

ENVIRONMENT MANAGEMENT PLAN

An Environmental Management Plan (EMP) is being and will be implemented at the site is given below

EMP for Air Environment

Construction Phase

To mitigate the impacts of dust during the construction phase of the project, the following measures are and will be followed for dust generation minimization:

- A dust control plan
- Procedural changes to construction activities

Dust Control Plan

The most cost-effective dust suppressant is water because water is easily available on construction site. Water can be applied using water trucks, handled sprayers and automatic sprinkler systems. Furthermore, incoming loads could be covered to avoid loss of material in transport, especially if material is transported off-site.

Procedural Changes to Construction Activities

Idle time reduction: Construction equipment are commonly left idle while the operators are on break or waiting for the completion of another task. Emission from idle equipment tends to be high, since catalytic converters cools down, thus reducing the efficiency of hydrocarbon and carbon monoxide oxidation. Existing idle control technologies comprises of power saving mode, which automatically off the engine at preset time and reduces emissions, without intervention from the operators.

Improved Maintenance: Significant emission reductions are achieved through regular equipment maintenance. Contractor is being asked to provide maintenance records for their fleet as part of the contract bid, and at regular intervals throughout the life of the contract. Incentive provisions is established to encourage contractors to comply with regular maintenance requirements.

Reduction of On-Site Construction Time: Rapid on-site construction reduces the duration of traffic interference and therefore, reduced emissions from traffic delay.

Operation Phase

To mitigate the impacts of pollutants from DG set and vehicular traffic during the operational phase of the Project, following measures will be implemented:

- DG set emission control measures
- Vehicular emission controls and alternatives
- Greenbelt development

Diesel Generator Set Emission Control Measures

Adequate stack height maintained to disperse the air pollutants generated from the operation of DG set at appropriate height as per CPCB norms to minimize the GLC of pollutants.

Vehicle Emission Controls and Alternatives

During construction, vehicles are properly maintained to reduce emission.

Footpaths and Pedestrian ways: Adequate footpaths and pedestrian ways are provided at the site to encourage walking.

Greenbelt Development

Increased vegetation in the form of greenbelt is one of the preferred methods to mitigate air and noise pollution. Plants serve as a sink for pollutants, act as a barrier to break the wind speed as well as allow the dust and other particulates to settle on the leaves. It also helps to reduce the noise level at large extent. Tree belt is developed at the site already.

EMP FOR NOISE ENVIRONMENT

Construction Phase

To mitigate the impacts of noise from construction equipment during the construction phase on the site, the following measures are and will be implemented.

Time of Operation: Noisy construction equipment not allowed at night time.

Job Rotation and Hearing Protection: Workers employed in high noise areas are and will be employed on shift basis. Hearing protection such as earplugs/muffs are and will be provided to those working very close to the noise generating machinery.

Operation Phase

To mitigate the impacts of noise from diesel generator set during operation phase, the following measures will be implemented

- Adoption of Noise emission control technologies
- Greenbelt development

Noise Emission Control Technologies

DG sets are provided with integrated acoustic enclosures as per E (P) Act, GSR 371 (E) and its amendments.

EMP FOR WATER ENVIRONMENT

Construction Phase

To prevent degradation and to maintain the quality of the water source, adequate control measures are and will be implemented. To check the surface run-off as well as uncontrolled flow of water into any water body, following management measures are and will be:

- Avoid excavation during monsoon season
- Care taken to avoid soil erosion
- Toilets are and will be constructed on site during construction phase and the sewage is and will be channelized to the septic tanks in order to prevent waste water to enter into the water bodies
- Any area with loose debris within the site will be seeded with grass
- To prevent surface and ground water contamination by oil and grease, leak-proof containers are used for storage and transportation of oil and grease. The floors of oil and grease handling area kept effectively impervious. Any wash off from the oil and grease handling area or workshop is disposed off after passing it through oil & grease traps.
- Storm run-off is and will be channelized through temporary drains and will be collected in sedimentation tanks. This water is and will be used for various purposes at site like wheel washing, curing, cleaning etc.
- All stacking and loading areas are provided with proper garland drains, equipped with baffles, to prevent run off from the site, to enter into any water body.

