Executive Summary

INTRODUCTION

The proposed project is development of Common Municipal Solid Waste Management Facility (CMSWMF) to cater to the needs of municipal solid waste generated from domestic, commercial, industrial activities in Bilaspur Municipal Corporation (BMC) area. As per SWM rules 2016, an Environmental Impact Assessment (EIA) of a proposed landfill site is required to be carried out before developing the landfill facility. EIA involves systematic identification and evaluation of the potential impacts of proposed projects. It assists in planning and programming of proposed actions related to the physical, chemical, biological, cultural, and socio-economic components of the total environment within the study area.

The solid waste being generated in the city is presently being openly disposed in open dumping. There is no facility for processing MSW at Bilaspur which will reduce the associated environmental and public health problems of BMC.

Bilaspur recorded maximum decadal growth rate of 121.80 percent during 1951-61 and subsequently a gradual decrease in the growth rate. The population of the city as per the 2001 Census was 3.18 lakhs. Population has increased to around 8.15 times over five decades. The approximate quantity of MSW generated is 181 TPD from a population of 3.56 lakhs distributed in 55 wards and the six villages including the commercial establishments. The Arithmetic Progression Method of population has been adopted for the present project. The average per capita generation of waste from households is estimated at 350 g/capita/day.

BMC has proposed integrated approach for solid waste management including primary collection, treatment and disposal. BMC proposes to develop an appropriate system for providing full and uniform coverage of the entire city population across all categories of settlements and income groups. Biodegradable portion of the MSW will be treated using aerobic windrow composting. The non-biodegradables with higher calorific value will be converted to Refuse Derived Fuel (RDF). All inert material shall be sent to the Sanitary landfill. Maximum expected waste to landfill will be 20% of the existing waste

The organic fraction of the waste will be converted to manure by aerobic windrow composting. For this - 150 TPD compost and for low density, high calorific 100 TPD RDF plant is proposed for Bilaspur.

The rejects and inert materials from the processing plant shall be land filled at the engineered sanitary landfill as per SWM rules 2016. The design volume of the sanitary landfill over its design life of 30 years is estimated at 9.42 lakh cubic meters and the area requirement will be about 16 acres for developing the processing facility and landfill.

The estimated cost of the Project is as follows:
Capital expenditure (CAPEX): =25.41 crores
Operational Expenses (OPEX): =13.79 crores

Draft EIA/EMP report has been has been prepared as per the standard ToR awarded by the SEAC.

Location of the project

- NE Boundary 22 ^{0} 10' 48.6 "N 82 ^{0} 07' 42.8"E
- NW Boundary 22 ^{0} 10' 53.9"N 82^{0} 06' 50.4 "E
- SW Boundary 22 ^{0} 10' 45.5"N 82^{0} 06' 43.4 "E

- SE Boundary 22 ^{0} 10' 36.0"N 82^{0} 06' 56.7 "E

PROJECT LOCATION AND ACCESSIBILITY

The proposed sanitary landfill area is **located at Kacchar, about 15 kms from Bilaspur**. The site is located between **Kachhar and Sendri village at a distance more than 0.5 km**. The site has an **area of 25 acres**. The site fulfils the siting guidelines of SWM rules 2016, EIA notification 2006 and CPHEEO guidelines; Knock out criteria of CPCB, etc.

The key of site assessment in especially terms of ecological and environmental sensitivities are given below.

- The Site is easily access to Amtara road which is diverted from National Highway -130 which is approx 1.21 km SE of the project site.
- The proposed site is near to Usalpur railway station which is 8 km South of the project site and Bilaspur airport more than 25 km of the project site.
- Nearest densely populated or built up area Sahupara which is 1.18 km Approx SE of project site
- The ground water is beyond 8 m depth at the proposed site.
- The proposed site in Kacchar falls under Zone II which is least active
- Arpa River is approx 600 metres west of project site
- Site Assessment was carried out using Delphi technique and Landfill Site Kachhar score is 411.25 which can be ranked as moderate on the scale of 300 to 750 moderate.

