

**RAPID ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR
INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT
PROJECT AT BORAGAON SITE GUWAHATI, ASSAM**



Prepared by

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(GWMCPL)**

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

To implement an integrated approach to Solid Waste Management Practices in Guwahati, GMC got prepared Detailed Project Report for solid waste management of the Guwahati city and got it approved for the grant of Rs. 3516.71 Lakhs under “Jawahar Lal Nehru National Urban Renewal Mission (JNNURM)” Scheme of Ministry of Urban Development, Govt of India.

Thereafter to assist GMC in selecting a suitable developer/ private operator for implementing the Integrated MSW management project on BOOT basis, GMC has appointed Infrastructure Development Corporation of Assam Limited (IDCAL) as a Project Management Consultant for the project. IDCAL is a company incorporated under Joint Venture between IL&FS and Guwahati Metropolitan Development Authority (GMDA). For project implementation, a Special purpose vehicle (SPV) in name of Guwahati Waste Management Company Private Limited (GWMCP) has been setup by IDCAL and all the project related activities and clearances has been housed in the name of SPV.

The proposed integrated solid waste management project shall consist of the following components:

1. **Primary collection of MSW:** Door-to-Door collection of MSW is to be implemented.
2. **Transportation of MSW:** After collection MSW will be transported in the closed/covered vehicles to the processing and disposal site at Boragaon.
3. **Processing and Disposal of MSW:** MSW is to be processed for energy recovery before final disposal into landfill site. Only inerts or processing rejects to be land filled which is to be in range of 20-30% of total waste transported to the site. Processing and disposal site is to be developed at Boragaon. Processing complex would comprise of the following:
 - i. **RDF Plant to handle 500TPD MSW:** Mixed MSW would be converted into Refuse Derived Fuel (RDF) in the RDF Plant.
 - ii. **Compost Plant to handle 50 TPD of Organic waste:** Organic components of MSW segregated during RDF Process will be treated in the compost plant to produce manure.
 - iii. **Power Plant:** Power Plant boiler will be fed with the 180 Tonne per day of RDF having CV in range of 2500-2800 Kcal/kg and 57 TPD of biomass, up to the limit laid as per MNRE Policy/ guidelines to use supplementary fuel for such plants as fuel and will generate 6 MW of electricity.

The Project has two-way integration – integration of all aspects of management of MSW as well as integration of processing technologies so as to result into minimum inerts to the disposal site (landfill).

The processing complex & disposal facility (Sanitary Landfill Facility) is proposed to be set up at Boragaon site, which is along the national highway 37 bypass (NH-37) towards the northeast of Guwahati and 12 km away from the city centre.

2.0 REQUIREMENTS FOR ENVIRONMENTAL CLEARANCE

As per Environmental Impact Assessment Notification dated September 14, 2006 to set-up common municipal solid waste processing and disposal facility, prior environmental clearance is required to be obtained. As per schedule I of the notification, the proposed project falls under Item 7 (i) and will fall under Category B requiring clearance from the State Level Environment Impact Assessment Authority (SEIAA).

Since in Assam, the SEIAA is yet to be notified, hence proposed project requires prior environmental clearance from Ministry of Environment and Forest, GoI.

GMC has initially prepared the EIA report for setting up compost Plant and landfill in the MSW management facility. Considering economic viability and feasibility of project, IDCAL with consent of Guwahati Municipal Corporation & MoUD, has proposed to add two components i.e RDF Plant and Power plant along with the existing components of the project.

Thereafter M/s GWMPCL, has revised the Environmental Impact Assessment (EIA) report based on the base line data generated by IIT Guwahati along with the Environmental Management Plan (EMP) and Disaster Management Plan (DMP) for the proposed project.

The purpose of this Environmental Impact Assessment (EIA) study is to provide information on the nature and extent of environmental impacts arising from the construction and operation activities of the proposed project.

A EIA study report has been prepared for this project based the secondary information collected from the published sources, reconnaissance survey, primary socio-economic survey and environmental monitoring of air, noise, soil, ground water and surface water in the study area. The baseline data was generated on meteorology, air quality, noise levels, ground and surface water quality, land environment including soil quality, land use pattern, biological environment and the socio-economic status. The meteorological data for complete year has also been collected to know the prevailing seasonal conditions. Identification & prediction of significant environmental impacts due to the proposed integrated waste processing facility with an Environmental Impact statement followed by delineation of appropriate impact mitigation measures in an Environmental Management Plan are included in the EIA Report.

