage. It promotes preliminary and primary treatment of the incoming sewage by allowing the physical separation of solid and liquid components in the sewage.

Biosolids – the byproduct of the treatment of domestic wastewater in a domestic wastewater treatment plant. Biosolids consist primarily of dead microbes and other organic matter and can be used as organic fertilizer or soil amendments. Untreated septage or treated sludge with high concentrations of pathogens, metals, or other pollutants are not considered biosolids and should not be applied to soils.

Desludging – the process of cleaning or removing the accumulated sludge or septage from a septic tank or wastewater treatment facility.

Destination – the place or the facility where the septage/sludge is treated or disposed of, such as the treatment facility, sanitary landfill, or land application site.

Digestion – a microbiological process that converts chemically complex organic sludge to methane, carbon dioxide, and inoffensive humus-like material.

Domestic Sewage – wastewater composed of untreated human waste coming from residential and commercial sources. Domestic sewage does not include industrial and/or hazardous wastes.

Effluent – a general term for any wastewater, partially or completely treated, or in its natural state, flowing out of a drainage canal, septic tank, building, manufacturing plant, industrial plant, and treatment plant, etc.

Environmental Sanitation Clearance (ESC) – the clearance issued by the Secretary of Health, or the duly authorized representative, allowing the collection, handling, transport, treatment, and disposal of domestic sludge or septage.

Excreta – human waste composed of urine and feces.

Helminthes – parasitic worm-like organisms that live and feed off living hosts and produce eggs that persist in wastewater effluent and septage sludge unless properly treated.

Mobile Service Provider – a public or private entity, operator or water utility that provides desludging services and transports the septage to treatment and disposal facilities.

Pollution Control Officer (PCO) – an officer of a private company that provides linkages between the company and the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR) and/or Laguna Lake Development Authority (LLDA). This officer possesses the qualifications of a PCO and is duly accredited by DENR or LLDA.

Project Description – a section of the ESC that contains information on the operational process, environmental sanitation measures, and site. It should provide sufficient details for the regulatory agency to review.

Project Proponent – the service provider applying for the ESC.

Scum – the lighter fraction of sewage composed of fats, oils, and grease that floats.

Seepage Pit – a hole in the ground that receives the effluent from a septic tank and is designed to permit the effluent to seep through the pit bottom and sides. It may either be lined with bricks or filled with gravel.

Septage – the combination of scum, sludge, and liquid that accumulates in septic tanks.

Septic Tank – a watertight, multichambered receptacle that receives sewage from houses or other buildings and is designed to separate and store the solids and partially digest the organic matter in the sewage.

Service Provider – a public or private entity, operator or water utility that is engaged in the collection, desludging, handling, transporting, treating, and disposing of sludge and septage from septic tanks, cesspools, Imhoff tanks, portalets, sewage treatment plants.

Sewage – mainly liquid waste containing some solids produced by humans, which typically consists of washing water, feces, urine, laundry wastes, and other material that flows down drains and toilets from households and other buildings.

Sewer – a pipe or conduit for carrying sewage and wastewater.

Sewerage – a system of sewers that conveys wastewater to a treatment plant or disposal point. It includes all infrastructure for collecting, transporting, and pumping sewage.

Sludge – precipitated solid matter with a highly mineralized content produced by domestic wastewater treatment processes.

Stabilization – the process of treating septage or sludge to reduce pathogen densities and vector attraction to produce an organic material that may be applied to the land as a soils conditioner.

Stationary Service Provider – a public or private entity, operator or water utility that provides treatment and/or disposal of sludge and septage at a fixed location.

1.0 INTRODUCTION

Protecting water resources from pollution and people from water contamination are two of the most pressing challenges facing the Philippines today. The direct relationship between diseases, such as diarrhea, cholera, hepatitis and dysentery, and untreated household sewage, is well documented.¹ At least 31 Filipinos die every day from diarrhea alone,² and many more miss work and school or are hospitalized due to poor sanitation. The World Bank estimates that the economic losses associated with these health impacts, plus losses from the fisheries, tourism, agriculture, commercial, and industrial sectors, exceed PhP78 billion per year.³

The prevalence of waterborne diseases and pollution in water bodies, however, can be significantly reduced if comprehensive programs are implemented to regularly desludge septic tanks, and properly treat and dispose or reuse the septage. Capable national and local governments need to effectively regulate and implement septage management programs.

The Philippine Department of Health is responsible for prescribing the regulations governing septage management programs in the country. This manual gives detailed procedures and forms needed to fully comply with the Implementing Rules and Regulations (IRR) Governing the Collection, Handling, Transport, Treatment and Disposal of Domestic Sludge and Septage, which was issued in May 2004. This IRR is a supplement to the IRR of Chapter XVII "Sewage Collection and Disposal, Excreta Disposal and Drainage" of the Code on Sanitation of the Philippines (Presidential Decree or PD 856) issued in November 1995.

Septage is the material inside septic tanks. It includes the liquid; solids (heavier solids that accumulate at the bottom of the tank); and fats, oils, and grease (scum) that accumulate in septic tanks over time. When properly designed, installed, and operated, the septic tank is a simple, effective device that serves as the first step in the sewage treatment process. However, the septic tank must be properly designed and emptied regularly, and the septage must be treated to kill pathogens and then reused or disposed of properly. Secondary treatment of the liquid effluent coming out of the septic tank is also crucial in combating waterborne diseases and pollution.

Sludge, on the other hand, is generated by domestic sewage treatment plants. Unlike septage, which is specific to the contents of septic tanks, sludge is a broadly defined term that may include sand and grit from preliminary treatment operations, accumulated solids from Imhoff tanks for digesters; waste sludge from activated sludge; or other aerated treatment processes, and others.

Depending on the source, sludge may contain high levels of heavy metals or other contaminants that may make it unsuitable for land application, even when treated. For these reasons, and to protect public health, stringent testing for heavy metals and other pollutants are discussed in this manual as minimum requirements for demonstrating that treated sludge is suitable for land application.

¹ World Bank. 2003. Philippines Environmental Monitor. Manila: World Bank.

² National Epidemiology Center. 2005. Field Health Service Information System Annual Report. Manila: NEC.

³ Rodriguez U.E., Jamora N., Hutton G. 2007. "Evaluation of the Economic Impacts of Sanitation in the Philippines." Manila: World Bank Water and Sanitation Program.

1.1 How to Use this Manual

This operations manual is for local government units (LGUs), desludging companies, septage treatment plant operators, or any other entity responsible for performing sludge or septage management activities such as:

- Desludging – pumping out or siphoning septage from septic tanks and transporting it to treatment facilities;
- Treatment system and disposal facilities – managing and operating treatment facilities and disposing of sludge and septage; and
- Land applications – using treated septage for agricultural purposes or as a soil amendment.

This manual is also designed to guide private and public service providers and government regulators through the regulatory requirements for effective sludge and septage management programs in the Philippines. In particular, it provides step-by-step guidance for preparing and submitting applications for required permits and clearances.

1.2 Legal Basis

Several Philippine laws provide the legal basis for septage management programs, including:

- Philippine Clean Water Act of 2004 (Republic Act (RA) 9275 - Sec.7.1.2, 7.2., 8)
- Code on Sanitation of the Philippines (PD 856 - Chapter XVII)
- Local Government Code of the Philippines (RA 7160 - Environmental Services Section)
- Water District Law (PD 198)

The Clean Water Act of 2004, for example, requires water utilities to provide sewerage or septage management services within five years of the law's passage. In the absence of a water utility, the LGU must provide these services, either on their own or through a service contract. In some instances, private entities may provide these services in the absence of LGU action, or in parallel with an LGU or a water utility. Since sewerage services are very limited and expensive to construct and operate, septage management is a practical first step for most utilities and LGUs.

Aside from the laws cited, the National Building Code of the Philippines (RA 6541) and the Revised National Plumbing Code of the Philippines also have provisions addressing proper design and operation of septic tanks and their maintenance. In all cases, municipalities, regulatory officials and service providers shall apply the most restrictive language in any law, rule, or regulation when interpreting the legal requirements for sludge and septage management. For the specific acts or codes, the latest version applies.

1.3 What is Septage Management?

Septage management refers to comprehensive programs for managing septic tanks and the procedures for desludging, transporting, treating, and disposing of septic tank contents. Improper handling of septage may lead to environmental damage and severe public health impacts. To function properly, septic tanks must be cleaned or desludged before the solids occupy half of the tank's volume.

A comprehensive septage management program includes the following elements:

- Septic tank design and construction - Regulatory oversight for the design, installation, and use of septic tanks;
- Septic tank inspection and desludging - Requirements for periodic inspection and desludging of septic tanks;
- Procedures for septic tank desludging and septage transportation - Rules for transporting septage once it is removed from the tank;
- Record keeping and reporting – Tracking mechanisms, such as use of manifests and self-monitoring reports; and
- Septage treatment and disposal - Rules that prescribe the septage treatment and disposal requirements.

1.4 The Role of Septic Tanks

It is estimated that more than 80% of households in the Philippines use septic tanks as their only form of sewage treatment. Many existing septic tanks, unfortunately, do not comply with the standards set by the Revised National Plumbing Code of the Philippines. The Code specifies that all tanks must be water-tight (no leaching compartments); be appropriately sized; located at least 25 meters from any well; and contain access ports for desludging. The reality, however, is that many tanks are too small; have open bottoms; are located underneath buildings; or do not have proper access ports. Some are not tanks at all but seepage pits or cesspools that contaminate groundwater with fecal bacteria. Due to the difficulty of renovating existing tanks, new regulations for septic tank construction should focus on permits for new septic tanks. Pre-fabricated septic tanks are required to be accredited by the AITECH (Accreditation for Innovative Technology) under the National Housing Authority, Department of Science and Technology (DOST), or Department of Health (DOH).

