

Executive Summary

for

Integrated Solid Waste Management Facility by Nanded Waghala City Municipal Corporation (NWCMC)

[Schedule 7(i) “Common Municipal Solid Waste Management Facility (CMSWMF)”,
Category B]

Capacity: 44.34 TPD

Proposal No: SIA/MH/MIS/61701/2021; SIA/MH/MIS/61701/2021,
ToR Letter, dated 20th March, 2023

Submitted by



Nanded-Waghala City Municipal Corporation (NWCMC)

Nanded-Waghala, Nanded, Maharashtra 431601

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Study Period: Dec 20 to Feb 21



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Integrated Solid Waste Management Facility by Nanded Waghala City Municipal Corporation (NWCMC) at Gut no. 372, Dawle Road, Milk Dairy Road, Near MIDC, Bheemwadi Village Tuppa, Nanded-Waghala, Nanded, Maharashtra – 431602.



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Executive Summary

1. Project Description

Nanded-Waghala is a city in Maharashtra state, India. It is the eighth largest urban agglomeration of the state and the eighty-first most populous city in India. It is the second largest city in Marathwada subdivision. Nanded-Waghala is the centre of governance of Nanded-Waghala district. Nanded is located at 19.1383° N, 77.3210° E. It has an average elevation of 362 metres (1188 feet). It has an average rain fall of 949.8 mm. It has maximum temperature of 44.4°C and a minimum temperature of 7.7°C.

Nanded will generate around 354.53 TPD MSW (in accordance to 2032 population) out of which 55.25 % (195.88 TPD) is wet waste, 29.07 % (103.06 TPD) is dry waste and 15.67 % (55.59 TPD) is inert waste. At present, all the waste generated from the city is openly dumped at the dumping site (Gut no. 372) which is 15 km from the urban local body (ULB) on Dawle Road, Milk Dairy Road, Near MIDC, Bheemwadi Village Tuppa, Nanded-Waghala. The area of this site is 9.89 Hectare. This site has been used as a dumping site since 2012. Nanded is facing the crisis to treat and dispose its garbage in a scientific manner in adherence to SWM Rule 2016. Nanded Waghala City Municipal Corporation (NWCMC) is now planning to have a municipal waste processing facility at the existing dumping site.

The proposed Integrated Solid Waste Management Facility (ISWWMF) has mainly been designed to process the inert waste that is obtained from segregation during windrow composting process. As per Environment Impact Assessment Notification dated 14th September 2006, the proposed project falls under schedule 7(i) – “Common Municipal Solid Waste Management Facility (CMSWWMF)”, it is categorized as Category ‘B’. The ISWWMF has been designed at the capacity of 44.34 TPD. The site is located in the dumping site (Gut no.372) which is on Dawle Road, Milk Dairy Road, Near MIDC, Bheemwadi Village Tuppa, Nanded-Waghala. The total area for the municipal waste processing plant is 98900 sq.m. (9.89 Hectares), out of which 14500 sq.m. (1.45 Hectares) is reserved for the development of the proposed ISWWMF.

1.1 History of the Project

Nanded Waghala City Municipal Corporation (NWCMC) has identified the project site which is located in Bheemwadi Village Tuppa, Nanded-Waghala, Nanded. The land is in possession of NWCMC and allotted by MPCB authority. The plot allotment letter is addressed in Annexure-2.1



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Table 0.1: Salient Features of the Project

Name & Address of Company	Integrated Solid Waste Management Facility at Gut no. 372, Dawle Road, Milk Dairy Road, Near MIDC, Bheemwadi Village Tупpa, Nanded-Waghala, Nanded, Maharashtra – 431602 by Nanded Waghala City Municipal Corporation (NWCMC)				
Schedule of project as per EIA Notification, 2006	7(i) – “Common Municipal Solid Waste Management Facility (CMSWMF)”.				
Category of Project	B				
Total Area Details	Components	Total proposed Area (Sq. m.)			
	Total Plot Area	98900			
	ISWMF Area	14500			
	SWM Plant	22400			
	Legacy Waste	62000			
	Green belt Area (33%)	32637			
	Note: Around 32637 sq. m of greenbelt will be developed in the plot premises and approximately 8100 trees will be planted.				
Production Details	Proposed designed capacity 44.34 TPD.				
Water Requirement of Project	During Construction stage: 25 KLD During Operational stage: 5 KLD				
Effluent Generation	Leachate generation is from the process 91.785 m ³ /day.				
Effluent Treatment	Leachate tank.				
Domestic Effluent generation	12 m ³ /day (Will be treated in STP -15 KLD)				
Details of recycled water	STP treated waste water 12 m ³ /day will recycle and reuse.				
Power requirement of project	Source: Maharashtra State Electricity Distribution Company Limited (MSEDCL). Total Power requirement: 45 kW				
Construction material	Construction material	Quantity in MT	Source	Mode of transport	Distance from source in Km
	Stone	45	Quarry	By truck	12
	Aggregates	280	Quarry	By truck	12
	Sand	142	Local Vendor	By truck	2.5
	Soil	4734	site	By truck	2.5
	Cement	71	Vendor	By truck	2.5
	Steel	192	Vendor	By truck	2.5
Total Manpower	During the construction phase: 25 workers During operational phase: 5 workers				
Project Cost	27.81 Cr				
EMP Cost	Construction phase EMP cost - 53.67 Lakhs Operational phase EMP cost - 93.62 Lakhs O & M cost during operational phase - 23.85 Lakhs/Annum				

