1.1 Project Fact Sheet

Project Name	Category II Sanitary Landfill
Project Location	Sitio Dalig, Barangay Batino, Calapan City, Oriental Mindoro
Nature of Project	Sanitary Landfill
Limits Applied for	143,257 square meters (Total Land Area)
With existing ECC	15,000 square meters ECC R4B 1009-0135 40 tons per day (estimated volume of waste) 146,000 metric tons (estimated capacity of categorized sanitary landfill)
Area for Expansion	128,257 square meters 81 tons per day Household generation 57 tons per day Non-household generation 24 tons per day
Proponent Name	City Government of Calapan, Oriental Mindoro
Proponent Address	City Government of Calapan, Oriental Mindoro
Proponent's Contact Person	Elizabeth L. Abogado Wilfredo G. Landicho
Contact Number	09778023748 09178891967
Project Components	
Project Phases	(1) Site Preparation/Pre-development Phase; (2) Construction of building facilities and other civil works; (3) Project Operation; and (4) Abandonment
Manpower	
Permanent	2 staff
Job Order	95 workers
Project Duration	25 years
Project Cost	Php 2,000,000

1.2 Project Location and Area

Calapan, officially known as the City of Calapan, is a third-class component city and the capital of the Philippine province of Oriental Mindoro. It has a population of 145,786 people, according to the 2020 census. This accounted for 16.05% of the total population of the province of Oriental Mindoro, or 4.52% of the total population of the MIMAROPA Region. Based on these figures, the population density is calculated to be 583 people per square kilometer or 1,510 people per square mile.

With the implementation of the Strong Republic Nautical Highway (SRNH), an integrated ferry project of then-President Gloria Macapagal Arroyo that extends further south in the Philippines, the city serves as the gateway to the province of Oriental Mindoro. The Calapan City Seaport is the largest and busiest seaport on Mindoro Island, and it is only 45 minutes away from Batangas City International Seaport via ferry boats and roll-on/roll-off (RORO) ships.

Calapan is one of two cities in the MIMAROPA Region, the other being Puerto Princesa in the Philippine island of Palawan. Calapan is the administrative center for the region. It is also the commercial, industrial, transportation, communication, religious, and educational hub for the entire province of Oriental Mindoro.

Calapan is bounded by the Calapan Bay to the north and north-east, the Naujan to the south and southeast, and the Baco to the west. The city is located at the intersection of 13°12.6 and 13°27' north latitudes and 121°17' east longitudes. It is about 28 nautical miles (52 km; 32 mi) from the nearest point in Batangas, 45 km (28 mi) south of Batangas City, and 130 km (81 mi) south of Manila.

The city has a total area of 250.06 km2 (96.55 sq mi) accounting for 5.90% of the total area of Oriental Mindoro and is made up of 62 barangays, 22 of which are urban and 40 of which are rural. The city also governs the Baco Islands and the two Silonay Islets in Calapan Bay.

The overall land feature is a broad plain with rivers interspersed with wetlands along the seacoast. Bulusan Hill, a 6-kilometer (3.7-mile) long landform east of the city that interrupts the mostly flat terrain north-east of the Halcon-Baco Mountain Range, has the highest elevation of 187 meters (614 feet) above sea level.

Calapan's SLF covers a total of 143,257 square meters, of which 15,000 square meters have an ECC permit and 128,257 square meters are for the projected SLF expansion. The project site can be reached by any form of vehicle via the national road to the barangay road to get to the project site.

Table 1.1 List of SLF area per Lot

Lot Number	Area
4281-A	23,257
4281-B	23,257
4281-C	16,939
4281-D	5,814
4281-E	5,814
4281-F	5,814
4281-G	5,815
4281-H	56,547
Total Land Area	**143,257**