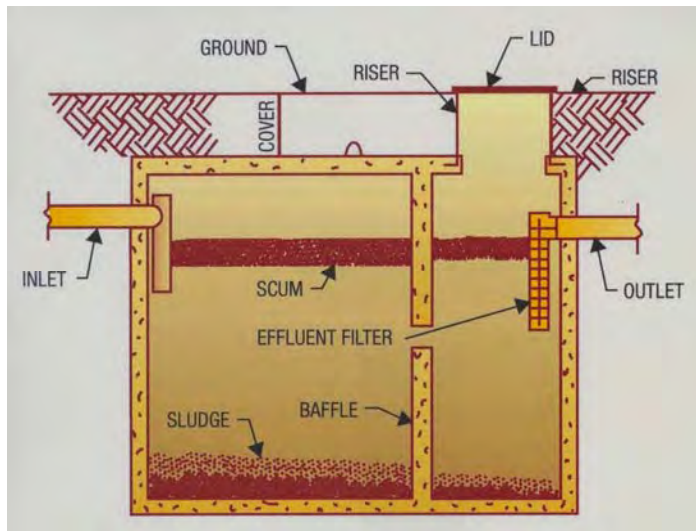
Proper septic tank
in the figure
the following:

Typical septic tank with access port inlet and outlets, and baffle separating two compartments

design, as shown
below, requires

- The septic tank is **sized** properly with appropriate detention time and volume;
- There are proper **inlet and outlet** structures;
- There is at least one **baffle** separating the tank into multiple compartments;
- It is **water tight**; and
- There is an **access port** for each compartment that allows for inspection and pumping.

The Revised National Plumbing Code of the Philippines provides detailed sizing requirements for septic tanks.



Typical septic tank with access port inlet and outlets, and baffle separating two compartments

1.5 Regulating Building and Construction of Septic Tanks

Based on the existing sanitation code, septic tanks can only be expected to perform properly when they are designed, constructed, and operated in accordance with standard practices. While the homeowner has the ultimate responsibility to ensure the septic tank functions properly, the LGU, building and health inspectors, and contractors also share this responsibility. LGUs with effective programs for issuing septic tank and building permits, and well-trained staff that perform plan review and construction inspections have greater compliance than those without these programs.

Septic Permits

LGUs can improve compliance if they require septic permits for all new septic tank construction, or where a change of use (for commercial properties) or a substantial remodeling or repair is proposed. A septic permit application should include:

- Information about the owner and the facility, including site address, mailing address, and contact phone number;
- Site plan drawn to scale showing the property lines, slopes, buildings, side walks and driveways, cut banks, water lines and other utilities, and any other feature of the property that might impact on the installation of the septic tank;
- Drawing of the septic tank showing materials of construction, baffles, inlet and outlet structure, cleanouts, and access ports;
- Schedule of proposed construction; and
- Contractor name and certification.

See Annex A for a Sample Septic Tank Permit Application Form.

Role of the Local Health and Building Departments

Local health authorities typically review and issue septic permit applications. The review stage includes an evaluation of the plans and application forms for compliance with local programs and national laws. A site visit is also conducted to verify that the drawings submitted match the field conditions. The permit is issued once local health authorities deem the plans to be acceptable and the health inspector has verified that the septic tank can be installed in accordance with the drawings and site conditions.

Inspecting the construction site is the next important step in the process. LGUs conduct septic tank construction inspections in three general ways:

- Inspections by Health Inspectors – It is the health inspector that usually issues permits and then performs construction inspections to verify permit conformance. Health inspectors receive specialized training to deal with issues relating to wastewater treatment and disposal. This is especially important where septic permits include infrastructure for advanced treatment or effluent disposal, such as soils-based leaching systems. These facilities may be more sophisticated than a simple septic tank where the specialized training of the health inspector may be better utilized.
- Inspections by Building Officials - Often, it is up to the building official to perform the construction inspection. Since the building inspector is monitoring construction of the building anyway, with a little more training on septic tank construction, that official can verify that construction of the system is in accordance with the issued septic permit. Having the building official responsible for septic tank construction inspections saves additional trips to the site and may provide further economic benefit to the LGU.
- Inspections by the Private Sector – LGUs may wish to allow private sector inspections or inspections done by accredited service providers. To be effective, such programs incorporate “service provider approval” mechanisms, such as certifications, licenses, or other authorizations from the LGU that authorize a person or company to perform construction inspections. The LGU can also organize a licensure or review board to review complaint cases or sanction service providers for poor performance. Such programs minimize LGUs expenditures and helps build local capacity.

Fees and Fines

LGUs may wish to consider adopting a fee structure to support septic system permit and inspection programs. Fees should be set to cover the costs associated with administering and implementing the program. Graduated fines and sanctions for non-compliance should also be considered.

2.0 ROLES AND RESPONSIBILITIES

This section discusses the roles and responsibilities of service providers, LGUs, household and building owners, DOH Center for Health Development (CHD) Regional Offices, EMB Regional Offices, and DA Regional Offices, all of which are responsible in some way for performing sludge or septage management activities.

2.1 Service Providers

- Apply for an ESC from the Center for Health Development (CHD) Regional Office for the operation of the business. The service provider first submits the application form (see Annex E) to the LGU. The LGU will determine if the application is complete and meets all local requirements. If these conditions are met, the LGU will forward the ESC application and documentary requirements to the CHD for processing.
- Comply with national and local government regulatory and permitting requirements relevant to the operation of the business;
- Submit quarterly environmental reports to each LGU within their approved area of operation for monitoring purposes (*Quarterly self-monitoring report forms will be provided by CHD upon issuance of the ESC*).
- In the case of agents or sub-contractors, submit an authenticated copy of the ESC issued to the principal operator and copy of the Memorandum of Agreement between the principal and the agent/representatives authorizing the latter to transact on their behalf.
- All service providers for treatment and disposal facilities shall have a full-time pollution control officer (PCO) duly accredited by the Environmental Management Bureau (EMB) of Department of Environment and Natural Resources (DENR) or Laguna Lake Development Authority (LLDA), who shall be responsible for all operations and submission of required reports.
- Service providers should coordinate with the barangay and LGU for scheduling of desludging activities.

2.2 LGUs

The LGU should develop a septage management plan with supporting ordinances to promote regular desludging within the covered area, thereby ensuring the protection of the environment and citizens' health. The plan should comply with the National Sewerage and Sanitation Management Program (NSSMP) framework (see Annex C – Septage Ordinance for Dumaguete City).

In some instances, the LGU is the service provider. Under such situations, quarterly reports shall be submitted to EMB (see Section 9.0 on reporting requirements). As with other service providers, LGUs shall submit applications for discharge permits directly to EMB.

For ESC Application and Evaluation

- Receives and evaluates notarized applications for ESCs and the supporting documents from service providers;
- Conducts project site inspections; and
- Upon compliance with all the required documents, endorses the ESCs to CHD.

For Sanitary Permit Issuance and Evaluation

- Issues sanitary permits to service providers upon compliance with environmental sanitation requirements, including presentation of a valid ESC and a copy of the contract with a treatment facility and disposal site for mobile service providers;
- Monitors facility operations and assesses/evaluates compliance with sanitation requirements on a quarterly basis or as the need arises;
- Revokes Sanitary Permits for violations of environmental sanitation requirements, and recommends to CHD the revocation of the ESCs; and
- Evaluates the quarterly environmental reports submitted by service providers.

For Collection and Transport

- The barangay captain or his/her representative should assist the service providers in maintaining orderly conduct of traffic during the collection and transport of sludge and septage within the jurisdiction. The captain or representative shall also sign the manifest form to certify that collection was completed in his/her area of jurisdiction.

2.3 Household/Building Owners

- Ensure that new or previously constructed septic tanks comply with the provisions of the Revised National Plumbing Code of the Philippines;
- Provide access ports for inspecting and desludging. One port per compartment is required, with a minimum size of at least 0.5 m x 0.5 m; and
- Ensure the septic tank is desludged before the solids exceed 50% of the tank volume, or is desludged every three to five years, whichever comes first.

2.4 CHD Regional Offices

- Receives and reviews notarized applications for ESCs, inspection reports, and recommendations and findings of the LGU concerned;
- Conducts site evaluations in coordination with the concerned provincial health office;
- Issues ESCs to project proponents following compliance with all the required documents;
- Suspends or revokes ESCs following violation of any provisions of the rules and regulations; and
- Provides technical assistance and facilitates training for personnel of service providers and LGUs.

2.5 EMB Regional Offices

- Reviews applications for and issues Environmental Compliance Certificates (ECCs), including Wastewater Discharge Permits (WDPs). The ECCs and WDPs are required for septage treatment and disposal facilities. Applications are technical in nature and full descriptions of the proposed treatment and disposal infrastructure are required.

- Regulates sludge disposal of septage treatment and disposal facilities, in coordination with relevant agencies such as DA for land application. In areas where LLDA has jurisdiction, LLDA shall perform the above-mentioned roles.

2.6 DA Regional Offices

- Regulate use of treated sludge for land application.