1.2 Justification of Project

The NWCMC will have facilities to process biodegradable waste, recyclables and inert waste. It has been planned to adopt composting technology for treatment of biodegradable organic fraction of the waste.



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Recyclables will be segregated and sent for further processing while the inert waste will be disposed in a sanitary landfill site. The project has been planned in such a manner that the emphasis shall be laid on maximizing resource efficiency and for promoting 4R's-Reduce, Reuse, Recycle, and Recover. The facility will make a significant contribution in diverting the municipal waste reaching the landfill sites and also reducing the load on the existing waste management/ processing facilities in the city.

2. Description of Environment

The study area is 10 km radial distance from the center of the project site. All the monitoring has been completed in various locations within the study area during the period of December 2020 to February 2021. The baseline data was generated by undertaking site visits, primary environmental monitoring, ecological surveys, social surveys and interviews, processing of satellite imagery for establishing existing land use of the area and secondary data review from established sources such as Indian Meteorological Department (IMD), Census of India, Survey of India, Maharashtra Forest Department, etc.

Table 0.2: Number of sampling location for Baseline Monitoring

Season	Period of collection		Number of monitoring locations						
	From	To	Meteorology (Nos.)	Ambient Air Quality (Nos.)	Surface Water Quality (Nos.)	Ground water Quality (Nos.)	Ground Water Level (Nos.)	Noise Level (Nos.)	Soil Quality (Nos.)
Winter	December 2020	February 2021	01	08	02	06	01	08	06

2.1 Meteorological Parameters

Table 0.3: Meteorological details from December 2020 to February 2021

Sr. No.	Parameter	Min. Value	Max. Value	Mean Value
1	Temperature (°C)	12.14	41.93	29.43
2	Wind Speed (m/s)	0.03	4.51	1.89
3	Relative Humidity (%)	5.38	97.69	33.40
4	Rainfall (mm)	Total rainfall	No. of rainy days	Average annual rainfall
		3.32	0	0.2
5	Predominant Wind direction	SW to NE		



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2.2 Air Environment

The ambient air quality monitoring network of 8 locations as per Standard ToR was designed based on the prominent wind direction as per the analysis of meteorological data. The sampling was carried out with twice a week frequency as per the NAAQS Notification of November 2009.

Core Zone: The study reveals that PM_{10} , $PM_{2.5}$, SO_2 , NO_x , concentration was observed to be in the range of (87.78-68.42 $\mu g/m^3$), (54.36-37.45 $\mu g/m^3$), (58.56-34.42 $\mu g/m^3$) & (40.22-24.56 $\mu g/m^3$) respectively.

Buffer Zone: The study reveals that PM_{10} , $PM_{2.5}$, SO_2 , NO_x , concentration was observed to be in the range of (53.82-6.56 $\mu g/m^3$), (86.64-11.56 $\mu g/m^3$), (56.84-4.49 $\mu g/m^3$) & (38.54-4.42 $\mu g/m^3$) respectively.

The Ambient Air Quality Monitoring was carried out for criteria pollutants only namely $PM_{2.5}$, PM_{10} , NO_x & SO_2 , which were found within the NAAQS and standards prescribed by the CPCB during the monitoring period.

2.3 Noise Environment

The noise monitoring was conducted at eight locations for 24 hr, once in a week and average hourly readings were recorded in the Core zone & buffer zone.

Industrial Area: The Leq (Day) was observed 62.24 dB(A). The Leq (Night) was observed 52.32 dB(A).