Table 1.2 Technical Description of the Calapan City Sanitary Landfill

Technical Description		
Corner	**Latitude**	**Longitude**
1	13º 22' 18.6"	121º 13' 31.9"
2	13º 22' 22.8"	121º 13' 31.6"
3	13º 22' 26.8"	121º 13' 31.3"
4	13º 22' 30.9"	121º 13' 30.9"
5	13º 22' 29.7"	121º 13' 37.9"
6	13º 22' 29.5"	121º 13' 39.5"
7	13º 22' 29.4"	121º 13' 39.9"
8	13º 22' 29.3"	121º 13' 41.8"
9	13º 22' 29.2"	121º 13' 43.7"
10	13º 22' 29.1"	121º 13' 46"
11	13º 22' 25.7"	121º 13' 45.2"
12	13º 22' 25.2"	121º 13' 45"
13	13º 22' 19.8"	121º 13' 44.9"
14	13º 22' 14.1"	121º 13' 41.2"
15	13º 22' 18.6"	121º 13' 40.2"
16	13º 22' 18.6"	121º 13' 37.8"
17	13º 22' 18.6"	121º 13' 37"
18	13º 22' 18.6"	121º 13' 31.9"

Figure 1 Project Location

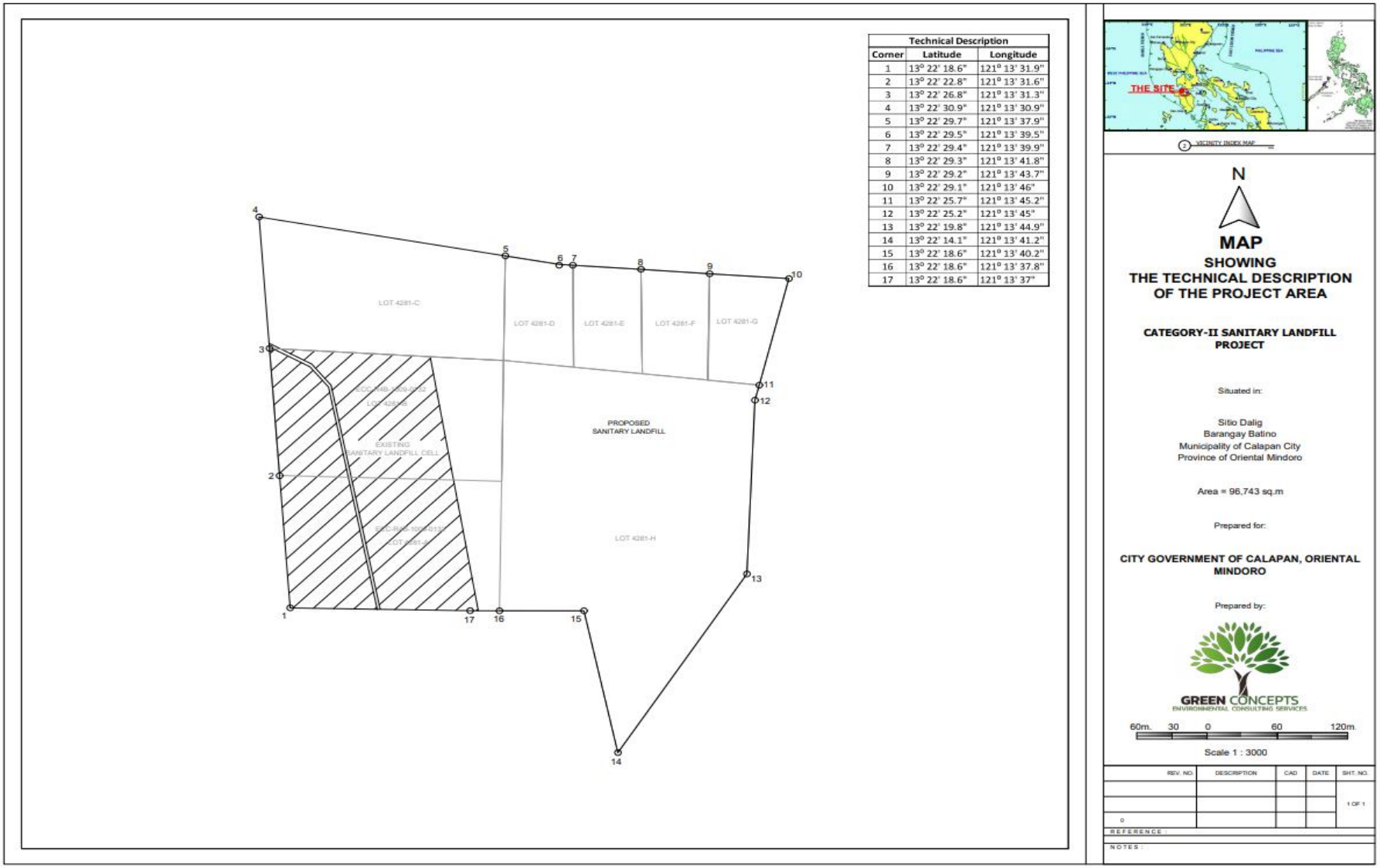

Figure 2 Map showing the Technical Description of the Sanitary Landfill

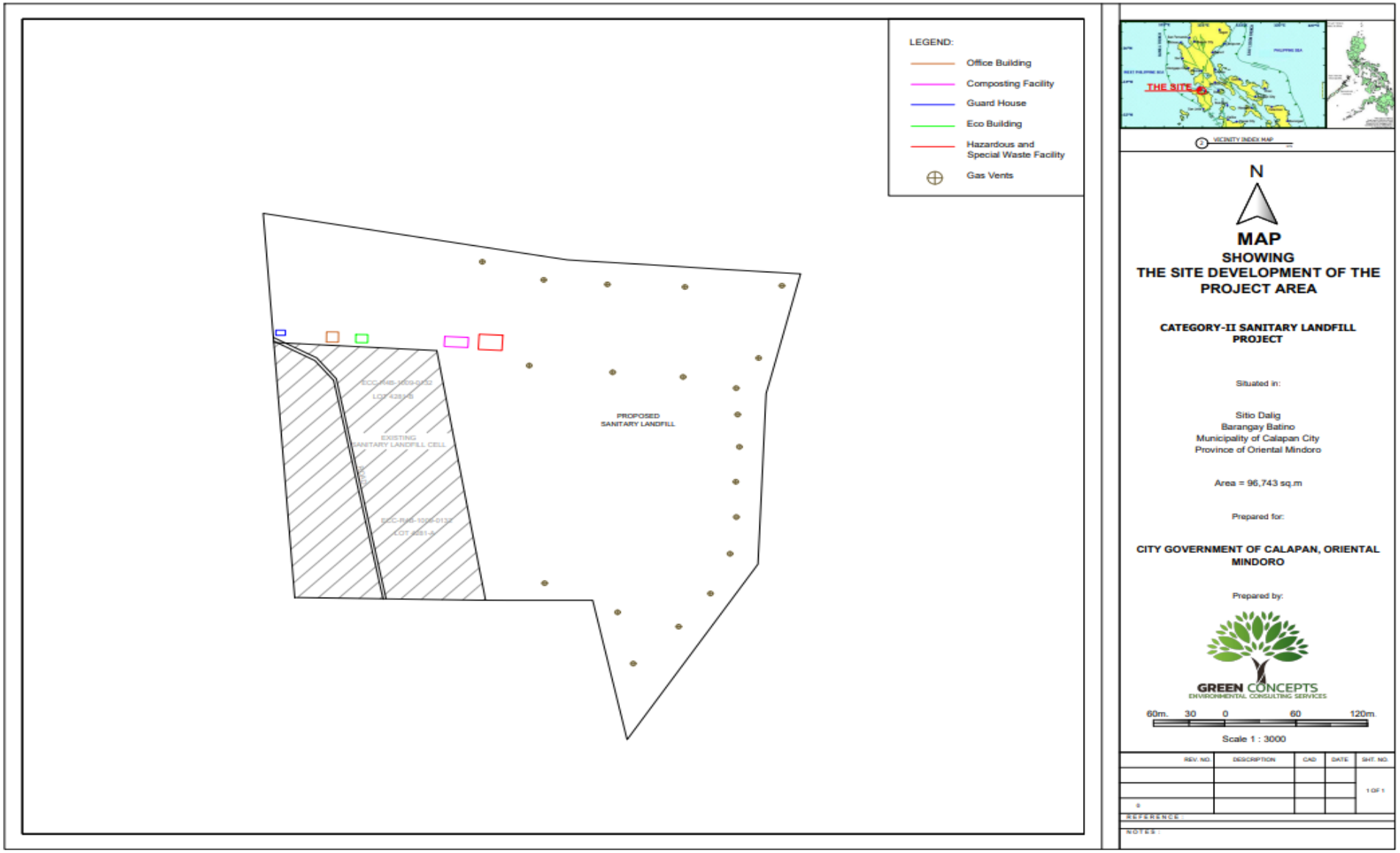

Figure 3 Map showing the Site Development Plan of the Sanitary LandFill

1.3 Project Rationale

Solid wastes generation is an alarming contemporary environmental issue. As part of national strategies in solid wastes management as stipulated in RA 9003 otherwise known as the Ecological Solid Wastes Management Act of 2001 is the establishment of sanitary landfills by the local government units. Sanitary landfills are considered as the most common E-waste disposal technique which aims to reduce or mitigate the potential risks associated with the environment and human health. Landfills are typically positioned in areas where prevailing land features can perform as natural buffers between the environment and landfills. Trenches are made in excavated soil and impervious liners are formed prior to burying E-waste in order to prevent escaping the hazardous materials (Li et al., 2009).