3.0 SALIENT FEATURES OF PROJECT

The Salient features of the project for processing & disposal of MSW at Boragaon site are provided below:

Total Project Cost:	Rs.110 Crores
Land area:	24.12 Hectares or 180 bighas
MSW processing capacity	500 TPD
Power generation capacity	6 MW
Water Requirement:	2000 m ³ /day
Source of water:	Ground Water/Surface Water

4.0 SITE LOCATION & DESCRIPTION

The proposed site for Integrated MSW Processing & disposal facility development is located at Boragaon and accessible from National Highway37 at distance of 1 km. The proposed site is 12 kms from city centre. The site is surrounded by Meghalaya hills on the south and the Phatasil hills on the east side. Variable topography is observed in the area. It located close to a small stream, Mora nalha, which is streaming from Garchug village and thereafter joining the Dipar beel at about 1.5 km from the proposed site. The coordinates of the proposed site are:

Latitude	:	26° 06.872'' N
Longitude	:	91°40.896 ''E
Site Elevation	:	46.9m above MSL

5.0 PROJECT UTILITIES/AMENITIES

Fuel /End Products/By products

The proposed integrated waste management facility will have a capacity to process 500 TPD of mixed MSW producing 180 Tonne per day of RDF having CV in range of 2500-2800 Kcal/kg and 57 TPD of biomass, up to the limit laid as per MNRE Policy/guidelines for use as supplementary fuel in such plants will be used as fuel to generate about 6 MW of Electricity. Compost Plant of 50TPD capacity to treat the organic component of waste would also be the part of integrated facility along with development of sanitary landfill to accommodate inerts and processing rejects.

Water

The proposed power plant will be provided with water-cooled condenser for condensing the exhaust steam from turbo generator. The water requirement for the proposed project would be around 2000 m³/day and would be met from groundwater or surface water.

Power

The total RDF used will be about 180 Tonne per day from MSW, which will be fired in power plant boiler along with 57 TPD of biomass up to the limit as per MNRE policy/Guidelines for use as supplementary fuel to generate 6 MW of electricity. The boiler will generate about 27.76 TPH of steam. The total electricity generated after in house power use will be stepped up to 11 KV grid substation at Garchuk.

Road & site drainage

All roads in the plant area will be well-designed bitumen roads and will be of 4 m wide with 1m wide berm on each side. For effective storm water drainage, final finished road will have a camber of 1 in 60 and water bound macadam surface will have a camber of 1 in 40.

Surface drainage will be designed based on the maximum rainfall intensity prevalent in the area over the last 50 years. All the building would be provided with a plinth protection all round, sloped towards the side drain. The side drain will be connected to the main drain on either side of the road.

6.0 ENVIRONMENTAL SETTING OF THE STUDY AREA

The baseline environmental status was assessed based on primary and secondary data collected through on-site field observations and obtained from agencies such as Indian Meteorological Department, Geological Survey of India, State Ground Water Department, State Pollution Control Board, Census of India and Local Forest Department. The following environmental components were focused at during this study:

- Air Environment (Meteorology, Ambient Air Quality, Noise Levels, Traffic Pattern, etc.)
- Water Environment (Quality and Quantity of Surface and Groundwater sources)
- Land Environment (Geology, Hydrogeology, Landuse, Solid Waste generation and characteristics)
- Ecological Environment (Terrestrial and Aquatic Flora & Fauna)
- Socio-Economic

The baseline status collated from analysis of secondary and primary data is summarized in the Table E-1 below.