It should be noted that the noise levels during the day time as well as night time were observed to be under the prescribed standards by CPCB i.e., for Industrial Area (75 dB(A) & 70 dB(A) for Day & Night respectively).

Residential Area: The Leq (Day) was observed to be in the range of (43.88-50.32 dB(A)). The Leq (Night) was observed to be in the range of (22.45-26.3 dB(A)).

It should be noted that the noise levels during the day time as well as night time were observed to be under the prescribed standards by CPCB i.e., for Residential Area (55 dB(A) & 45 dB(A) for Day & Night respectively).

2.4 Water Environment

Six groundwater and two surface water samples were collected from the study area for analysis of the existing water quality in the area. For surface water samples, water from nearby passing canals were collected and for ground water, samples from borewells and handpumps were collected.



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2.4.1 Ground Water Study

Core Zone: The pH of samples was found to vary between 6.21–6.71. The concentrations of Total Dissolved Solids were in the range of 1008 mg/l to 4256 mg/l. Total Hardness were observed to be ranging between 737.2 to 2061.25 mg/l. The Sulphate concentration was found to be in the range of 84.5 mg/l to 23.6 mg/l. The Lead concentration was found to be in the range of 0.09 mg/l to 0.098 mg/l.

Buffer Zone: The pH of samples was found to vary between 4.1–8.9. The concentrations of Total Dissolved Solids were in the range of 644.1 mg/l to 791.4 mg/l. Total Hardness were observed to be ranging between 475.3 to 591.7 mg/l. The Sulphate concentration was found to be in the range of 4.66 mg/l to 63.2 mg/l. The Lead concentration was found to be in the range of 0.095 mg/l to 0.104 mg/l.

2.4.2 Surface Water Study

Core Zone: The pH of sample was found as 5.92. The concentration of Total Dissolved Solids was 724.5 mg/l. Total Hardness was observed to be 693.55 mg/l. Sulphate was observed to be 66.3 mg/l. Chloride was observed to be 65.51 mg/l.

Buffer Zone: The pH of samples was found to vary between 7.42–7.75. The concentration of Total Dissolved Solids was 8184 mg/l. Total Hardness was observed to be 1076.7 mg/l. Sulphate was observed to be 142.48 mg/l. Chloride was observed to be 1496.8 mg/l.

2.5 Soil Environment

Core Zone: The pH of samples was found to vary between 7.54-7.76. The concentration of Available Nitrogen, Available Phosphorus & Available Potassium was found to be ranging between 62.62-125.44 kg/ha, 2.62-17.25 kg/ha & 303.52-730.24 kg/ha respectively. The concentration of total organic carbon was found to be ranging between 0.3-1.13%.

Buffer Zone: The pH of samples was found to vary between 7.61-7.75. The concentration of Available Nitrogen, Available Phosphorus & Available Potassium was found to be ranging between 87.81-137.98 kg/ha, 16.8-35.35 kg/ha & 322.56-1369.76 kg/ha respectively. The concentration of total organic carbon was found to be ranging between 0.68-1.35%.

2.6 Biological Environment

Primary data/Baseline data was collected in the form of inventory of the floral & faunal species found during the survey:



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Flora : A total of 15 plant species were recorded in randomly sampled five locations within the project site boundary. The dominance and abundance of herbs and grasses was observed to be more in the project area. A total of 66 plant species were recorded in buffer area of which 31 were trees, 10 were shrubs and 19 were herbs and 6 were grass species.

It was observed that quartile I & IV show higher species richness and compositions than quartile II, as it falls in high build-up areas like residential layouts. Higher tree species diversity was found compared to shrub diversity due to planting of avenue trees in most of the residential layouts and parks. The average Shannon index for tree species and shrubs over all four quartile is 1.86 and 1.32 respectively. Quartile IV has witnessed highest Shannon index for tree species while Quartile II has lowest Shannon index among the all four quartiles. Whereas, Shannon index for shrub is vice-versa with highest in quartile II and lowest in quartile IV.

Fauna The birds, mammals and reptiles were sampled within 10 km of buffer area and the same was collated with the published literatures for the region. It was observed that there were around 102 species of birds, 12 species of mammals, 14 species of Butterfly, 11 species of reptiles, 2 species of fishes, and 3 species of frogs in Nanded region.

Mammals: As per Indian Wildlife Protection Act Schedule species, 2 species under Schedule-I, 2 species of Schedule-II, 1 of Schedule-III, 5 species of Schedule-IV, and 2 species of Schedule-V were observed.