3.0 ENVIRONMENTAL SANITATION CLEARANCE

3.1 General Guidelines

Prior to the implementation of septage management programs, the project proponent or service provider must secure an Environmental Sanitation Clearance (ESC) from the Center for Health Development (CHD) of the Department of Health (see Annex B: Environmental Sanitation Clearance from CHD). This requirement applies to all new septage management activities, expansion, or modification of permitted facilities, and those existing activities that have not secured ESCs.

First step: The LGU initially evaluates all ESC applications - checking for completeness and returning them to applicants if deficiencies are found (see Annex D: Flow Chart for Securing an Environmental Sanitation Clearance). If the application is complete, the LGU will receive, evaluate, and transmit it to the CHD within fifteen (15) working days. Even if the LGU recommends disapproval of the project, the application will still be forwarded to the CHD for final decision.

Second step: The CHD evaluates and decides to approve or disapprove ESC applications within 30 working days. If the CHD disapproves the project, the project proponent will have an opportunity to correct the deficiencies and re-submit the ESC application to the LGU.

For treatment and disposal facilities, the project proponent/service provider must secure an Environmental Compliance Certificate (ECC) from the EMB Regional Office or LLDA. In operating treatment and disposal facilities, the operator must secure a Wastewater Discharge Permit (WDP) from the EMB Regional Office.

3.2 Mobile Service Providers

This section outlines the requirements for an ESC application for a service provider that provides desludging services and transports the septage to treatment and disposal facilities. As part of an ESC application, the applicant must complete all sections and notarize the form (see Annex E: Environmental Sanitation Clearance Application Form).

Project Description

When providing the project description, the applicant should include the following information:

- Proponent information and contact details
- Scope of activities
- Area covered
- Method of collection
- Type of vehicles and equipment
- Occupational and health safety measures
- Staffing plan
- Mitigating/control measures

Detailed Maps

- Service area indicating residential, commercial, industrial, and agricultural lands with major routes for septage hauling indicated
- Location of proposed septage treatment and disposal sites

Others

- Target market of septage pumping activities, including planned volume per month
- Make and model of septage pumping trucks
- Staffing plan indicating number of employees, job descriptions, and organizational chart
- Business plan indicating anticipated costs of providing services and expected revenues from grants, loans, and tariffs

3.3 Stationary Service Providers

This section outlines the requirements for an ESC application for a service provider that provides treatment and/or disposal of sludge and septage at a fixed location. As part of an ESC application, the applicant must complete all sections and notarize the form (see Annex E: Environmental Sanitation Clearance Application Form).

Project Description

When providing the project description, the applicant should include the following information:

- Basic project information
- Site information (including neighboring parcels with land ownership information and information on wells and drinking water intakes)
- Project rationale/objective
- Project type and area covered
- Operational processes
- Plans and specifications (including site plan for septage treatment facilities including all treatment and disposal components)
- Project component
- Description of existing environment
 - Topography
 - Hydrology (including information on surface waters like streams, lakes, coastal water resources)
 - Geological condition
- Environmental sanitation measures
- Environmental and health impacts
- Mitigating/control measures
- Occupational and health safety measures
- Monitoring and evaluation plan

Others

- Design report and detailed plans and specifications for domestic sludge and septage treatment and disposal facilities that are signed and sealed by a licensed civil or sanitary engineer
- Target market of septage pumping activities, including planned volume per month;
- Staffing plan indicating number of employees, job descriptions, and organizational chart
- Business plan indicating anticipated costs of providing services and expected revenues from grants, loans, and tariffs

4.0 COLLECTION AND TRANSPORTATION

4.1 Collection

Collection should be done in coordination with the Barangay Captain or his/her duly authorized representative who shall sign the manifest form (see Annex F: Manifest Form). The use of the Manifest Form is further discussed in Section 8 of this manual.

Preferably, collection should be done when traffic is light in the area. All collection vehicles should have traffic cones or an early warning device. Traffic cones should be placed behind and in front of the vehicle during operation. It is the responsibility of the collection operator to check the safety equipment daily before proceeding to a collection site. Any safety equipment deficiencies should be reported to the supervisor.

After the desludging operation, the operator should clean and disinfect any spills with a bleach solution or by spreading lime on the spillage. It is the collection operator's responsibility to verify that sufficient disinfectant (bleach or lime) is on the truck before it goes to a collection site. .

Desludging workers must wear appropriate personal protective equipment, including rubber gloves, rubber boots, a face mask, and eye protection. After pumping, operators must wash their hands with soap.

Only operators with a valid ESC and sanitary permit are authorized to collect and transport domestic sludge and septage. Only drivers with Land Transportation Office (LTO) License Restriction Code #3 can operate the desludging tanker/truck.

4.2 Transportation of Sludge and Septage

The driver and service providers are responsible for safe operation of the vehicle and equipment at all times. Traffic rules must be followed at all times. All accidents and citations shall be reviewed and investigated by management to ensure adequately trained and competent drivers are employed for sludge and septage transportation. Additional requirements are:

- Drivers inspect all trucks prior to transport on public roads to ensure that septage will not leak, spill, or run out of the tank;
- All vehicles used to transport septage shall be equipped, at all times, with spill control or absorbent materials and disinfectant materials, such as lime or chlorine bleach;
- No discharge of septage or sludge shall be allowed in manholes, drainage areas, canals, creeks, rivers or other receiving bodies of water or land; and
- Manifest forms must be properly filled out.

4.3 Vehicle and Tank Maintenance

Each septage transporter/hauler should display the company name, contact number, company logo, and body number of the septage hauler or transporting vehicle on both sides of the vehicle used to transport septage. The information should be marked using permanent and legible lettering at least 3 inches high and made of a reflective material.

All vehicles should display the names of all the cities and municipalities covered by their permits.

Any transporter/hauler with a valid permit should maintain all vehicles and tanks used to transport septage in accordance with the following requirements:

- The collection vehicle used for the transport of septage and domestic sludge should have a leak-proof body and lock to secure the sludge and septage, and should be able to withstand a collision with another vehicle or any permanent structure.
- The collection vehicle should be in good running condition in accordance with the LTO safety standards on roadworthiness.
- The collection vehicle and tank should be maintained to prevent excessive odors or public health hazards. To prevent these, the following needs to be done::
 - The collection tank must be watertight;
 - All piping, valves, and connections should be accessible for cleaning
 - All inlet and outlet connections should be constructed and maintained such that no material will leak, spill, or run out of the tank during transfer or transportation; and
 - Discharge outlets should be designed to control the flow of discharge without spraying or flooding the receiving area.
- The discharge pipe must protrude from the end of the tank at least 6 inches.
- The end of the discharge pipe must have a screwed-on end cap installed.
- A parking and dispatching area for collection vehicles.

4.4 Accidental Spillage

In the event of an accidental spillage of sludge/septage, the operator shall:

- Immediately take action to contain the sludge/septage, minimize the environmental impact, and begin clean-up procedures. To the extent possible, the operator should contain the spill by using a shovel to dig a containment trench or build berms, then disinfect by applying bleach solution or lime to the area. Then, with a rake, broom or shovel, the operator should pick up solids and dispose as solid waste.
- The operator must notify the LGU (where the accident occurred) within 24 hours, using the Accidental Spillage Notification Form (see Annex G: Sample of Accidental Spillage Notification Form).
- In the event that a private service provider fails to perform clean-up operations, the LGU should perform the clean-up and charge all related expenses incurred to the service provider.

5.0 TREATMENT AND DISPOSAL

5.1 General Provisions

All domestic sludge/septage shall be processed and treated before disposal. Septage facilities, including treatment and disposal facilities and septage truck yards, must maintain a hygienic and safe work environment. Facilities and equipment must be properly designed, installed, and maintained.

5.2 Requirements for Treatment Facilities

- Only those applicants with valid ESCs and sanitary permits are authorized to operate domestic sludge and septage processing and treatment facilities.
- These operators shall also obtain all other necessary permits as required by existing regulations.
- The designated Pollution Control Officer (PCO) of the service provider shall be responsible for the operation of the facility.
- Only sludge and septage with corresponding manifest forms shall be accepted by the facility.
- The treatment facility shall comply with existing standards and regulations of regulating agencies, including disposal of treated effluent to the receiving environment.
- Treatment facilities shall comply with hygienic and sanitation requirements as specified in Section 4.0.

The following are the minimum sanitation requirements for treatment facilities:

- Hand washing facility (1)
- Toilet (1)
- Bathroom (1)
- Drinking water fountain/dispenser (1)
- Utility sink (1)
- Ventilation and lighting
- Flooring and walls shall be made of impervious materials
- All plumbing fixtures must be in accordance with the National Plumbing Code (R.A. 1378)
- Soap and any approved hand-drying device/material
- There must be adequate and separate changing rooms for both male and female users with individual lockers for clothes and personal belongings. The changing room must be at least 1.9 sq.m/user.

5.3 Sludge and Septage Treatment Systems

There are a number of facility configurations for treating septage or sludge. They include, but are not limited to, the following systems:

Lagoon Systems

A lagoon system consists of several ponds that are lined with plastic sheets or clay. They can be designed so they require no energy or chemical inputs. However, they require large land areas. Odor and mosquitoes can be controlled through best management practices.

Electro-Mechanical Systems

These systems include activated sludge or other aerobic treatment processes. While these systems require high energy inputs, they require less space than other technologies.

Integrated Systems

These systems use a combination of technologies, both natural systems and mechanical, to treat wastewater. Natural systems include lagoons, constructed wetlands and bioreactors.