PROJECT ACTIVITIES

All the waste collected through primary collection system, from the households, shops and establishments has to be taken to the processing or disposal site either directly necessitating a large fleet of vehicles and manpower or through cost effective systems which are designed to ensure that all the waste collected from the sources of waste generation is temporarily stored at a common place called "Waste Storage Depots" comprising of community bins and then transported in bulk to the processing or disposal sites.

Details of segregation of Municipal Solid Waste at household level and on site
There is no practice segregation at source currently in Bilaspur. The following scheme for SWM rules 2016 in Bilaspur has been proposed.

Step-1: Segregation of MSW at source and Collection from the house holds
Step-2: Transportation of MSW to transfer station and then to waste processing facility
Step-3: Segregation of MSW at facility for processing
Step-4: Shredding of the compostable waste to desired particle size
Step-5: Composting of the biodegradable waste
Step-6: Disposal of non bio-degradable solid waste in to Secured Landfill Facility

BASELINE ENVIRONMENTAL MONITORING IMPACTS AND MITIGATION MEASURES

Baseline monitoring was carried out for the air, water, noise, soil and traffic in the month of October-November 2016

Impact on Ambient Air quality
Ambient air qualities in three locations (one upwind and two in downwind directions) are measured in terms of various pollutants present in the surrounding air and were found within permissible limits. The maximum proportion of these pollutants has been released from the vehicular exhausts.

During the **construction phase**, PM_{10} & $PM_{2.5}$ is expected to be the main pollutant associated with on-site roads (paved and unpaved), stockpiles and material handling. The proposed activities during construction phase would primarily involve development of site and construction of new plant.

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.

On site Odour Control Measures

- **Green Belt Development**
  Odour can be reduced by developing green belt for counteracting smell, counteracting chemicals. 153923.92 sq feet green belt will be developed in the 14 % of the project area.

- Nozzles, sprayers and atomizers that spray ultra-fine particles of water or chemicals can be used along the boundary lines of area sources to suppress odours.

Water Environment
Ground water will not be extracted for the project purposes and hence there will be no impact on groundwater from the proposed project. Impermeable lining is proposed .so that ground water is not polluted by leachates from SLF/compost pad area.

All the analysed results for the parameter BOD, COD, pH, Pb, SO_4, NO_3 and all heavy metal are under permissible limit, No impact in surface water quality; as there will be no discharge for the proposed project.

Two ground water sample one from on-site (boring) and other from near site (within 1 Km from the site) were collected for their water quality assessment in the study area.

Impact on Drainage & Hydrology

The regional drainage pattern would not be affected by the project activities as the natural drainage channels and pattern during the construction and operational stage would not be changed. The local drainage pattern and drainage slopes would be factored in to the design of the SLF and its various facilities. The nearest water body Arpa River is 600 m from the project site.

Drainage Layer

A drainage layer, consisting of gravel with a grain size of 16/32 mm will be applied to assist drainage of leachate. Gravel will consist of uniform sizes and be washed to ensure a high permeability. Perforated HDPE leachate collection pipes will be embedded in the drainage layer to further assist leachate collection. Leachate will drain towards the leachate pond. The thickness of the drainage layer will be at least 300 mm. The gravel has to fulfill the following quality standards:

a. **Permeability kf 1 x 10-3 m/s and b. maximum 20 mass-% of carbonate.**

Impact on Groundwater

A project may be deemed to have a significant impact on groundwater resources if the pertinent project components like liner and leachate management system is not properly installed and effectively functional. The major source of pollution is the leachate from the landfill site entering into soil and thus ground water.

Leachate Collection System

Estimation of Leachate Generation

The volume of the leachate pond will be calculated with the appropriate rainfall data and assumed evaporation rates in order to ensure a sufficient storage capacity with no need to discharge any leachate water at any time during operation

Leachate Collection Pipes

Leachate has to be collected via HDPE leachate drain pipes. The leachate system has been designed in order to enable inspection (via manhole) during operation.

Lacehate management and Treatment

An ETP is proposed for the treatment of leachate generated. Sludge generated will be dried and land filled.