Reptiles: As per the wildlife Protection act, one species under Schedule –I, 3 species under Schedule –II, and 6 species in Schedule – IV were recorded.

Butterflies: As per the Wildlife Protection Act, all the 14 species fall in to the Schedule –II and all the species fall under are local and least concerned category as per IUCN.

Fishes and Frogs: As per the wildlife Protection act, all the 5 species fall in to the Schedule – IV, and all are common and local species and under Least Concern category as per IUCN.

Avifauna: As per the Wildlife Protection Act 1972, all the species reported were under Schedule IV. As per the IUCN, 17 species were local migrant, 5 species were least concerned, 72 species were local resident, 3 species were winter migratory and status of 3 species is not clear.

2.7 Socio Environment

The present study was carried out with the help of both primary and secondary sources. Questions were asked to respondents to seek their opinions, perceptions and aspirations regarding the proposed project.



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Opinions are an important vehicle through which one could understand the existing mental attitude of people in general and groups, and community in particular.

- Concerning the sex structure of the respondents, 50 % of the respondents were males while 50 % were females. The average household size was found to be 4 members.
- Most of the respondents are private employees working in the industry sector. Also, some people have self-employed occupations like Motor garage, small shops, fruit and vegetables sellers. Out of the working respondents, 2% are working in government jobs like Primary and secondary Teacher, Irrigation Engineer, etc.
- Basic amenities are measured through the availability of drinking water facility, toilet, drainage, garbage disposal, electricity, cooking fuel etc. most of the respondents use LPG Gas for cooking fuel Also some respondents use wood as a fuel (in rural areas). Gram panchayats provide drinking water in Gaothan area; other area respondents use their own well water and Borewell water for Drinking.
- When asked about the most pressing problem faced in the surrounding area, respondents highlighted the Road quality problem in the study area. Also, traffic problems in gaothan area because of long vehicles coming from MIDC and Industrial area. All respondents used a Pakka type of house having Cement Concrete and Tin shade.

Many respondents were aware of the project, which reflects that the project proponent has carried out regular consultation with the local peoples. All of the respondents are in support of the project fully, but they need regular flow of information from the point person provided by the community as well as the project person regarding the progress of the project. Their only demand is to give the preference to local people for labour contractors, transporters and raw material suppliers etc. in construction phase and job opportunity in operation phase.



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3. Anticipated Environmental Impacts and Mitigation Measures

Table 0.4: Summary of Impacts & Mitigation Measures during Construction & Operation Phase

Sr. No.	Environmental Parameters	Impact	Proposed Mitigation Measures
Construction Phase			
1.	Air Quality	<ul style="list-style-type: none"> Dust emissions from site preparation, excavation, and material handling. Fuel combustion & vehicular movement. 	<ul style="list-style-type: none"> All storage piles and exposed soil/debris shall be adequately wetted or covered with plastic to ensure protection of ambient air from fugitive emission during wind storm; Wet suppression will be applied to all inactive disturbed surface areas on a daily basis especially during dry and windy days; Downwash of trucks (especially tyres) will be done prior to departure from the construction site to reduce the mud and dirt carryout; Haul trucks will be covered with suitable covering material like tarpaulin sheets to prevent fugitive emissions during transportation of construction materials; Trucks /dumpers engaged will be covered during off site transportation;
2.	Noise Quality	<ul style="list-style-type: none"> Noise generation from construction activities, construction equipment & vehicular movement. 	<ul style="list-style-type: none"> The construction areas to be provided with sheet barriers or temporary walls along the boundary close to any habitations; Rubber padding to be provided in the construction machinery for vibration control; Provide acoustic enclosures and noise barriers in areas of high noise generating sources; High noise generating activity will be permitted during day time only; The EPC contractors will adopt measures such as regular maintenance of its vehicles and repair of its equipment/ machinery.
3.	Water Quality	<ul style="list-style-type: none"> Surface runoff from project site, oil/fuel & waste spills. 	<ul style="list-style-type: none"> Excavation will be avoided during monsoon season; Drains will be constructed to prevent the runoff from stockpiles generated during excavation; Vehicle Maintenance and related activities will not be undertaken at site to avoid any oil spill/leaks; Arrangements for septic tank-soak pits will be provided for disposal of sewage as per the design aspects of Bureau of Indian Standards; An impervious cover will be provided over the adjacent storm water drain to prevent the surface runoff carrying the construction waste materials/ other pollutants to enter the nearby pond near the proposed entry gate.