Operation Phase

In the operation phase of the project, water conservation and development measures are taken, including all possible potential for rain water harvesting. Following measures are adopted:

- Water source development.
- Minimizing water consumption.
- Promoting reuse of water after treatment and development of closed loop systems for different water streams.

Water Source Development

Water source development shall be practiced by installation of scientifically designed Rain Water Harvesting system. Rainwater harvesting promotes self-sufficiency and fosters an appreciation for water as a resource. 95 Nos. of RWH pits (65 Nos. existing and 30 Nos proposed) will be developed at site to put the storm water in ground for recharging the ground water aquifers. Thus, proper management of this resource is a must to ensure that it is free from contamination.

A detailed storm water management plan is developed which consider the possible impacts from above sources. The plan incorporates best management practices which include the following:

- Regular inspection and cleaning of storm drains.
- Installation of clarifiers or Oil/Water separators/traps system of adequate capacity around parking areas and garages as per requirement.
- Avoid application of pesticides and herbicides before wet season.
- Conducting routine inspections to ensure cleanliness.
- Preparation of spill response plans, particularly for fuel and oil storage areas.
- Provision of silt traps in storm water drains.
- Good housekeeping in the above areas.

Minimizing Water Consumption

Consumption of fresh water is minimized by combination of water saving fixtures and other domestic water conservation measures. The following section discusses the specific measures, which shall be implemented:

Domestic Usage

- Use of water efficient plumbing fixtures (dual flushing cisterns, low flow showers, pressure taps and faucets etc). Water efficient plumbing fixtures uses less water with no marked reduction in quality and service
- Leak detection and repair techniques.
- Meter water usage: Implies measurement and verification methods.
- Monitoring of water uses is a precursor for management.

Horticulture

- Usage of STP treated water for horticulture

Promoting Reuse of Water after Treatment and Development of Closed Loop Systems

Sewage generation from the site during operation phase is expected to be 10876 KLD which will be treated in STP of Ghaziabad Development Authority. Treated water treatment system and dual plumbing system is provided at site to retreat and re-use the treated water from STP of GDA for flushing, landscaping and other purpose.

EMP FOR LAND ENVIRONMENT

Construction Phase

Solid waste is generated both during construction as well as during operation phase. Solid waste generated during construction phase is majorly excavated materials, cement bags, bricks, concrete, MS rods, tiles, wood etc. Construction waste is segregated into re-usable, recyclable and reject fraction. Re-usable waste is stored at site, recyclable material will be sold to authorized vendor and rejected material will be disposed off at the designated areas of RMC. Same will be followed for remaining construction phase

Operational Phase

During the operation phase, the waste generated will primarily comprise municipal solid waste. It is estimated that approximately 1609 kg/day of solid waste will be generated from the project site. The estimation is based on standard generation rates of 0.5 kg per capita per day for residents, 0.25 kg per capita per day for staff, and 0.15 kg per capita per day for visitors. Landscape waste generation is negligible. A proper waste management system will be implemented at the site for segregation, collection, treatment, and disposal of waste. Waste management plan is given below.

SOLID WASTE MANAGEMENT PLAN

❖ Collection and Segregation of waste

- a. Door to door collection system is provided for collection of domestic waste
- b. Local vendors are hired for waste collection, management and disposal
- a. Separate colored bins for dry recyclables and rejected waste are provided to residents as well as in common and open areas

❖ **Treatment**

- i. Inhouse facility for treatment of the wet fraction of waste is developed of capacity 10 TPD. The facility comprise of aerobic composting of organic waste, segregation and handing over of dry waste to recyclers, temporary storage shed of inert waste for disposal at landfill site

❖ **Disposal**

- a. Rejected fraction of the waste is collected and disposed by local agencies on daily basis at the locations designated by municipal authority. Recyclable waste is sold to authorized vendors by plot owners
- b. Used oil from DG sets is sold to authorized vendors

EMP FOR ECOLOGICAL ENVIRONMENT

The project site is presently vacant land and does not support any significant vegetation; therefore, no adverse impact on ecology is anticipated due to the proposed development. During the operation phase, a total green area of approximately 1,762.17 sq.m will be developed within the project site. Additional landscaping and plantation will further enhance the aesthetic and microclimatic conditions of the area.