Waste-to-Energy Systems

These systems capture methane and other biogases and use bioreactors to create energy for use within the facility or neighboring homes or businesses. However, domestic waste may need to be mixed with higher strength waste such as from animals to make the process cost efficient.

5.4 Sludge and Septage Treatment Processes

Septage must be stabilized prior to disposal on the land surface. Stabilization refers to treatment processes that reduce the pathogens to levels safe for land application. According to guidelines released by the United States Environmental Protection Agency (USEPA), one of the following recommended methods should be used to treat sludge and septage before agricultural land application:

- Aerobic digestion between 40 days at 20 degrees Celsius and 60 days at 15 degrees Celsius.
- Anaerobic digestion between 15 days at 35 to 55 degrees Celsius and 60 days at 20 degrees Celsius.
- Air dry for at least three months. Two of the months must have average daily temperatures above freezing.
- Compost at temperatures greater than 40 degrees Celsius for five days. The temperature of all of the material being composted must be greater than 55 degrees Celsius for four hours during the five days.
- Lime stabilization to bring the pH higher than 12 for 30 minutes.

These methods have been found to reduce the number of helminth eggs to levels that are acceptable to the World Health Organization (WHO) for land application purposes for food crops.

- The WHO guideline is 1 nematode egg/liter of treated wastewater used for vegetable irrigation (WHO, 1989), and on an average application rate of 2–3 tons/ha/year.

Testing for nematode eggs is a relatively simple procedure to check if the septage or sludge has been treated to a level that is safe for disposal on agricultural land. This should become an integral component of any program that reuses the treated product as a soils amendment for agricultural purposes.

Treatment of domestic sludge and septage shall undergo best applicable and cost-effective processes, including, but not limited to, the treatment options described below:

Conditioning

Conditioning processes include addition of chemicals, thermal conditioning (heat treatment), elutriation, and freezing. These processes are used prior to dewatering to produce drier sludge, which is easier to dispose of. Some conditioning processes also disinfect the sludge, deodorize, physically alter the sludge, improve solids recovery, and reduce the solids content.

Dewatering

When treating septage or sludge, it is imperative to remove the liquid portion of the sludge. The reduction of the liquid in sludge will lessen sludge trucking costs. Moreover, liquid reduction is normally required prior to composting to reduce the amount of leachate. Leachate is produced at landfill sites where the sludge is disposed. The amount of water can be reduced from 20 to 40 percent depending on the process used and whether or not the sludge is conditioned. Simple natural processes to sophisticated mechanical processes can be used, including drying beds, lagoons, vacuum filters, pressure filters, belt filter presses, centrifuges, solar inclined beds, perched beds, and solar dryers. Reliability of the dewatering process is a key factor in choosing which process to use.

Biological Sludge Thickening

Generally, the first process in the sludge treatment is the thickening of the sludge. Waste activated sludge usually has solid concentrations near one percent and primary sludge concentrations near four percent. The primary purpose of thickening is to reduce the overall waste volume. By reducing the quantity of water in the sludge, capital and operating costs of subsequent processing units may be decreased. Thickening can also provide additional benefits, such as blending, sludge equalization, storage, grit removal, gas stripping, and clarification. Thickening is generally performed using one of these types of processes: gravitational, flotation, or centrifugal concentration.

Biosolids Disinfection

Wastewater sludge contains significant quantities of pathogenic organisms, including viruses, bacteria, parasites, and fungi. These pathogens come from human and animal wastes, biological laboratory wastes, industrial wastes, and food wastes. These pathogens must be removed before sludge can be applied to land as a fertilizer or soil conditioner. Disinfection is the deactivation or destruction of these pathogens. Sludge stabilization processes previously discussed can significantly reduce the number of pathogens in the sludge. Other processes that kill or reduce pathogen levels include: air drying, pasteurization, long-term storage, and high-energy radiation. Another method of disinfecting septage is to add 25 kg of hydrated lime (calcium hydroxide) to 4,000 liters of septage. Hydrated lime at this application ratio increases the pH to 12 and effectively disinfects septage when kept at this level for 30 minutes.

Thermal Processes

Thermal processes use heat to either remove the water from the sludge (e.g., heat drying) or reduce the sludge volume by both evaporation of water and the destruction of organic matter (e.g., incineration or starved air combustion (pyrolysis)). Temperatures range from

300-400° C for heat drying, which kills all the pathogens in the sludge. These processes require a great deal of energy to produce high temperatures, have high capital costs, and require extensive air pollution equipment.

Composting

Composting is the aerobic decomposition of the organic matter in the sludge to a relatively stable humus-like material similar to fertilizer. The compost derived from the process can supply some of the nutrients required for most soils and can help the soil retain moisture. The compost is musty in odor, brown in color, and relatively pathogen free. Techniques can be divided into three processes: (1) windrow composting; (2) aerated static pile composting; (3) and various mechanical composting. No matter which process is used, several basic principles apply. The sludge is dewatered, then a bulking agent comprised of wood chips, sawdust, or dried compost is added to bring the solids content of the mixture up to 40-50 percent. The mixture must be stable, porous, and capable of sustaining decomposition without added fuels.

Certain composting processes use temperatures ranging from 54 to 65° C to destroy pathogens and reduce the moisture content. The compost is stored for a lengthy period of time to further stabilize the compost. Additional air drying may be necessary if the compost is too wet. A separation process is necessary to recycle the bulking agent, if desired.

5.5 Disposal of Treated Sludge and Septage

Treated sludge and septage shall be disposed by landfilling (as per RA 9003), spread on land, or using other new technology options that may be accepted by DOH. The sludge may be applied to agricultural land, forestland, lahar areas, coconut, bamboo and rubber plantations, etc. as organic fertilizer and/or soil conditioner to facilitate nutrient transport and increase water retention. If applied to land where food crops will be grown, special precautions must be taken to prevent contamination. The amount of nitrogen, phosphorus, potassium, pathogens, essential trace elements and heavy metals shall be within the allowable/acceptable limits set by the DA Bureau of Soils and Water Management. In cases where the operator intends to sell its treated sludge, product registration shall be secured from DA.

5.5.1 Disposal of Treated Domestic Sludge in Sanitary Landfills

Sanitary landfills are often used for the disposal of treated septage or sludge. However, under no circumstances may untreated sludge or raw septage be placed in a sanitary landfill. All septage or sludge must be treated or stabilized prior to land filling.

Evaluation Criteria for Environmental Considerations

The following environmental considerations should be addressed when evaluating and developing a sanitary landfill:

- The base of the landfill should be located above the high groundwater table and avoid all contact with groundwater. Sole-source aquifer and areas of groundwater recharge similarly must be avoided.
- It should be located in such a way that will minimize fugitive emissions and odor impacts.

- Wetlands and habitat areas, which are important to the propagation of rare and endangered species, should be avoided.
- The landfill should avoid populated areas of conflicting land use, such as parks and scenic and areas in site selection.
- The landfill should avoid areas of unique archaeological, historical, and paleontological interest to preserve cultural resources.
- Social acceptability of the project should also be given due consideration.

Evaluation Criteria for Engineering Considerations

The physical site should be large enough to accommodate waste for the operational life of the facility.

The landfill location should be as close as possible to the treatment facility to reduce handling and transport costs. It must be located in an area that will not contaminate any nearby water sources.

The access road should be all-weather; have adequate width and load capacity; and with minimum traffic congestion.

Earth-moving should be minimized; however, natural topography, such as valleys, may not be ideal if such placement threatens to cause groundwater contamination due to high water tables or overly porous soil.

The landfill should avoid areas prone to landslides, or near earthquake faults, underlying mines, sinkholes, and solution cavities.

The landfill should have a clay liner or synthetic liner at least 1.0 mm in thickness and soil available for cover material.

5.5.2 Requirements for Land Application

Only treatment plant operators or their authorized agents with valid ESCs and sanitary permits are allowed to dispose of treated septage or sludge on land. Project proponents must specify which parcels of land are intended for such uses. This information, along with approval from the landowner, shall accompany any application made to the Department of Agriculture (DA) for land application.

For agricultural land application, DA will enforce the standards set in the tables below. In certain circumstances, land application for non-agricultural purposes may be requested. Such non-agricultural uses may include disposal to:

- Tree farms or landscape nurseries
- Lahar reclamation sites

For non-agricultural land, DA will consider land disposal on a case-by-case basis. In some instances, when the potential for public health effects or impact upon groundwater is minimal, waivers of the standards may be permitted.