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Sr. No.	Environmental Parameters	Impact	Proposed Mitigation Measures
4.	Land use & Aesthetics	<ul style="list-style-type: none"> • Land development. • Unaesthetic visual impact. 	<ul style="list-style-type: none"> • Although no major cutting and filling operations are envisaged, during site clearance and levelling, minimum filling and cutting will be done; • During excavation works, the topsoil will be preserved in stockpiles; • Good housekeeping will be practiced and all construction material will be stored in order; • Construction of greenbelt will improve the overall aesthetics of the site.
5.	Ecology Flora & Fauna	<ul style="list-style-type: none"> • Habitat disturbance during construction activity. 	<ul style="list-style-type: none"> • NWCMC will monitor and supervise the activities of the contractors engaged during construction phase of the project in order to ensure that no illegal hunting and poaching activities are undertaken in the study area; • Minimum levels of noise during construction activities shall be maintained as well as illumination and night operations will be restricted to avoid adverse impacts on habitat of fauna.
6.	Soil Quality	<ul style="list-style-type: none"> • Construction activity leading to top soil removal & erosion. • Improper material handling may lead to spilling of waste, chemicals, solvents, etc. 	<ul style="list-style-type: none"> • Major activities pertaining to site grading and excavation for foundation and backfilling shall be avoid during monsoons. • Retention wall or bund shall be provided around the storage areas for excavated soil and other construction material to check the flow of sediments with storm water in case of rain; • Movement of heavy machinery in the site area shall be restricted to identified routes to minimize the possibility of compaction;
7.	Traffic Pattern	<ul style="list-style-type: none"> • Haul truck/construction vehicle & machinery movement. 	<ul style="list-style-type: none"> • The movement of traffic entering the site shall be properly managed so as to cause minimum problems to local users on the roads; • Detailed plan for signage around the construction areas will be prepared to facilitate traffic movement. • The loading and unloading of the construction equipment will be carried out at dedicated location in the site. • Roads damaged due to project vehicle, if any will be repaired and maintained at regular intervals during the construction period.
8.	Socio-Economy	<ul style="list-style-type: none"> • Increased job opportunity for locals. • Occupation health issues to workers. 	<ul style="list-style-type: none"> • Adequate drainage inside the project facility will be provided so that water does not become stagnant or collect in adjoining areas; • All high noise generating activity will be permitted during daytime only to ensure minimal disturbance;



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Sr. No.	Environmental Parameters	Impact	Proposed Mitigation Measures
		<ul style="list-style-type: none"> • Temporary discomfort to community. • Accident potential increase. 	<ul style="list-style-type: none"> • NWCMC will ensure that vehicles used during construction possess Pollution under Control (PUC) Certificate and drivers have valid driving license; • Adequate security arrangement will be provided to ensure that the local inhabitants and the cattle are not exposed to the potential hazards of construction activities; • Proper fencing and proper signage will be provided around construction site.
Operational Phase			
1.	Air Quality	<ul style="list-style-type: none"> • Particulate emissions during waste tipping, windrows compost plant, RDF storage area, material handling, landfilling & daily soil cover activities. • Vehicular movement within the plant premises. • Truck movement on daily basis for carrying waste. 	<ul style="list-style-type: none"> • Air from waste ditch, pre-sorting area, windrow composting plant and curing shed will be collected to be treated at wet scrubber for dust separation and biofilters for odour removal; • All the trucks bringing waste to the site will be covered from top throughout their transportation route; • Adequate moisture, oxygen and C:N ratio will be maintained during the operations as per standard procedures to minimize the odour and to maintain adequate temperature in compost plant; • A periodic ambient air quality monitoring will be undertaken to ensure that all the relevant air quality parameters are within the permissible limits. Since the sanitary landfill has been planned only for disposing inert waste, no methane gas will be generated; • Wastes shall be covered immediately or at the end of each working day with minimum 10 cm of soil, inert debris or construction material.
2.	Noise Quality	<ul style="list-style-type: none"> • Noise from facility operations such as shredders, rotators, compactors, balers & vehicular movement. 	<ul style="list-style-type: none"> • Acoustic enclosures, rubber paddings and linings will be provided for all noise producing equipment such as shredders, DG sets generator etc. • Trees with heavy foliage will be planted as vegetative barriers to minimize the noise pollution; • Earplugs/muffs, or other hearing protective wear will be provided to those working very close to the noise generating machinery; • Periodic monitoring of noise levels on site and at nearby receptors will be carried out to ensure compliance with Noise Pollution (Regulation & Control) Rules 2000.
3.	Water Quality	<ul style="list-style-type: none"> • Oil/fuel & waste spills. • Potential leachate contamination. 	<ul style="list-style-type: none"> • The toilets at the facility will be provided with soak pit-septic tank arrangement and no sewage will be disposed outside the facility. • The process yard for composting will be entirely covered roof shed in order to facilitate unhindered processing of waste even during rainy seasons.