Storm water Collection System

Appropriate rain water tanks (storm water ponds) with dimension 53x53m will be provided

Impact on Soils

During the operation phase, the wastes will be compacted and covered each day with thin layer of soil or construction debris material. Therefore, the soil characteristics of the region would not be affected by the project activities.

- **Surface Sealing System**

General

To avoid negative impact of the landfill body a surface sealing system has to be installed after the filling of the landfill or parts of it (landfill cells) are completed. The sealing system has to fulfill the guidelines and

technical requirements as defined in the EIA and in the SWM rules 2016. The surface sealing system has to fulfill the following requirements:

1) 300 mm compensation layer,
2) 600 mm mineral sealing layer (clay), kf < = 1 x 10-9 m/s
3) 150 mm drainage layer, kf 1 x 10-2 m/s
4) 450 mm re-cultivation layer.

After reaching the highest level of each construction phase, as final cover, the surface sealing system has to be placed on top of the waste body. The surface sealing system will be constructed with a maximum slope of 33 % in the embankment area.

Compensation Layer

After completing the waste filling, the waste surface will be re-profiled according to the planned inclination of the surface sealing system. Above the waste surface, the compensation layer made of a homogenous non-binding material will be applied. The thickness of the layer will be 300 mm. The layer will be the foundation for the mineral-sealing.

Mineral Sealing Layer

On top of the compensation layer a mineral sealing layer with a thickness of 600 mm (after compaction) will be placed. This layer will be incorporated in two layers of 300mm each (after compaction). The mineral sealing layer of the surface has to fulfill the same quality standards as the mineral sealing layer of the base.

Re-cultivation Layer

The re-cultivation layer (topsoil) will be used for the final restoration of the site. The recultivation layer will have a thickness of at least 450 mm. Plants will be placed in accordance to the local flora as provided in the vicinity of the site. In order to protect the sealing system, deep rooting plants must be avoided. The plants have to protect the total sealing system against wind and water erosion and have to minimise rainwater infiltration.

Source: DPR

Impact on Land Use

The proposed project is developed as per the draft Development Plan 2031.

Impacts on fauna and flora

On site species are commonly found in the study area as well. Threatened species are not present on site. Therefore, the proposed project is not anticipated to impact on flora and fauna.

Onsite trees *Schleichera oleosa* (Kosam) and *Butea monsperma* (dhak) found on the site would be retained as part of the proposed green belt or translocated with in and around the site so that tree felling is avoided. This would enhance the green cover of the proposed site and its surroundings. Trees with nests of avifaunal species, if any, should not be disturbed.

Impact on Noise Quality

Construction activities are likely to increase noise levels as well as vibration. Noise during operational phase will be due to vehicular movement and land filling machinery compost plant. These can be minimized by development of 14% of the area as green belt.

Impact on Traffic

Traffic analysis was carried out on NH-130, Bilaspur –Raipur road which is at distance of 1.21 km from the project site. No anticipated impact on traffic envisaged.

Socio-economic Impacts

Socio- Economic aspects will be maximally benefited from the operational activity of this project. During construction stage, local labour may be required. However, the labour force involved during construction stage will have more skilled manpower to operate and maintain the project during normal operational hours.

Positive Impacts include employment generation, infrastructure development.

Impacts on Occupation health

During construction phase, workers may have the risks on their health due to waste handling, operating machines, etc. These risks can be mitigated by implementing recommended mitigation measures.

Impact of Infrastructure

(i) **Improvement in health and civic amenities:** After the completion of the construction of this project improvement in health and civic amenities is expected as it will provide good solid waste management in local areas and municipal areas serviced by BMC.

(ii) **Improvement of access and internal roads:** Access road to the site will be improved which will be beneficial to other users of the road**.** Besides, road safety measures will be taken including construction of internal circulation road with in the site.

(iii) **Anticipated secondary development:** The said site in revenue record is recorded in head "Ghas" (grass) and is vacant. However, secondary development is anticipated around the site which will benefit local communities.

Site Security Measures

The site is currently secured by a concrete wall and entry point will be manned.