Table E-1: BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Meteorology	<p>The meteorological data were obtained from the regional meteorological center located at Airport, Borjhar. The meteorological parameters include, wind speed, wind directions and other information, viz. humidity, rainfall, temperature. The annual average temperature observed of maximum mean daily is 29.5 °C and that of minimum mean daily temperature is 19.7 °C. During the study period, the inversion levels (up to 150 to 200m) were observed to be very low, and the prevailing wind direction is observed to be from North-East and East.</p>
Ambient Air Quality	<p>Ambient air quality was monitored at six stations. Selection of air quality monitoring station was done as per MoEF guidelines for conducting EIA study. One station was set up at the project site (core Zone) and two are in upwind direction and three are in down wind direction of the project site. The pollutant concentration levels of NO_x, SO₂, and RPM (PM₁₀ & SPM were measured. It was observed that while the concentration levels of NO_x and SO₂ were well within the prescribed limits at all locations, the SPM & RPM concentrations exceeded the limits at two locations</p>
Noise Levels	<p>Noise monitoring was carried out at different locations at and around the site. The noise levels at day & evening time noise levels recorded at the junction of NH-37 and the access road were found to exceed the noise standards due to heavy traffic.</p>
Water Quality	<p>The assessment of water quality in the study area was done and compared with the drinking water standards prescribed by CPCB. After studying the drainage pattern of the study area and proximity to the site, 2 samples of surface waters were collected, one is, from Mora nalha at the Garchug (passing through the proposed site) and the second is, from the water body near the project site. The physico-chemical parameters are well within the prescribed limits for the drinking water standards.</p> <p>Three ground water samples were collected from the existing sources. One is, from IASST towards east of the site, Second is, from a residence in Paschim Boragaon towards the north of the site, and the third is, from the Maghuwapara village towards the south of the site. The water quality with respect to almost all was observed to be of good and acceptable quality except for the concentration of iron which was found to be very high.</p>

Attribute	Baseline status
Ground water Availability	The aquifer in the area is composed of brownish soil mixed with loose sand. The average depth to groundwater is about 7 to 15m. Groundwater flow is generally west
Soil Quality	To assess the baseline soil quality in the study region, four soil samples were collected and analyzed at three locations. The surface soil at the proposed site is silty brown, mixed with fine grained sand. The soil being mostly loose sandy for a significant depth has more water contaminant filtering capacity. The share of oxygen and silica content in the soil is more compared to others, however, other macronutrients, nitrogen, phosphorus and potassium have been found in very insignificant amount. The depth of rock in the area is over about 100m. The soil is observed to be having high cation exchange capacity and low soluble ions. The soil is slightly acidic with low nitrogen and phosphate
Socio-economy	The study area is scarcely populated and because of wetland and forested (hills) steep slopes, there are no proper roads and other amenities of life. Around the site, few numbers of small villages like Devchatal, Pamahi, Maghuwapara, Garchug and Pashim Boragaon are situated. The land adjoining the site for integrated waste management facility is acquired by LIC and tea industry. In the study area maximum number of people are found to be engaged as “other workers” in economic activity like Government/Private service, teachers, factory workers, commerce etc. negligible population is involved in agricultural activities.

7.0 ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PLAN

Environmental impact due to the construction and operation stages of the project were predicted quantitatively using models such as ISCST3, which is a steady-state Gaussian plume model, is used to assess pollutant concentrations around the power plant, highway noise level model for noise impacts. Impacts were also evaluated qualitatively using engineering judgment and best management practices.

Adequate environmental management measures will be incorporated during the entire planning, construction and operation stages of the project to minimize the adverse environmental impacts and assure sustainable development of the area.

The impacts during the construction phase will be temporary in nature. This summary details the pollution sources and mitigation measures proposed for the project.

7.1 AIR ENVIRONMENT

During the construction phase, operation of construction equipments and vehicles will be the main sources of pollution. A dust control plan will be implemented and regular maintenance of vehicles and equipment will be carried out.

During the operation phase, the main sources of pollution shall be boiler stack emissions, emissions from RDF plant, fugitive dust and odor emissions from waste handling and processing and emissions due to vehicular movement. Adequate mitigation measures shall be implemented. Emissions from waste handling areas shall be controlled by provision of covered areas, proper ventilation. Herbicides will be sprayed to discourage further decomposition of MSW. The RDF plant shall be provided with adequate dust control systems such as cyclones, bag filters to control the dust emissions. The boiler will be provided with adequate stack height of 65 m and an ESP shall be provided to reduce the PM emissions. NO_x emissions shall be controlled by admission of secondary air and maintaining temperature balance. A gas recirculation system shall be provided to reduce CO formation. Dioxins and Furans shall be controlled by extensive segregation to ensure complete removal of chlorinated compounds, controlling PM emissions and appropriate furnace design. In addition to this, a High Performance dioxin removal device (Activated Carbon Packed Column) shall be provided.