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Sr. No.	Environmental Parameters	Impact	Proposed Mitigation Measures
			<ul style="list-style-type: none"> • Proper concreting with standard design of compost pad will be laid to prevent percolation of leachate into the ground. • A peripheral drain will be provided to collect the leachate generated during the composting process.
4.	Ecology Flora & Fauna	<ul style="list-style-type: none"> • Change in landscape & aesthetics 	<ul style="list-style-type: none"> • Green area of about 33% will be maintained, which will provide more habitats to birds and smaller mammals. • Native plant and tree species will be selected and healthy saplings will be planted • No activities will be planned in the green buffer other than approach/ service road, public amenities (activities which would not result in damaging the green cover).
5.	Soil Quality	<ul style="list-style-type: none"> • Improper material handling may lead to spillage of waste, chemicals, solvents & leachate percolation. • Improper storage of solid wastes. • Fuel & materials spills. 	<ul style="list-style-type: none"> • Waste oil from pumps and machinery will be collected and stored in used oil barrels and shall be kept in a designated storage area. The storage areas will have paved flooring, containment bund and roof. • Waste/used oil will be disposed off through recyclers/ re-processors registered with the CPCB and authorized by MPCB. • Windrow areas will be provided with an impermeable concrete base. Installation and maintaining effective leachate run-off controls.
6.	Traffic Pattern	<ul style="list-style-type: none"> • Slight increase in traffic on MIDC Road & Nanded-Narsi-Bodhan Road due to daily movement of closed compacted trucks. 	<ul style="list-style-type: none"> • The weighbridge operator will manage entry and exit of vehicles at Site with proper record keeping; • Dedicated parking area will be provided within the project site; • A proper traffic management plan will be implemented to mitigate adverse impacts, if any on existing traffic and transport scenario; • Proper signages will be put up within the site to facilitate smooth traffic movement; and • Inventory of the vehicles used in project along with their Pollution Under Control (PUC's), Driver's Licence (DL) and Registration Certificate (RC) will be maintained.
7.	Socio-Economy	<ul style="list-style-type: none"> • Increased job opportunity for locals, Increased business prospects. • Better management & disposal of city waste. 	<ul style="list-style-type: none"> • Good Waste Handling practices will be implemented which will greatly reduce foul smell and reduce impact from odour; • Vehicles/ trucks moving through community roads will be covered and the operations will be restricted to day time; • NWCMC will form a database of rag pickers in the area through assistance from NGOs to engage them for the project;



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4. Environmental Monitoring Program

4.1 Post Project Monitoring Parameters & Frequency

Table 0.5: Post Project Monitoring Parameters & Frequency

Environmental Component	Project Phase	Monitoring			Institutional Responsibility
		Parameters	Standards	Frequency	
Air	Construction Phase	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO	As per SWM Rules, 2016 and Air (Prevention and Control of Pollution) Rules, 1984	24 hrs. sampling at 8 locations, twice a Week every Quarter (Except Monsoon),	Contractor through approved monitoring agency
	Operation Phase	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO		24 hours sampling at 4 locations, quarterly (Except Monsoon), Project Site, residential areas, downwind, crosswind	Contractor through approved monitoring agency
Ground Water	Construction Phase	pH, TDS, heavy metals, Nitrate, Fe, Chloride, Phenolic Compounds & Sulphate	As per SWM Rules, 2016 and Water quality standards by CPCB/ IS 10500:2012	At 6 locations in & around the project site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
	Operation Phase	pH, TDS, heavy metals, Nitrate, Fe, Chloride, Phenolic Compounds & Sulphate	As per SWM Rules, 2016 and Water quality standards by CPCB/ IS 10500:2012	At 4 locations in & around the project site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
Surface Water	Construction Phase	pH, TDS, TSS, COD, BOD, heavy metals, Nitrate, Fe, Chloride, Phenolic Compounds & Sulphate	Primary Water Quality Criteria for Designated-Best-Use-Classes by CPCB	At 3 locations in & around the project site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
	Operation Phase	pH, TDS, TSS, COD, BOD, heavy metals, Nitrate, Fe, Chloride, Phenolic Compounds & Sulphate	Primary Water Quality Criteria for Designated-Best-Use-Classes by CPCB	At 2 locations in & around the project site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency



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Environmental Component	Project Phase	Monitoring			Institutional Responsibility
		Parameters	Standards	Frequency	
Noise	Construction Phase	Noise level on dB (A) scale	Noise standards by CPCB	At 8 locations from project site, nearby habitation, nearby silent zone & industrial area, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
	Operation Phase	Noise level on dB(A) scale	Noise standards by CPCB	At 4 locations from project site, nearby habitation, nearby silent zone & industrial area, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
Soil	Construction phase	Colour, pH, Electrical Conductivity, Moisture Content, Organic Carbon, Bicarbonate, Chloride, P, K, Ca, Mg, Na, SAR, N, Texture	As per Environment (Protection) Act, 1986 and SWM Rules, 2016	At 6 locations from project site, & locations around the projects site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
	Operation Phase	Colour, pH, Electrical Conductivity, Moisture Content, Organic Carbon, Bicarbonate, Chloride, P, K, Ca, Mg, Na, SAR, N, Texture	As per Environment (Protection) Act, 1986 and SWM Rules, 2016	At 4 locations, 1 location inside the project site, 3 locations in the vicinity of the project site, Once Per Quarter (except monsoon)	Contractor through approved monitoring agency
Leachate	Operation Phase	Suspended solid, Dissolved solid, pH, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, BOD, COD, As, Hg, Pb, Cd, Cu, Cr, Zn, Ni, CN, Fluoride, Phenolic compound	As per SWM Rules, 2016	Before discharging of leachate for reuse, once in a Quarter	Contractor through approved monitoring agency
Compost quality	Operation Phase	Arsenic, Cadmium, Chromium, Copper,	As per Municipal Solid Waste (Management & Handling) Rules, 2016	Before selling the compost, once in a Quarter	Contractor through approved



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Environmental Component	Project Phase	Monitoring			Institutional Responsibility
		Parameters	Standards	Frequency	
		Lead, Mercury, Nickel, Zinc, C/N Ratio, pH			monitoring agency
Social Factors	Construction Phase	Aesthetics, Vectors, Odour, Health of surrounding Habitants, Communicable diseases	As per Municipal Solid Waste (Management & Handling) Rules, 2016	Yearly monitoring of workers health & monitoring of diseases in the surrounding community	Contractor through approved monitoring agency
	Operation Phase	Do	Do	Yearly monitoring of worker health & seasonal monitoring of diseases in the surrounding Community. Annual assessment of the ratio of the incident of particular disease related to the project activity.	Contractor through approved monitoring agency

4.2 Budget & Procurement Schedule

Table 0.6 gives the overall cost estimates for environmental monitoring during construction phase. Table 0.7 gives overall cost estimates for environmental during operational phase considering the first 5 years of operation.



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Table 0.8: Cost Estimates for Environmental Monitoring During Construction Phase

Component	Quantity	Total Cost (For One Year-Construction Phase) (INR)
Ambient Air Quality Monitoring	Total 576 samples for a year (8 locations)	40,32,000
Surface Water Quality Monitoring	Total 9 samples per year (3 locations)	45,000
Ground Water Quality Monitoring	Total 18 samples per year (6 locations)	90,000
Ambient Noise Monitoring	Total 24 samples for one year (8 locations)	60,000
Soil Quality Monitoring	Total 18 samples per year (6 locations)	90,000
Total		43,17,000

Table 0.9: Cost Estimates for Environmental Monitoring During Operation Phase

Component	Quantity	Total Cost (For 5 Years-Operation Phase) (INR)
Ambient Air Quality Monitoring	12 samples per year (4 locations) 120 samples for 10 years	4,20,000
Surface Water Quality Monitoring	6 samples in total for one year (2 locations) 80 samples for 10 years	3,00,000
Ground Water Quality Monitoring	12 samples in total for one year (4 locations) 160 samples for 10 years	1,50,000
Ambient Noise Monitoring	12 samples in total for one year (4 locations) 160 samples for 10 years	1,50,000
Soil Quality Monitoring	12 samples in total for one year (4 locations) 160 samples for 10 years	3,00,000
Stack Monitoring for DG Set	3 samples in total for one year (1 location) 30 samples for 10 years	60,000
Leachate Analysis	3 samples in total for one year	75,000
Compost Analysis	4 samples in total for one year (Quarterly)	1,00,000
Total		15,55,000