Sanitary landfill is still considered as one of the most significant and least expensive methods of waste disposal. It is essential to consider environmental impacts while selecting a suitable landfill site. The total amount of solid waste generated in Calapan is 85 tons/day which increases to 90 tons/day during summer. In the past, 69% of the collected solid wastes was managed in controlled facilities. And about 28% are City recovery rate. Despite the availability of other disposal methods, landfill is the most widely accepted and prevalent method for municipal solid waste (MSW) disposal. Majority of the solid wastes generated were from residential (70%), then non residential such as commercial, institutional and industrial comprises 30%.

This is taken into consideration the continuous and ever increasing wastes being generated. This is under that premise that this “stand alone” facility will drastically improve the SLF system (i.e. the handling and final disposal of MSW) with a possible integration capability for a long-solution to cover the entire Calapan City. The inclusion into the design of a multi-barrier system, leachate and gas collection systems will result in a significant reduction in anticipated impacts. With the significant environmental issues identified and evaluated, mitigation measures and monitoring plans are also proposed to prevent or minimize the negative impacts and further enhance positive effects. the SLF project is classified as category II, a project with site-specific impacts, few if any of which are irreversible and where in most cases mitigation measures can be designed more readily compared to projects classified as category

The average daily global municipal solid waste (MSW) generation per person is approximately 1.2 kg, with this figure expected to rise to 1.5 kg by 2025. As a result of the excessive waste output, every state and municipal government faces difficulties with appropriate garbage disposal. The problem is that today's era is defined by throw-away consumerism, with businesses and manufacturers seeking to maximize profits by producing one-time-use products that do not prioritize reuse, recycling, or the use of environmentally friendly materials. In contrast, Asia has experienced rapid urbanization and population growth. The rapid population growth in Asian countries will have far-reaching consequences for a variety of urban environmental issues, including solid waste management.

Given that the existing facility's usable space is decreasing in comparison to the ongoing inflow of garbage, it is essential to create an expanded sanitary landfill (SLF). This would also obviate the necessity of providing additional disposal space only to be subjected to the SLF procedure once more. The following operational components must be included in the proposed project: Better waste volume, type, and source tracking; proper segregation of inorganic materials to strengthen recycling; proper disposal of residual waste into an engineered sanitary landfill; specified operational procedures to protect the receiving environment; provision for an efficient site restoration; and closure procedures for existing landfills.

1.4 Project Alternatives

The current waste disposal system has been through controlled dumpsites. Further, controlled dumps are used as an alternative method for sanitary landfills. They show some similarities to sanitary landfills where pollutants are dumped in mixtures. While having the well-planned capacity, these dumps do not associate with cell-planning. The pollution incidents may become complicated and diversified due to the mixed nature of pollutants and the absence of any gas management and proper covering (Kiddee et al., 2013).