7.2 NOISE ENVIRONMENT

During the construction phase, adequate mitigative measures such as controlled time of construction, job rotation etc. will be implemented.

During the operation phase, the sources of noise emissions shall be equipments such as shredders, boilers, generator etc and vehicular movement. Noise enclosures shall be provided wherever possible and workers shall be provided with earplugs.

7.3 WATER ENVIRONMENT

Construction activities for the proposed development can have minor impact on hydrology and water quality of the area as the construction waste will not be leached into ground or any surface water body.

During the operation phase, activities responsible for the impact on the surface waters are, uncontrolled discharge of surface waters, leakage from the engineered drainage systems, runoff from the raised landfill areas, deposition of air pollutants and removal of vegetated areas. During this phase, these activities may cause significant change in the surface water quality.

Approximately 2000 m³/day water from groundwater or surface water will be utilized for plant operation. Effluent generated from the process will be treated adequately and disposed off into the near by stream.. Spill over from the process would be collected and treated prior disposal.

The effluent generated from the MB unit regeneration waste and boiler blow down will be discharged after suitable treatment. Filter backwash water and cooling tower blow down will be discharged after treatment. The small quantities of leachate generated will be collected in the sump and treated in Effluent Treatment Plant.

7.4 LAND ENVIRONMENT

The proposed project will be developed on the existing waste disposal site; hence, no change in the land-use of the site due to the proposed project is anticipated. With the site development for the proposed plant, green belt of 2.5 m to 3.0m around the periphery of project site would be developed and other aesthetic changes would be made at the plant site, there by creating overall positive impact on the aesthetics of the site.

During operation phase of the project, the rejects from waste segregation system/RDF plant. Will be disposed at the landfill site, which is about 20-30% of total MSW. The fly ash generated will be supplied to local brick manufacturing units. The bottom ash from the power plant shall be supplied to low cost housing units or disposed off at landfill.

7.5 ECOLOGICAL ENVIRONMENT

Deepar beel is an ecologically sensitive area is about 1.5 km from the site. It has been declared as one of the Ramsar Site and is recognized as wetland of national importance. The beel is the natural habitat of many species of birds, various aquatic life and vegetation. However, as this is located at a distance of about 1.5 km, the impact of the plant on this area will be negligible. The mitigative measures for air emissions as well as waste water treatment will further reduce the possibility of impact on Deepar beel.

The existing land cover and physiognomy support plant species typical of habitats and having a low plant diversity and simple structure. During the construction stage; there will be removal of shrubs and herbs at the site. It will be temporary and the proposed peripheral greenbelt will provide a much better habitat for those species than earlier.

The impact on ecological environment is suitably compensated and mitigated adopting comprehensive EMP.

7.6 SOCIO ECONOMIC ENVIRONMENT

The proposed project will lead to employment generation and will have a positive impact on the socio economic environment. Preference to local population shall be given in employment opportunities. Adequate mitigation measures will be put in place or implemented to reduce odor emissions and disease vectors from proposed site.

8.0 ENVIRONMENTAL MANAGEMENT SYSTEM

For the effective implementation of the EMP, an Environmental Management System (EMS) will be established at the proposed project. The EMS will include the following:

- An Environmental Management cell
- Environmental Monitoring Program
- Personnel Training
- Regular Environmental Audits and Corrective Action
- Documentation – Standard operating procedures Environmental Management Plans and other records.

9.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

For the effective & safe implementation Municipal Waste Processing project, it is important to identify associated safety hazards and carry out a basic risk assessment; an effective risk assessment & disaster management plan has been proposed as part of EIA report. Risk assessment & disaster management plan includes:

- Critical aspects including safety culture, training and awareness, relationships and training of contractor staff and many others.
- Safety measures, possibility of accidents either due to human errors and/ or due to equipment/ system failure.
- Disaster management and response plan to minimize the adverse impacts due to an unfortunate incident and disaster Management aspects.

10.0 CONCLUSION

All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Thus implementing the proposed project will not have any appreciable negative impacts. Moreover, the landfill area requirement will reduce significantly as the about 75% to 80% of solid waste will be converted into usable form and only inerts (20-25%) would be sent for disposal at landfill site. This would save upon the future requirements of area for land filling. Generation of green power would be an added advantage.

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