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5. Additional Studies

5.1 Risk Analysis

Risk analysis includes an estimate of the probability or likelihood that an event will occur. Estimation of random incidents totally uncorrected with plant activities may also be taken. Risk can be characterized in qualitative terms as high medium or low, or in quantitative terms using numerical estimates and statistical calculations. For practical purposes a risk analysis may be based on a subjective, common-sense evaluation. Both probability and consequences are extremely important in evaluating risk. A high-risk situation can be the result of a high probability with severe consequences (e.g., irreversible health effects or death due to an airborne toxic dust, a fire or explosion with Injuries or fatalities), whereas moderate risk situations can be a result of either high probability with mild consequences or low probability with more severe consequences. In order to be in a state of readiness to face the adverse effects of accidents, an Emergency Preparedness Plan (EPP) has to be prepared. Such a plan must. Inter-alia, cover the possible hazardous situations in the locality and the causes, areas most likely to be affected, on-site and off-site plans, establishment of Emergency Control Centres (ECC), location of emergency services and duties of officers/staff during emergency.

6. Project Benefits

The municipal solid waste from Nanded – Waghala is currently being dumped openly without any segregation. This will have severe consequences on environment, health and hygiene. Under these circumstances, the facility developed scientifically is a welcome step towards solving this ever-increasing problem. The establishment of such sanitary landfill is going to benefit in many ways not only to the society but also to the government, as highlighted below:

- Disposal of waste in an environmentally safe manner in scientifically designed facility
- Utilization of waste in more productive manner
- Protection of the environment through contamination of surface & ground water by disposing of the minimum quantity of left-over waste in the scientifically designed ISWMF
- Provide an employment to the local people to improve the socio-economic status
- Improving the image of capital by providing a scientific solution to the municipal wastes
- Use of landfill gas (LFG) to generate energy and reduce methane emissions that produces positive outcomes for local communities and the environment.



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- Reduction of Greenhouse Gas emissions. Reduction of air pollution by offsetting the use of non-renewable resources.
- Creation of health and safety benefits Enhancement of the health condition of the surrounding areas through the implementation of ISWMF and reduction of vector borne disease problems
- Segregation of hazardous waste
- Economic Benefits to Local Municipality: Development of the facility will create more jobs in the area both in construction & operation phase and also present the opportunity to provide improved products or services to people in the area. The jobs offered will be terms of waste diversion, disposal & green energy facilities for the next twenty years. There will be continued services to customers for waste disposal.
- Increase in Business Opportunities: With the establishment of the facility and improvement in road access, it is likely that there will be increase in employment/ business opportunities along the road-side and periphery of the facility, such as small eateries, tea stalls, pan and cigarette shops, etc.

7. Environmental Management Plan

7.1 EMP Cost & Budgetary Allocation

The total EMP cost during construction phase is Rs. 53.67 Lakhs. The total EMP capital cost during operational phase is Rs. 93.62 Lakhs and O & M cost during operational phase is Rs. 23.85 Lakhs per Annum.

Table 0.10: Environmental Cost Estimates (Construction Phase)

Sr.No.	EMP Details	Cost (INR)
1	Provision of Tin Sheets for Noise Barriers During Construction	4,00,000
2	Environment Monitoring During Construction	43,17,000
3	Dust Suppression During Construction	2,00,000
4	Soak Pit for Domestic Wastewater	1,50,000
5	Disinfection	1,50,000
6	Health Check-up	1,50,000
Total		53,67,000



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Table 0.11: Environmental Cost Estimates (Construction Phase)

Sr. No.	EMP Details	Cost (INR)	Operation Cost (INR) per annum
1	Odour Control Management	40,00,000	1,50,000
2	Greenbelt Development, Landscaping, Wall Creepers etc.	10,00,000	50,000
3	Leachate Collection and Evaporation Tank	10,00,000	1,00,000
4	Road Side Drainage System	20,62,000	2,00,000
5	Borewell for Environmental Monitoring	7,00,000	70,000
6	Fire Extinguishers	1,00,000	10,000
7	Mosquito and fly breeding control	-	1,50,000
8	Sanitation Provision–septic tank, Soak Pit	5,00,000	1,00,000
9	Environment monitoring during operation	-	15,55,000
Total		93,62,000	23,85,000