A "No-Action alternative" or failure to carry out the project will result in the allocation of land solely to be subject to the current practice. Alternatives in this context refer to the SLF being expanded at alternate locations or the project not moving forward. It is evident that these alternatives will not make up for the drawbacks of allocating land for disposal just to subject it to the SLF practice that is already in place.

Strong layers of loam (silty clay) are what define the location where the present SLF were built, making them an ideal natural barrier. Deep groundwater aquifers that are precisely characterized serve as a complement to this. The geological features on this site can, at this point of the project, be described as a "excellent" site for the creation of an SLF because the groundwater is generally adequately protected. In light of the environmental, social, and economic circumstances, the site is the best choice. Furthermore, waste minimization and recycling techniques can be used to complement and improve this.

1.5 Project Components

Table 1.3 Project Components

Components	Number of Units (Present)	Future Units to be added
Office buildings	1	1
Composting Facility		1
Guard House		1
Eco Building	1	1
Power house		1
Hazardous and special waste facilities	2	1
Gas Vents	15	20
Leachate pond	2	For rehabilitation of present units

1.6 Operation Process/Technology

Environmental issues are a crucial factor in this endeavor to build a sanitary landfill. The project's proponent intends to undertake and start the following distinct processes:

- site preparation;
- construction of building facilities and other civil works; and
- SLF operation.

The project begins in the design phase, which entails the selection and study of the project site, site usage and land-use studies, technical feasibility studies, architectural and space planning, final design development, and contract document phase. Construction activities like civil work, the installation of different electrical and mechanical appliances, plumbing and sanitary installations, security and management systems, support facilities, and other tasks required to finish the project then start.

Construction activities will be carefully managed to protect the environment. The construction shall conform to standards of construction for SLF project and should be environmentally friendly. The scale of construction of the facilities will be characterized by low to medium structural works and intensive sanitary work activities. The aesthetical value of the project site will also be given high degree of importance. The design is such that remaining natural areas will not be further affected.

Heavy equipment will be used only in areas that needed one or more of the following structures:

- drainage and sewerage work;
- electrical and communication lines;
- topsoil stripping or leveling; and
- building foundations.

1.7 Project Size

Sitio Dalig, Barangay Batino, Calapan City, Oriental Mindoro is the proposed location. The Calapan City Sanitary Land Fill is located in an Environmental Conservation Area, which is designed to protect the general welfare of the public as well as to prevent the loss of life and property. As a result, the land uses permitted in this area will primarily be open space and low density developments. The total land area will be 96,743 square meter.

1.8 Delineation of Primary and Secondary Impact Areas

After compiling and assessing all relevant environmental data, the study team proceeded with the three sequential phases of environmental and social assessments – impact identification, prediction, and assessment. Impact identification revealed components of the existing project that may impact the social and physical environment. Impact prediction forecasted the nature and extent of identified environmental impacts and estimated the likelihood of their occurrence. Population groups that may be directly or indirectly affected by the project were identified. Lastly, impact assessment provided an analysis of the beneficial and adverse impacts of the project. The Project's impact areas were identified based on the socioeconomic, and biophysical assessments conducted within and near the vicinity of the project area. Specific impact areas are delineated into two categories: the primary or direct impact areas, and the secondary or indirect impact areas.

1.8.1Study Area

Sitio Dalig, Barangay Batino, Calapan City, Oriental Mindoro

Table 1.4 The Direct and Indirect Impact areas of proposed expansion project in terms of biophysical and socio-cultural impacts

Area Classification	Area Coverage
Direct Impacts Area	➢ In terms of biophysical impact ➢ The 143,257 square meters project area ➢ The adjacent coastline area; and ➢ nearest barangay communities
	In terms of Socio cultural impact ➢ Barangay Batino (host community) as primary beneficiaries of the Social Development Programs (SDP); and Calapan City)
Indirect Impacts Area	In terms of biophysical impact ➢ The adjacent communities whose livelihood will most like be affected
	In terms of Socio cultural impact ➢ Adjacent communities/barangays other than primary beneficiaries' of the SDP that will benefit at a municipal and provincial level from potential revenues and taxes of the project.