Table 1. Specifications for Fertilizers and Compost/Soil Conditioner

	Plain Organic Fertilizer	Compost/Soil Conditioner	Fortified Organic Fertilizer
Total NPK	5-7%	3-4%	8% minimum
C:N	12:1	12:1	12:1
Moisture Content	< 35%	< 35%	< 35%
Organic Matter	> 20%	≥ 20%	≥ 20%

NPK - nitrogen, phosphorous, potassium
C:N – carbon nitrogen ratio

Table 2. Test for Pathogens for Organic Fertilizer/Soil Conditioner

Fecal streptococci	<5 x 10 ³ /g compost
Total coliforms	<5 x 10 ² /g compost
Salmonella	0
Infective parasitic	0

Table 3. Allowable Levels of Heavy Metals in Organic Fertilizer/Compost Soil Conditioner

Heavy Metals	mg/kg dry weight
Zn	1000
Pb	750
Cu	300
Cr	150
Ni	50
Hg	5
Cd	5

Soil samples from each field used for land application of sludge shall be collected on a yearly basis not more than 90 days prior to the initial application for that year, and analyzed by accredited laboratories of the Department of Agriculture Fertilizer and Pesticide Authority (DA-FPA) using standard methods on the following parameters:

- Soil acidity, measured as pH
- Buffer pH
- Texture
- Calcium
- Magnesium
- Potassium
- Phosphorus
- Organic matter

As a general guide, land application of stabilized septage or treated sewage sludge shall conform to the following conditions:

- Keep land application a minimum of 10 meters away from irrigation return flow ditches, rivers, streams, lakes, or wells;

- Spread a maximum of 264 m³/ha/year;
- Spread the material evenly, on or just below the soil surface, do not dump it all in one place where it can easily get washed off in heavy rain;
- Avoid applications on soils that are highly permeable, have a low water holding capacity, have a shallow depth to bedrock or a hardpan, have a high water table, or have a slope steeper than six percent;
- Follow good irrigation water management practices to prevent surface runoff or leaching of nutrients; and
- Keep good records of application rates, management practices, and field conditions at the time of application.

6.0 MANIFEST SYSTEM

All transport of domestic sludge and septage requires a manifest form (see Annex F: Manifest Form). The collection and transport service provider must complete the manifest form by providing the following required information:

- Origin of sludge and septage indicating the name of the client, complete address, and contact numbers;
- Date and time of collection;
- Source of sludge and septage (whether it is residential, commercial, or institutional);
- Estimated volume of sludge and septage collected (in cubic meters);
- Identity of transporter/hauler including the name of the operator, company, address, storage capacity of vehicle, plate number, body number, and name of driver;
- Destination (treatment/disposal facility) of collected sludge and septage, (the manifest form must be signed by the receiving facility, including the name and address of the facility);
- Date and time when the sludge and septage is received by the treatment/disposal facility; and
- Other applicable conditions:
 - If the destination is a treatment plant, the form shall be signed by the treatment facility owner and indicate, that it is a treatment plant, and not a disposal facility.
 - If the treated sludge will transported to a disposal site after treatment or application of any of the treatment processes mentioned in the IRR, a separate manifest form should be completed.
 - The name and signature of the disposal facility owner or his authorized representative shall be affixed, without which, the manifest form shall be considered void.

The service providers (including collection and transport and the treatment and disposal facilities) are required to retain copies of the manifest forms for a minimum of 3 years. See Section 9.0 on reporting requirements.

7.0 RECORDING AND REPORTING

Recordkeeping is a crucial part of an effective septage management system. Keeping accurate records as to which tanks were pumped and the volume is important for billing purposes and overall compliance.

The IRR requires all service providers to accomplish

The documentation system accomplishes two main goals. Firstly, it provides an incentive for haulers to bring collected septage to the treatment facility. Secondly, it provides an incentive for the service provider to pump as much septage out of the septic tank as possible. This is important because simply removing the liquid fraction of the septage does not remove the sludge, which is the primary goal of the desludging service.

The requirements for recordkeeping and manifest forms should become part of the comprehensive septage management program and codified into the rules and regulations developed by the local government unit and the records of service providers. Information for recordkeeping may include, but are not limited to, the following:

- Pumping activity and volume recorded in log book;
- Filled out manifest forms;
- Notes about deficiencies with the septic tank. Cracks, missing pipes or fittings, improper manholes or access ports should be recorded as the homeowner will need this information for making any required upgrades;
- Inventory of tools; and
- Desludging schedule.

The service provider shall retain its records for a minimum of 5 years. Each service provider shall submit the quarterly report to the concerned LGU on or before the 15th of the month following the end of the quarter.

This completed document should be given to the local government for their records. The manifest form and the self-monitoring report (SMR) are tracking and compliance tools. They help to ensure that all of the septage pumped is sent to a disposal site, thereby minimizing the opportunity for illegal discharge. Some septage programs may choose to use records for paying septage hauling subcontractors.

8.0 TRAINING OF SERVICE PROVIDERS AND PERSONNEL

Septage is biologically active material that must be handled with care. Operators must always employ good hygienic practices when handling or working with septage.

Operating the septage pumping equipment is a dangerous job. The operator is not responsible for their own personal safety, but for safety on the road during transport.

All service providers and personnel directly involved in the operations are required to undergo training on health, safety, and hygiene from DOH or DOH-recognized academic institutions, or professional organizations.

See box below for further information on safety issues.

Safety Issues

- Septage is an infectious material. It can cause disease if ingested or when it comes in contact with broken skin. Always wash hands immediately with soap after contacting septage or tools and equipment that may have contacted septage, and always before eating or drinking.
- Septage workers should be immunized for tetanus, hepatitis A, and hepatitis B.
- Never smoke while operating septage equipment. Septic tanks may generate methane, an explosive gas. Smoking also promotes the hand to mouth route of infection.
- Use caution around the septic tank. Never enter a septic tank. Every year people are killed because they enter tanks, which are confined spaces that may contain toxic gas or too little oxygen. Use caution when walking around septic tanks. Septic tanks may cave in or break when excessive weight is placed on the lid or manhole cover.
- Always secure septic tank lids with screws or locks. Keep children safe by securing septic tank lids.
- Personal protective equipment – All employees are responsible for maintaining their personal protective equipment in good condition. These protective equipment include among others,
 - Gloves
 - Boots
 - Hard hat and face mask
- Disinfecting and spill control equipment – Operators should be trained on identifying spills and proper methods of disinfecting pavement and equipment in the event of a spill. In Asia, septic tanks are often located in the home. Should spills occur while desludging septic tanks in homes, special care to clean and disinfect surfaces is important in maintaining good customer relations and avoiding complaints. Examples of disinfecting methods and safety measures are:
 - Bleach solution – Typically one cup of bleach to 2 liters of water is a good solution for disinfecting surfaces.
 - Lime – only use outside. Sprinkle over spilled area, wait 15 minutes, then wash with water
 - Safety cones – set up safety cones around spilled areas until properly disinfected

When using the lime stabilization method for treating septage, follow the recommendations below:

- Avoid contact with skin or eyes to avoid severe burns.
- Keep bags of hydrated lime dry. A wet bag can start a fire.
- Do not put water on a fire involving hydrate lime. The water will react with the hydrated lime and cause it to release more heat.

The following safety equipment should be used when handling quicklime:

- Safety goggles;
- Half-mask respirator with cartridge;
- Shoulder-length, fully coated neoprene gloves;
- Emergency eyewash, in case lime gets on the face or in the eyes; and
- Carbon dioxide fire extinguisher, in the event of a fire.

Septic Tank Application Form

(Name and Address of Municipality or LGU)

1. APPLICANT DATA

Name: _____

Address: _____

Telephone: _____ Fax: _____

2. TYPE OF APPLICATION (check where applicable)

Residential: _____ Commercial: _____

3. SEWAGE FLOW

Number of bedrooms: _____

Number of people in residence: _____

4. SEPTIC TANK DESIGN INFORMATION:

Septic tank material: Concrete (poured in place) _____ Concrete (precast): _____ Hollow blocks _____
Plastic: _____ Fiberglass: _____ Other: _____

Size: Total Volume (liters) : _____ Number of compartments: _____

Name and Manufacturer: _____

Note: Use of steel, wood or other materials that may degrade in the soil is prohibited.

5. PLOT PLAN OR SKETCH. Please show North arrow, building locations, septic tank locations, streets, driveways, cut banks, water lines and any other feature of the property that may affect the septic tank installation.

Setback Table

Septic tanks must adhere to the following setbacks:

Wells: 25 meters

Lake: 25 meters

Stream/river: 25 meters

Flood plain: 25 meters

Water lines: 3 meters

Structures: 1 meter

Property lines: 1 meter

Cut banks: 1 meter

FOR OFFICIAL USE ONLY

Approved by: _____

Issue Date: _____

Final Inspection: _____

Comments: _____

6. CERTIFICATION: I hereby certify that the above information is true and correct and that the proposed work will be done to meet the requirements of the building official, health officer or sanitary inspector:

Applicant name: _____ Date: _____

Annex B: Environmental Sanitation Clearance from CHD

CONTROL NO. _____

Republic of the Philippines
Department of Health
CENTER FOR HEALTH DEVELOPMENT FOR _____
Telephone Nos. _____

ENVIRONMENTAL SANITATION CLEARANCE

Issued to: _____
(Name of Owner/Operator)

Address: _____
(No., Street, City/Municipality, Province)

Nature of Business Activities: (Check appropriate space)

- a.) Collection and Transport _____
- b.) Treatment _____
- c.) Disposal _____

Operational Service Area: _____

Recommending Approval: _____
Supervising Sanitary Engineer

Approved: _____
Director IV

ESC No.: _____
Date issued: _____
Official Receipt No.: _____
Date Issued: _____

Annex C: Sample Septage Ordinance – Dumaguete City



REPUBLIC OF THE PHILIPPINES *City of Dumaguete* OFFICE OF THE CITY COUNCIL

EXCERPT FROM THE MINUTES OF THE REGULAR SESSION
OF THE CITY COUNCIL HELD AT THE SESSION HALL ON
APRIL 6, 2006

PRESENT:

HON. WILLIAM E. ABLONG, <i>Presiding Officer</i>	CITY VICE-MAYOR
HON. ROTELIO U. LUMJOD	CITY COUNCILOR
HON. MANUEL T. SAGARBARRIA	CITY COUNCILOR
HON. NOEL C. DE JESUS	CITY COUNCILOR
HON. FRANKLIN O. ESMEÑA	CITY COUNCILOR
HON. URBANO E. DIGA, JR.	CITY COUNCILOR
HON. SALETO J. ERAMES	CITY COUNCILOR
HON. ESPIRIDION V. CATAN	CITY COUNCILOR
HON. MANUEL C. PATRIMONIO	CITY COUNCILOR
HON. HARRISON K. GONZALES, <i>Liga President</i>	CITY COUNCILOR
HON. KARISSA FAYE R. TOLENTINO, <i>SK Chairman</i>	CITY COUNCILOR

ABSENT:

HON. SAMUEL D. DICEN	CITY COUNCILOR
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RESOLUTION NO. 141
Series of 2006

WHEREAS, mandated by the new *Clean Water Act of 2004 (R.A. 9275)* and other existing laws and ordinances related directly or indirectly to wastewater and septage management, the City of Dumaguete, as a non-highly urbanized city, is establishing a septage management system;

WHEREAS, untreated wastewater affects health by spreading diseases, making water unfit for human consumption and other uses, contaminating groundwater, threatening biodiversity, and reducing the quality of life of the citizens;

WHEREAS, most of the residences, businesses and institutions in Dumaguete City use septic tanks for wastewater treatment and disposal;

WHEREAS, most of the septic tanks in the city are not properly designed, constructed or regularly desludged;

WHEREAS, groundwater is the city's water source;

WHEREAS, the construction and operation of a sewerage network and treatment system is beyond the financial capacity of the city government at this time;

WHEREAS, the City is committed to the improvement, maintenance and conservation of the ecosystem and the protection of public health;

WHEREAS, Section 7 of the Clean Water Act (RA 9275) provides, among others, that each LGU may raise funds to subsidize necessary expenses for the operation and maintenance of sewage treatment or septage facilities servicing their area of jurisdiction through local property taxes and enforcement of a service fee system;

WHEREFORE, on motion of **Councilor Manuel C. Patrimonio**, duly seconded by **Councilor Harrison K. Gonzales**, the City Council in session assembled.

RESOLVED, AS IT IS HEREBY RESOLVED, to enact the following ordinance:

ORDINANCE NO. 18

Series of 2006

AN ORDINANCE ESTABLISHING A SEPTAGE MANAGEMENT SYSTEM IN THE CITY OF DUMAGUETE.

Be it ordained by the City Council of Dumaguete that:

ARTICLE I

Title of the Ordinance

AN ORDINANCE ESTABLISHING A SEPTAGE MANAGEMENT SYSTEM IN THE CITY OF DUMAGUETE.

ARTICLE II

Scope

Section 1. This ordinance shall apply to all buildings and structures whether public or private, residential or commercial, proposed/planned or existing. However, properties or businesses that have onsite wastewater treatment facilities approved by the City Environment and Natural Resources Officer (CENRO) shall be exempted from this ordinance.

Section 2. *Pretreatment for Commercial Facilities.* Septage from a commercial or other non-residential facility is acceptable if the septic tank only receives wastewater typical of a household (i.e., from toilets and sinks). If the wastewater contains substances of a commercial nature such as oil or fuel residue, metals, or high volumes of fats and grease, an appropriate pretreatment program, approved by the CENRO, must be in place.

ARTICLE III

Authority

Section 3. This ordinance is enacted to supplement the provisions and specifications of existing laws and ordinances related to septage management and complement existing laws on clean water and building and plumbing regulations.

ARTICLE IV

Definitions

Section 4. The words and phrases used in this Ordinance shall mean as follows:

Anaerobic ponds – are deep stabilization ponds used to treat high-strength organic wastewater that also contains high concentration of solids. Anaerobic treatment does not require the presence and use of oxygen and encourages the growth of bacteria, which breaks down the waste material, releasing methane and carbon dioxide.

Baffle – a device (as a wall or screen) to deflect, check or regulate the flow of sewage and septage. It promotes preliminary and primary treatment of the incoming sewage by allowing the physical separation of solid and liquid components in the sewage.

CENRO – City Environment and Natural Resources Office.

Chamber – an enclosed space, cavity or compartment of a septic tank.

Communal Excreta Disposal System – an excreta disposal system serving a group of dwelling units.

Desludging – the process of removing the accumulated sludge or septage from the septic tank.

Digestion – a microbiological process that converts the chemically complex organic sludge to methane, carbon dioxide, and inoffensive humus-like material.

Disposal Field or Leaching Bed – a soil-based effluent disposal system composed of pipes and shallow trenches leading from the outlet of the septic tank, consisting of open jointed or perforated pipes so distributed that effluent from a septic tank is oxidized and absorbed by the soil. The surrounding bedding material of the network of pipes should be of high enough permeability to effect treatment by seepage.

Domestic Sewage – sewage containing human excrement and liquid household waste. Also called sanitary sewage.

Effluent – a general term denoting any wastewater, partially or completely treated, or in its natural state, flowing out of a drainage canal, septic tank, building, manufacturing plant, industrial plant, treatment plant, etc.

Facultative Ponds – shallow rectangular ponds that stabilize wastes using a combination of anaerobic, aerobic, and facultative (aerobic-anaerobic) processes.

Freeboard or Airspace of a Septic Tank – the distance as measured from the maximum liquid level line to the underside of the septic tank slab or cover.

Individual Excreta Disposal System – an excreta disposal system serving a dwelling unit.

Maturation ponds – low-rate stabilization ponds that are designed to provide for secondary effluent polishing and seasonal nitrification.

“P” traps – traps used on plumbing fixtures, such as toilets and drains, to prevent sewage gases from entering the plumbing system or the atmosphere.

Scum – a slimy or filmy covering on the surface of the liquid in the septic tank.

Seepage pit – a loosely lined excavation in the ground that receives the discharge of a septic tank and designed to permit the effluent from the septic tank to seep through pit bottom and sides.

Septage – thickened and partially treated sewage that is removed from a septic tank.

Septic tank – a watertight receptacle, which receives the discharge of a sanitary plumbing system or part thereof, and is designed and constructed to accomplish the sedimentation and digestion of the organic matter in the sewage within the period of detention/retention and to allow the liquid to discharge to a leaching field, sewer lines, a combined sewerage network or directly to a secondary wastewater treatment facility in accordance with the standards set forth by the Revised National Plumbing Code of the Philippines.

Sewage – any wastewater containing human, animal or vegetable waste matter in suspension or solution including human excreta and urine and may possibly contain liquids consisting of chemicals in solution.

Sewer – an artificial pipe or conduit for carrying sewage and wastewater.

Sewerage – a comprehensive term, including all construction for collecting, transporting, and pumping of sewage. Usually refers to a buried system of underground pipes.

Sewage works – a comprehensive term for pumping, treating and final disposal of effluent via a centralized treatment plant.

Sludge – precipitated solid matter with a highly mineralized content produced by water and sewage treatment processes.

Stabilization pond – An artificial pond designed to treat wastewater in general using solely naturally occurring biological treatment processes, and without the need for an electro-mechanical energy input.

Subsurface Absorption Bed or Drain field – also called leaching bed, leaching field, or soak-away. An underground system of pipes embedded in a suitably porous soil medium leading from the outlet of the septic tank, consisting of open jointed or perforated pipes so distributed that the effluent from a septic tank is oxidized and absorbed by the soil. Must be located far from environmentally critical waterways or groundwater wells.

ARTICLE V

Septage Management System

Section 5. Excreta Disposal System. All houses/buildings shall have an approved excreta disposal system for treatment of domestic sewage.

Section 6. Desludging and Transfer of Septage to the Septage Treatment Facility. Liquid and/or solid materials removed from septic tanks shall be transported by a septage hauler/pumper to the Septage Treatment Facility in Barangays Camanjac and Candau-ay of this City following Department of Health regulations on desludging and transport of sludge. No septage hauler/pumper can unload or dispose of septage in other places, including bodies of water, agricultural fields, and the drainage system within the city until the implementing rules and regulations for proper land application have been issued by the authorized government agencies.

Section 7. Septage Treatment Facility. The septage treatment facility shall use stabilization ponds or lagoons, composed of anaerobic, facultative, and maturation or aerobic ponds. All stabilization ponds shall be lined with high density polyethylene (HDPE) geomembrane on top of highly compacted soil. Jointing of adjacent sections of geomembrane sections shall be in accordance with manufacturers' jointing guidelines. Effluent from the last aerobic pond shall flow into a constructed wetland to ensure that the quality of the final effluent shall meet DENR standard for the receiving water body. Periodically, the solid material that accumulates in the receiving tank and ponds shall be removed and deposited in sludge drying beds. Dried

sludge shall be recovered as compost material, soil conditioner or landfill material. An operations and maintenance plan shall be developed, which shall include a vector control strategy to insure that no disease-causing elements shall thrive in the treatment facility and a maintenance schedule for clearing excess vegetation growth.

The operations and maintenance plan shall also include provisions for reducing system upset, including immediate actions to prevent the occurrence of foul smells and release of partially treated effluent from the system.

ARTICLE VI

General Design and Construction Requirements of Septic Tanks

Section 8. General Requirements.