1.6 EMP for Socio-Economic Environment

During construction stage only local labour is and will be hired for construction purpose which provided employment to local people. Environment management plan is and will be implemented at the site which prevented the environmental pollution in the area and problems to the people in the project site surroundings

During operation phase, environment management plan will be implemented to manage sewage, storm water, emissions and waste from the site. Thus, there are no impacts due to the project on socio-economy. Being townshipproject, project provide quality services for residents and arrangement of events

EMP FOR ENERGY CONSERVATION

Energy saving measures will be taken during construction and operation phase of the project. Energy saving measures proposed are described in section 9 of this document. Some of the measures are detailed below

- Energy efficient lifts are installed at the site
- All motors and pumps installed are energy efficient
- All the electrical fittings and internal & external lighting are BEE star rated
- CFL/LED lights are used for internal lighting
- Solar street lights will be installed in ratio of 1:3 in common areas
- Usage of fly ash mixed cement for construction (PPC)
- Green belt and greenery developed around the project periphery.
- Painting wall and roof with white/light color heat reflecting paint
- No fenestration provided on the west facing side of the building. West facing is blocked
- All windows of all rooms open to outside so as the day light enters in all the flats
- Shafts and windows provided for adequate ventilation
- Bus bars in all distribution panels are specified as copper bus bars to reduce losses and improve reliability.

ENVIRONMENTAL MANAGEMENT CELL

Project proponent is responsible for implementation of environment management plan at the site. Project proponent has designated an environment and safety expert at the site who ensure implementation of environment management plan and to abide by the environmental legislations. Contract will be given to external agency for STP maintenance and operation, green belt development and waste management at the project site. Project proponent ensures that all environmental management measures are taken up at site by them and contracted agencies.

Environmental Management Budget

Implementation cost for environmental management plan during operation & construction phase of the project is given below in **Tables 1&2** below.

Table 1: EMP budget for Construction Phase

S. No.	Activity	Capital Cost (Lacs)	Annual Recurring Cost (Lacs)
1.	Health & safety of Workers (PPE, safety officers etc)	10.0	3.0
2.	Environmental Monitoring	10.0	3.0
3.	Septic Tank & Soak Pit/ Modular STP	15.0	5.0
4.	Sedimentation tanks	7.0	2.0
5.	Covered sheds for storage of material	6.0	2.0
Total		48.0	15.0

Table 2: EMP budget for Operational Phase

S. No.	Activity	Capacity/ Area/Nos./parameters	Capital Cost (Lacs)	Annual Recurring Cost (Lacs)
2.	Landscaping & planting trees	1,762.17 sq.m	60	20
3.	Solid waste Management	Municipal waste-1.61 TPD	50	20
4.	RWH Pit Installation	5 pits	25	5
5.	Energy Saving	2%	60	12
6.	Environmental Monitoring*	Air, water, soil and noise	10	3
7.	Sewage Treatment Plant	400 KLD	50	18
Total			255	78

Environmental Monitoring

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodic monitoring. The important environmental parameters within the impact area are selected so that any adverse effects are detected and time action can be taken. The project proponent will monitor ambient air Quality, Ground Water Quality and Quantity, and Soil Quality in accordance with an approved monitoring schedule.

Table 3: Suggested Monitoring Program for Project

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality	Project Site	Criteria Pollutants: SO ₂ , NO ₂ , PM _{2.5} & PM ₁₀	Half yearly (24 hr average samples) during construction phase and annual during operation phase.
2.	Groundwater (Portability testing)	Project site	Drinking water parameters as per IS 10500.	Half Yearly
3.	Ambient Noise	Project site	dB (A) levels	Half Yearly (Hourly day and night time L _{eq} levels) during construction phase and every year during operation phase.
4.	Potable water quality	Drinking water supply	As per IS 10500 potable water standards	Half Yearly
5.	Soil quality	Project site	Organic matter, C.H., N, Alkalinity, Acidity, heavy metals and trace metal, Alkalinity, Acidity.	Half Yearly
6.	Waste Characterization	Municipal waste	Physical and Chemical composition	Daily
7.	Treated water	Outlet of STP	BOD, MPN, coliform count, etc.	Monthly

Awareness and Training

Training and human resource development is an important link to achieve sustainable operation of the facility and environment management. For successful functioning of the project, relevant EMP will be communicated to occupants. Staff& visitors will also be made aware of the importance of waste segregation and disposal, water and energy conservation through the signages provided in the project site.