Given the technology to be used and the information about the receiving environment, the impacts of the SLF were identified and quantified. Potential adverse environmental impacts induced by the construction and operation of the proposed SLF include: (a) Dust emissions from construction works. (b) Potential generation of odors (c) Potential attraction of vermin and pest in the area (d) Generation of noise from increased vehicular traffic, construction works, and mechanical equipment such as pumps or compressors and (e) associated occupational health and safety hazards. Such impacts are likely to be short-lived, temporary and is expected that the project will bring about a positive environmental benefits wherein impacts are reduced below threshold levels during project implementation.

1.8.2 Equipment and tools to be used during construction

Table 1.5 List of equipment

Component	Number of Units at Present	Future Units to be added
Bulldozer	1	1
Eco brick maker		1
Conveyor	1	
Loader		1
Composter	1	
Shredder	1	
Power Spray	1	1
Manual Spray	1	1

1.8.3 Drainage System

It is acknowledge that in spite of the low rainfall, the presence of irrigation canals may pose as a threat to the landfill area (i.e. damage to irrigation canals causing water infiltrating the landfill area). A drainage system is installed to divert and minimize the risk of irrigation water and/or rainwater infiltrating the waste column.

1.8.4 Perimeter Fence

A perimeter fence with an entrance gate of reasonable height, 2 meters from the ground, shall be installed in order to prevent the entry of unauthorized persons and potential scavengers.

1.9 Development Plan, Description of Project Phases and Corresponding Timeframes

Planning is necessary before construction of the different infrastructures and actual operations begin. The general SLF project activities cover the following phases, namely:

1.9.1 Pre-construction phase

Land and Site Acquisition. The proposed SLF is within the government lands of Calapan City.

*Structural Design Stage***.** An architectural and structural design that is compatible with the area will be adopted by the project proponent. The design is such that the remaining natural areas will be preserved.

- Area capacity and availability
- Hauling distance and time
- Proximity to sensitive groundwater resources
- Proximity to perennial surface water
- Proximity to sensitive land user / vulnerable groups
- Occurrence of flooding
- Local ecological conditions
- Current and future land use
- Seismic conditions
- Geological conditions
- Soil / land conditions
- Topography
- Proximity to residential areas and communities

Considering the siting criteria, it was ascertained that site conditions at the Calapan Sanitary Landfill provides a suitable basis to establish a sanitary landfill, although it is noted that an agricultural plot will be affected.

Securing the permits for the project is a very important aspect during the preconstruction phase. The project will also secure other permits and clearances relevant to the project prior to any construction activities unless permitted by virtue of provisional construction permits.

1.9.2 Construction phase

The project will start with the necessary preparation for construction works. The whole construction works can be described by the following activities:

- Site preparation
- Construction of infrastructures such as Fencing and gates
- Construction of temporary facilities like warehouses, staging areas, bunk houses and related facilities
- Land preparation that include land leveling, construction of access and internal roads, drainage facilities and other horizontal earth works
- Construction of foundations for the major facilities, procurement of materials equipment and other facilities
- Construction of Expansion Landfill
- Construction of the Administrative Building and operations Buildings
- Commissioning

1.9.3 Operation phase

Waste collection trucks and container vehicles will deliver wastes from the transfer station/s. After carrying out formal entrance inspection, these trucks will be ushered to the appropriate disposal area. The precise registration of waste delivered will be carried out through the proper documentation of the type and weight or volume of waste, and the specific location in the landfill where the waste will be deposited.

The acceptance and deposing of waste will be done daily, during the daytime. The prepared disposal areas, which will be filled during the transitional period, will first be covered with a layer of waste to a thickness of about 2.0 m. This will be carried out from the ring roads using a front deposing method with a wheel loader.

The waste compactors will distribute the garbage delivered in an area-filling or horizontal method in layers of < 0.5 m thickness. By doing so and by driving over the layers several times, good homogenization and intensive compaction of the material will be achieved. The deposing procedures will ensure a high degree of compaction of about 0.8 to 1.0 tons/m3 which will minimize the landfill volume required. Static security problems can be excluded on the whole as a result of these methods.