Section 8.1. Buildings or Structures Proposed for Construction

- a. No building plan for residential dwelling units or commercial and institutional structures shall be approved unless the design of the sanitary plumbing and septic tank conforms to the specifications set herein and other pertinent regulations; alternative wastewater treatment systems shall be duly approved and endorsed by the CENRO. Further, per DENR regulations, all malls, restaurants, hotels, apartelles and other residential buildings, subdivisions, hospitals and similar establishments are required to utilize sewage treatment facilities as a condition to the granting of Environmental Clearance Certificates (ECCs) and permits to operate.
- b. It shall be the duty of the owner, administrator or contractor to inform the concerned agency that the newly constructed septic tank, sewage treatment facility or alternative treatment system, with prior plan approval, is ready for inspection. The new system shall not be covered or used until inspected and approved by the City Engineer's Office.

Section 8.2. Existing Buildings or Structures

- a. Owners of existing septic tanks that are not accessible for desludging are required to repair or upgrade their tank so it can be desludged. If repairs are not possible, such owners are encouraged to build a new septic tank that will comply with the provisions set herein.
- b. The cost of repair and upgrading of septic tanks shall be borne by the owners.

- c. Communal or shared septic tanks can be used alternatively whenever feasible, particularly for existing clustered structures that are highly dense and characterized by lack of or inadequate land space. The design and the manifest of ownership and joint maintenance shall go through an approval process as determined by the City Government.

Section 9. Specifications. Septic tanks shall be designed and constructed in compliance with the mandate set forth in the National Building Code, including use of unconventional or new material for building parts, and as prescribed by the National Plumbing Code and the Code on Sanitation, including proper sizing and layout, and the criteria set forth below.

- a. It shall be designed to produce an effluent consistent with approved engineering and environmental standards.
- b. It shall be built of solid durable materials and shall be watertight. Materials shall conform to applicable Philippine material standards.
- c. It shall not be constructed under any building and not within twenty-five (25) meters from any existing source of water supply.
- d. It shall be divided into three compartments; the volume of the first compartment shall be between one-half to two-thirds of the total tank volume.
- e. Where more than one tank is used to accommodate the required liquid volume in a given minimum retention time of 2 days, the tanks shall be conjoined. The first tank shall be equal to or larger than any subsequent tank in the series.
- f. Baffles or similar devices shall be installed at each inlet and outlet of the tank and at each compartment. Materials shall conform to approved applicable standards. It must be integrally cast with the tank, affixed with a permanent waterproofing material, or attached at the top and bottom with connectors that are not subject to corrosion or decay. Sanitary tees used on baffles shall have a minimum diameter of 100 mm (4 inches).
- g. The baffles between compartments shall extend at least 200 mm above the maximum liquid surface or all the way to the underside of the top cover.
- h. The centerline of the inlet pipe shall be at least 50 mm above the centerline of the outlet pipe. Both inlet and outlet pipes shall be similar in diameter with each other and shall have a minimum diameter of 100 mm.
- i. Adequate venting shall be provided in each compartment with the use of ventilating pipes not less than 50 mm in diameter. For buildings where plumbing fixtures have appropriate "p" traps, venting should occur through the plumbing stack in the building, not from the septic tank. For buildings where toilets and sinks are not protected with "p" traps, traps should be installed, or vent directly from the septic tank.

- j. Access to the septic tank: There shall be at least one maintenance hole for each compartment, with a minimum side dimension of 500 mm. All maintenance holes shall extend through the tank cover and shall extend to finished grade. Manhole covers shall be designed with durable and fully coated or non-corrosive handles for easy lifting. Septic tank access covers should be secured from unauthorized entry, either through safety screws, locks or a tank lid that weighs 15 kg or more.
- k. Outlet from the septic tank:
The design, construction, and location of structures receiving effluent from septic tanks shall conform to the National Plumbing Code of the Philippines. Effluent treatment is further required but will be covered by a separate ordinance and other infrastructure projects.
- l. For clustered structures or houses that are highly dense and characterized by lack of or inadequate land space, there shall be designed a communal septic tank consistent with approved engineering and environmental standards.

ARTICLE VII

Administration and Enforcement

Section 10. The administration and enforcement of this ordinance for new buildings is hereby vested in the Building Official of the City Government of Dumaguete.

Section 11. There shall be created a City Septage Management Authority (CSMA) composed of representatives from the City Environment and Natural Resources Office, City Health Office, General Services, City Treasurer's Office, Dumaguete City Water District, City Legal Office, City Engineer's Office and a non-government organization who shall be appointed by the City Chief Executive from the NGO members of the City Development Council. Other persons may be invited to provide technical advice to the CSMA.

- a. The CSMA shall conduct a survey of all properties and premises in coordination with barangay officials to determine if a septic tank is present, and if it is accessible for desludging.
- b. If a septic tank is not present or it is inaccessible for desludging, the CSMA shall serve notices of non-conformance to the provisions of this ordinance to the owners/administrators, or occupants.
- c. The CSMA or its authorized representatives shall be permitted to enter all properties for the purpose of inspection, observation, measurement, sampling and testing. A prior notice shall be given property-owners to facilitate inspection and provide assistance to the CSMA representatives.

- d. For those property owners, administrators or occupants served with notices of non-conformance, a compliance period shall be set by the property owners, administrators or occupants and the CSMA. The compliance period shall be based on the proper installation of an acceptable septic tank of which design is specified in this ordinance
- e. The CSMA shall issue a certificate of compliance to the property owners who are deemed to have met the minimum requirements for septic tanks.
- f. For new developments, the occupancy permit issued by the building officials shall serve as certificate of compliance until the CSMA conducts another round of inspection.
- g. The CSMA shall conduct a periodic survey of properties every 3 years or as determined by the CSMA to verify changes in septic tank accessibility or changes in tank capacity requirements. This shall be done in coordination with the barangay officials.
- h. The CSMA shall plan and implement an information and education program on wastewater management and the city's septage management system.

Section 12. Monitoring and Evaluation. Close monitoring of all activities in the treatment facility shall be conducted by the CSMA in conjunction with the operations and maintenance plan that will be contained in the operational guidelines. Adverse effects of the project shall be mitigated and considered top priority in prevention and maintenance operations. Any environmental change/hazard attributed to the project implementation shall be immediately addressed.

Section 13. Desludging. Septic tanks require desludging on an average of every 3 to 5 years. Septic tanks shall be deslugged when the sludge volume is $1/3^{\text{rd}}$ of the total volume of the septic tank.

- a. The CSMA shall keep a record of all owners/administrators of buildings and structures who have deslugged their septic tanks, those that are inaccessible, those that do not have septic tanks, and those that do not have water-sealed toilets, and other data that may be deemed necessary by the CSMA.
- b. The CSMA shall implement and adhere to the rules and regulations set forth by the Department of Health in handling, transporting, treatment and disposal of septage.
- c. The CSMA shall strictly implement an accreditation system and operational guidelines for private desludging service providers that would like to operate in the city, including but not limited to securing an environmental sanitation clearance (ESC) which is discussed more thoroughly in the rules and regulations set forth by the Department of Health in handling, transporting, treatment and disposal of septage.

Section 14. Funding. The City Government shall allocate necessary funds to support capital expenditures and operating and maintenance expenses of the septage management system.

Section 15. User fee. All building or structure owners shall pay an amount for the desludging of their septic tanks and treatment of the septage equivalent to the following:

User Fees. A user fee of Two Pesos (P2.00) per cubic meter of water consumed shall be charged and added to the Dumaguete City Water District (DCWD) monthly water bill. The fee may be adjusted periodically following public consultations.

Section 15.1. Users of un-metered water and users with no history of billable water flow or water consumption shall have their user fee estimated by the Water District by averaging the billable flow of other households with the same number of members and toilets. Commercial establishments that have their own water source shall be required to install a production meter. The quantity of water produced shall be the basis for computing the cost of desludging the septic tank.

Section 15.2. Users who have their own onsite wastewater treatment system certified by the CENRO as functioning and compliant shall be exempt from paying the required user fee.

Section 15.3. Trust Fund. Monies collected from **users' fee** or the desludging and treatment fees shall be held in Trust by the City Treasurer's Office. Said Trust Fund shall only be disbursed upon proper authorization by the CSMA, subject to the usual accounting and auditing regulations.

Section 16. Violations and Penalties. -

Section 16.1. Issuance of Non-Conformity. The CSMA shall issue a notice of non-conformity to property owners, administrators or occupants who do not have a septic tank, whose septic tank is not designed properly, or is inaccessible for desludging unless they have an alternative system approved by the CENRO.

Section 16.2. Penalties. The violator, or owner of a non-complying establishment or household, who fails to comply with the provisions of this Ordinance within one (1) year as provided by the Local Government Code, must pay the fines per violation set herein in lieu of prosecution:

- a. For private residential buildings **P1,000.00**
- b. For hotels, apartments, banks, offices,
shops, lodging houses, malls, restaurants,
and other commercial establishments **P2,000.00**

- c. For hospitals, funeral parlors and similar operation **P3,000.00**

or by imprisonment of not less than one (1) day nor more than one (1) year, or both fine and imprisonment at the discretion of the court. Failure to comply with the provisions herein shall result in the cancellation of business permits for commercial establishments.

ARTICLE VIII
Final Provision

Section 17. All provisions of existing laws and ordinances are hereby supplemented and added to come up with a system that will work for the city.

Section 18. This Ordinance shall take effect upon its approval.

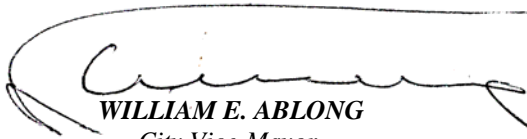
UNANIMOUSLY APPROVED.

o o o O o o o

I hereby certify to the correctness of the above quoted resolution with an ordinance.


RAMON A. VILLAROSA
City Secretary

ATTESTED:

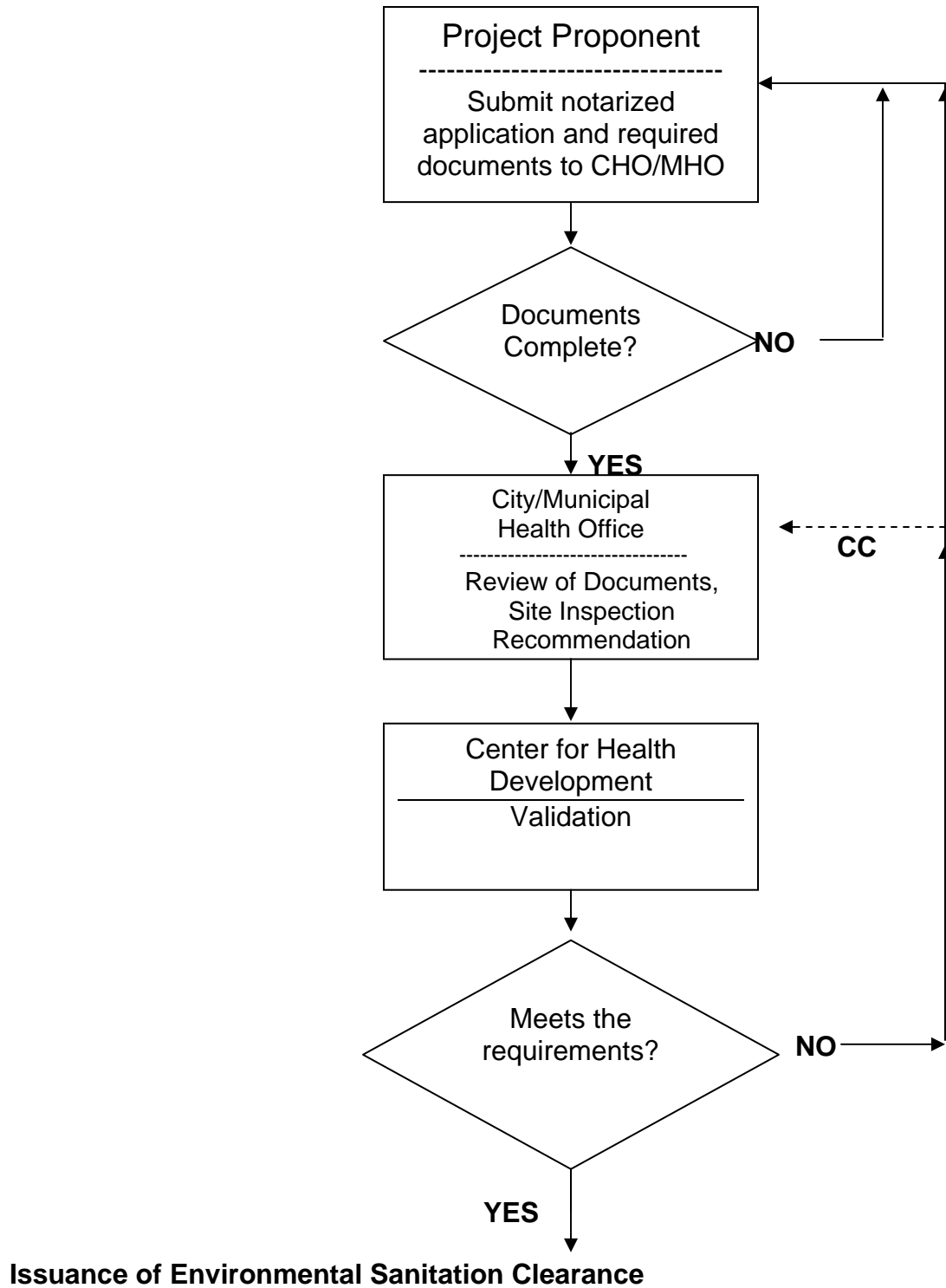

WILLIAM E. ABLONG
City Vice-Mayor
Presiding Officer

APPROVED:


AGUSTIN R. PERDICES
City Mayor

lbtorres

Annex D. Flow Chart for Securing an Environmental Sanitation Clearance



Annex E: Environmental Sanitation Clearance Application Form

Application No. _____

Date:

To: Mayor _____

Attention: City/Municipal Health Officer: _____

Dear Sir/Madam:

I would like to apply for an Environmental Sanitation Clearance. Please see the attached documents to support my application.

Business Name: _____

Owner/Manager: _____

Address: _____

Description of Business: _____

I hereby certify that the statements made in this application and the attachments are given/submitted under pain of PERJURY/FALSIFICATION OF OFFICIAL DOCUMENTS against the applicant if warranted.

IN WITNESS WHEREOF, I have hereunto set my hand this _____ day of _____ in _____.

Applicant

SUBSCRIBED AND SWORN to before me, in _____, this ____ day of _____, Applicant exhibiting to me his/her Community Tax Certificate No. _____ issued at _____ on _____.

WITNESS MY HAND AND SEAL the same date and place above stated.

Notary Public

****Complete the checklist on the following pages and submit this form with the required attachments.***

Notice to Applicants: The checklist below is a list of the attachments required to apply for an Environmental Sanitation Clearance. Please complete the checklist for either stationary or mobile service provider and attach the required documents to your application.

Checklist for Stationary Service Provider

- Basic project information
- Site information (including neighboring parcels with land ownership information and information on wells and drinking water intakes)
- Project rationale/objective
- Project type and area covered
- Operational processes
- Plans and specifications (including site plan for septage treatment facilities including all treatment and disposal components)
- Description of existing environment
 - Topography
 - Hydrology (including information on surface waters like streams, lakes, coastal water resources)
 - Geological condition
- Brief discussion on environmental and health impacts
- Brief discussion on mitigating/control measures
- Occupational and health safety measures
- Monitoring and evaluation plan
- Design report and detailed plans and specifications for domestic septage, sludge treatment and disposal facilities signed and sealed by licensed civil or sanitary engineer
- Target market of septage pumping activities including planned volume per month
- Staffing plan indicating number of employees, job descriptions, and organizational chart
- Business plan indicating anticipated costs of providing services and expected revenues from grants, loans, and tariffs

Checklist for Mobile Service Provider

- Proponent information and contact details
- Scope of activities
- Area covered
- Method of collection
- Type of vehicles and equipment
- Occupational and health safety measures
- Staffing plan
- Mitigating/Control measures
- Maps that provide the following details:
 - Service area indicating residential, commercial, industrial and agricultural lands with major routes for septage hauling indicated
 - Location of proposed septage treatment and disposal sites
- Target market of septage pumping activities including planned volume per month
- Make and model of septage pumping trucks
- Staffing plan indicating number of employees, job descriptions, and organizational chart
- Business plan indicating anticipated costs of providing services and expected revenues from grants, loans, and tariffs.

Annex F: Manifest Form

CONTROL NO. _____

MANIFEST FORM

SLUDGE/SEPTAGE ORIGIN

Name (Household/Unit Owner): _____

Address: _____

Date and Time of Collection: _____

SOURCE AND VOLUME OF SLUDGE/SEPTAGE

Source	Check one	Volume (cubic meters)
Residential		
Commercial/Industrial		
Institutional		
Wastewater Treatment Plant		

Commercial/industrial waste must be sampled and tested before it is off-loaded at the treatment facility to ensure that the material won't contaminate the treatment process. Contamination can be caused by grease, oil, metals, and chemicals.

Description of Commercial/Industrial Waste: _____

EXCAVATOR/TRANSPORTER

Operator/Company	
Address	
Type of Vehicle	
Plate No./Body No.	
Name of Driver	
Signature	
Driver's License No.	
Name of Other Personnel	

Attested by Barangay Captain or Authorized Representative: _____

(Name and Signature)

TREATMENT/DISPOSAL FACILITY

Name of Treatment/Disposal Facility	
Address of Treatment/Disposal Facility	
Date and Time Received	
Type of Treatment/Disposal	
Name and Signature of Disposal Facility Owner or Authorized Representative	

Annex G: Sample of Accidental Spillage Notification Form

Control No.: _____

Accidental Spillage Notification

NAME OF CONTACT PERSON:	CONTACT ADDRESS:	
INCIDENT DATE:	INCIDENT TIME:	
INCIDENT ADDRESS:	VOLUME OF SLUDGE/SEPTAGE SPILLED (cubic meters)	
INCIDENT DESCRIPTION:		
IMMEDIATE ACTION TAKEN TO CONTROL THE SPILL, MINIMIZE THE ENVIRONMENTAL IMPACT AND CLEAN UP PROCEDURES:		
ENVIRONMENTAL CONTAMINATION		
<input type="radio"/> Water	<input type="radio"/> Ground	<input type="radio"/> Others
Spread of Spilled Material		
<input type="radio"/> Nearby stream	<input type="radio"/> Soil	
<input type="radio"/> Storm drain	<input type="radio"/> Near Shore/coast	
<input type="radio"/> Others		
Local Terrain Condition		
<input type="radio"/> Flat	<input type="radio"/> Rolling	
<input type="radio"/> Grassy	<input type="radio"/> Concrete/Asphalt	
<input type="radio"/> Dirt	<input type="radio"/> Near river banks	

Prepared by:

(Name and Signature)