The operator will implement and provide all necessary personal protective equipment (PPE) to ensure the safety of personnel on any possible health risks and probable accidents. Regular monitoring and system checks will be conducted to ensure efficiency and to minimize the incidence of accidents

1.9.4 Abandonment / Decommissioning & closure

Due to its role as a necessary piece of infrastructure for Calapan City SLF’s waste management, it is doubtful that the project will be abandoned before the allocated landfill area is used up. A landfill cell starts to be closed completely once it has been finished or filled. If the landfill's volume were totally depleted, it would be covered and landscaped to blend in with the neighborhood. All other facilities could continue to be run and maintained. If a new location for the services were desired, the area could be planted to blend in with the surroundings and the buildings and structures could be torn down.

Operators must implement a final cover system in accordance with SLF closure criteria to reduce water infiltration, regardless of how little of it there may be, and stop soil erosion. The formal closure plan will be created by the SLF operator and must include the following: Information on the final cover design, its installation techniques, and methodologies. a rough estimation of the landfill's greatest area in need of a final cover. A forecast of the total amount of garbage that will be generated over the course of the landfill's operational life. A schedule for completing all required closure chores. The SLF operator must then ensure that each phase's closure has been completed in accordance with the closure plan that has been approved.

1.10 Manpower Requirements

Labor and employment becomes competitive in nature between and among the local residents and the migrants settling in the area. The competition in labor opportunities may lead to cheaper cost in labor. Thus, labor force will be hired within the nearest barangay, and consequently adjoining barangays of Calapan. The required work force will be hired within the barangay and, consequently, adjoining barangays if not available from within the community. If skilled (technical) employees are not available locally, they will be sourced from other municipalities within the province or beyond.

Pay scale for workers will be based on the regional wage standard. These local manpower requirements will boost the LGUs income and may trigger other livelihood opportunities within the community concerned of the municipality.

During construction, around 11 contractual workers (foreman, laborer, and helper) will be required for about six months. If typhoons, earthquakes, or other natural disasters cause the project to take more time than expected to complete, a new contract will be drafted. Calapan City SLF is expected to employ about 95 people overall, with the current Regular Employee constraint of 2 employees. Additional staff will be hired as needed all through the actual operation.

1.11 Project Investment Cost

The local estimated cost of the Category II Sanitary Landfill Project is around PhP **2,000,000.00.**

Project Timeframe:

The project development will be completed in twenty five (25) years. The project activities schedule to be undertaken is presented in **Table 1.6**.

Table 1.6. Development Schedule of Project Activities.

PROJECT ACTIVITIES	YEAR 1				YEAR 2				YR 3	YR 4	YR 5	YR 6 onwards…	YR 25
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Pre-construction phase													
Acquisition of all necessary permits													
Survey, architectural programming, design and tendering works													
Construction phase													
Construction of buildings													
Construction of SLF facilities and other civil works													
Installation of various electrical and mechanical appliances													
Plumbing and sanitary installations													
Building security and management systems													
Building support facilities and ancillary works													
Operation Phase													
Marketing, promoting and advertising													
Implementation of Environmental Protection													

Table 1.7 Key Environmental aspect

Key Environmental Aspects per Project Phase	Potential Impacts per Envt'l. sector	Parameter to be monitored	Sampling and Measurement Plan			Responsibility	Annual Estimated Cost	EQPL Management Scheme					
			Method	Frequency	Location			EQPL Range			Management Measure		
								Alert	Action	Limit	Alert	Action	Limit
Pre-construction Phase													
Construction and Operation Phase													
	LAND:					Proponent							
Generation of Leachate	Loss of habitats and species indicators	Biological indices of wildlife	Re-vegetation and transect/quadrat method	Quarterly	Project area		PhP 50,000						
Possible Contamination of Soil and Groundwater	Soil exposure	Soil erosion and siltation	Water quality assessment of coastal area adjacent to the SLF	Quarterly	Civil works areas and vicinities Natural drainage ways	Proponent	PhP 100,000						
	WATER:												
Degradation of water quality	Ambient Water Quality	pH, Temperature, DO, TSS, TDS, BOD, turbidity, and color	In situ and lab analysis method	Quarterly	Project area	Proponent	PhP 50,000						
	AIR:												
Generation of Objectionable Odor and Impacts on Air Quality	Increase in TSP	TSP, NO_2 and SO_2	1-hour averaging period	Quarterly	Project area	Proponent	PhP 100,000			230ug/ Ncm 150ug/ Ncm 180ug/ Ncm			
Attraction of Vermin and other pests in the area	Environmental Health and Safety	Health condition of the employees and personnel	household survey (only if necessary)	Once a year	Project affected barangays	Proponent's Consultant	PhP 150,000						
Communities' benefits from the project	Employment; taxes	Employment, taxes, community projects initiated by the proponent and other social issues and benefits of the community from the project	household survey (only if necessary)	Once a year	Project affected barangays	Proponent's Consultant	PhP 150,000						

Information, Education and Communication (IEC) and Social Development Program (SDP)

IEC Framework

The Information, Education and Communication (IEC) component of the project aims to communicate and educate the stakeholders in the priority impact areas on the following aspects:

- Proponent's corporate profile and its claim area
- Laws, policies and legal procedures covering SLF establishment activities
- Importance of SLF establishment to Philippine tourism industry and economy
- Processes and activities in SLF establishment
- Effects and impacts to the community and environment
- Mitigating measures to be implemented
- Opportunities and benefits
- Social obligations

Initially, education levels of stakeholders were determined based on socio-economic surveys conducted. The findings were used to structure the communication survey form to determine knowledge levels, attitudes and communication practices in the area. The results of this communication survey were used to determine the most effective and efficient way to inform and educate the stakeholders and provide the best feedback system.

Table 1.8 IEC Plan/Framework for Sanitary Landfill Project.

Target Sector Identified as Needing Project IEC	Major Topics of Concern in Relation to Project	IEC Scheme/ Strategy/ Methods	Information Medium	Indicative Timing and Frequency	Indicative Cost (PhP)
1. LGUs	▪ Project description coverage, process ▪ Laws, ordinances, agreements	Group method (Brgy.,Mun., Prov.)	▪ Group meetings ▪ Audio-visual presentation ▪ Visual aid (Flip chart)	During application of project claim	25, 000
2. Informal leaders in the communities	▪ Project description, coverage, process ▪ Social values ▪ Environmental concern	Individual and Group methods	▪ Individual interview (socio and IEC) ▪ Group meetings/ discussion	During application of project claim	50,000
3. LGUs	▪ Project description coverage, process ▪ Laws, ordinances, agreements	Group method (Brgy.,Mun., Prov.)	▪ Group meetings ▪ Audio-visual presentation ▪ Visual aid (Flip chart)	During application of project claim	25, 000

Target Sector Identified as Needing Project IEC	Major Topics of Concern in Relation to Project	IEC Scheme/ Strategy/ Methods	Information Medium	Indicative Timing and Frequency	Indicative Cost (PhP)
4. Informal leaders in the communities	▪ Project description, coverage, process ▪ Social values ▪ Environmental concern	Individual and Group methods	▪ Individual interview (socio and IEC) ▪ Group meetings/ discussion	During application of project claim	50,000
5. Residents of areas under considerations in Calapan	▪ Project description, coverage, process ▪ Actual impacts and measures ▪ Benefits/obligations	Group methods	▪ Focus interview ▪ Hand-outs ▪ Invitation letters ▪ Focus Group Discussion ▪ Visual aid (flip chart)	Before application for ECC	15,000
6. NGOs and POs	▪ Project description, coverage, process ▪ Actual impacts and measures ▪ Benefits/obligation ▪ Social duties and responsibilities	Group methods	▪ Invitation letters ▪ Focus Group Discussion ▪ Visual aid (flip chart)	Before application	5,000
7. General Public	▪ Project Status ▪ Schedule of activities ▪ Public safety information	Multi-media	▪ Newsletter ▪ Radio broadcast	At least every quarter during actual operation of SLF establishment	NA