

9.0 ENVIRONMENTAL MANAGEMENT PLAN

9.1 General:

The objective of the Environmental Management Plan (EMP) is to ensure that the stress/load on the ecosystem is within its carrying capacity. The most reliable way to achieve the above objective is to incorporate the Environmental Management Plan (EMP) in to the overall planning and implementation of the project.

The Environmental Management Plan (EMP) for the proposed project is classified into the following categories:

1. EMP during project construction phase
2. EMP during project operation phase

9.1.1 EMP during Construction Phase:

The EMP for the integrated facilities within Chennai Port area includes the following:

- Air Emissions Management
- Control of Noise
- Waste water management
- Waste Management
- Dredged materials management
- Hazardous material and oil management
- Biodiversity management
- Green belt development
- Energy conservation measures
- Environment Management Cell

9.2 AIR EMISSIONS MANAGEMENT:

9.2.1 Construction Phase:

The following measures to reduce fugitive and gaseous pollutant emissions during the construction phase should be implemented.

- Water sprinklers will be used to control the fugitive dusts.
- Prudent and good construction practices will be used to minimize the spread of sediments, which are stirred during pile driving and other construction.
- Diesel driven construction machinery and equipments should be fitted with appropriate silencers, will not be left idle for prolonged periods of time, and be subjected to regular scheduled maintenance to minimize the exhaust emission.
- Vehicle engines should not be left running when not in use
- Improperly functioning equipment and vehicles should be removed from the project site or should be repaired before returning to service.
- Trucks carrying C&D waste will be covered with tarpulin and will be disposed in low lying areas within port.

9.2.2 Operation Phase:

Volatile Organic Compounds (VOC) may also be emitted from fuel storage and transfer. Storage and handling of dry bulk cargo, as well as from onshore construction activities and vehicle traffic on unpaved roads, may also contribute to particulate matter emissions.

Recommended air emissions management strategies include:

- Combustion sources
- Develop air quality management procedures applicable to ship operators such as
 1. Maintaining emissions of NO_x and SO_x within the limits
 2. Using low-sulfur fuels in port
 3. Keeping transfer equipment's such as cranes, trucks in good working condition.
 4. Encouraging reduction in engine idling during on and off loading activities.

5. Volatile Organic compounds

VOC emissions from fuel storage and transfer activities should be minimized by means of equipment selection, adoption of management practices such as limiting or eliminating loading/unloading during poor air quality episodes or implementing tank and piping leak detection and repair programs.

9.2.3 Dust

- Dry bulk materials storage and handling facilities should be designed to minimize or control dust emissions, including:
 - Installing dust suppression mechanisms (water spray or covered storage areas)
 - Using vacuum collectors at dust-generating activities.
 - Minimizing free fall of materials
 - Ensuring hatches are covered when material handling is not being conducted.
 - Covering transport vehicles
 - Regularly sweeping docks and handling areas, truck/rail storage areas and paved roadway surfaces
- To control the fugitive dust Chennai Port Trust is procuring fogging cannon and mobile road sweepers in this financial year.

Mobile fog cannons

- This system consists of Water Tank, Generator Set, and Sprayers with a turbine arrangement inside. The entire arrangement is mounted on a truck enabling mobility of the machine all over the Port wherever required. The advantage of having this system is that the fog is produced by mixing of water with high velocity wind produced by turbine and fog is thrown in the air. This Fog will be throwing around 60 meters with a pinching angle of -10° to 45° and capable of spraying horizontally around 180° to 320° . Since the water droplet size is 30-320 microns and because of fogging effect, the entire dust will be brought down to the ground level and gets suppressed.
- These machines because of their mobility can be moved to any place which is more vulnerable to dust in a particular day and water in the form of mist

is sprayed at the dust emanating area at a height of about 10 metres from surface, which is the source of that emanation to all surround areas, due to wind farm / Breeze. The Fog cannons spray a huge mist of water at this source of Dust, resulting in the mist and dust particles getting conglutated and due to self-weight settles down and will be in their state for the next 10 minutes.

Mobile road sweeper machines

The proposed Ravo Road Sweeping Machine is versatile and consists of a Front Roller Boom, Heavy Duty Wire Mesh, Water Pressure Pumps, Container Dump, Wander Hose, Pressurised Cabin, heavy Duty packages, Water installations, independent Linde Wheel Motors, Corton Steel Containers, etc. The principle of working of a Road Sweeping Machine is that the 2 Nos Brushers at the front located underneath the driver's cabin are capable of rotating in two different directions so that the deposited dust and waste materials will be pushed to the centre. The entire dust will be pulled and collected in the tank located in the rear side of the machine through a Vacuum system. Since there is a provision of spraying water during operations there will not be spreading of dust around the cleaning area.

Some of the salient features of this machine are:

- Adjustable suction nozzle flap for intake of large pieces of garbage
- Load carrying capacity of 5400 kg
- Ravo Machine has the feature of sweeping 2000mm to 3100mm width and vacuuming the debris into the container
- The Ravo Machine has a high pressure water pump with spray gun and a flexible hose reel. This enables to use high pressure water jet for even cleaning the side walls or inside of the cabin or remove the hard debris or oil stains, etc.

Both the Fog cannon machine and Road Sweeper Machines would be operated in tandem with a frequency difference of 10 minutes so that the Dust suppressed is immediately collected and disposed. They would also be operated separately at different locations depending on the intensity and necessity.

9.3 CONTROL OF NOISE:

The noise control is to ensure that noise from the proposed project activities does not exceed acceptable parameters and that the noise levels are not injurious to health and do not create a nuisance.

9.3.1 Construction Phase:

Transportation activities will not be allowed to avoid high noise level in locally during night time.

All vehicles will be equipped with the horn of low noise level which is recommended by authority to avoid noise impacts.

Machineries/equipment causing high noise level should not be operated during night time.

Construction machinery should be in good working condition and engines turned off when not in use.

9.3.2 Operation Phase:

Noise reduction options include the following:

- Selecting equipment with lower sound power levels.
- Installing suitable mufflers on engine exhausts and compressor components
- Installing acoustic enclosures for generators
- Installing vibration isolation for mechanical equipment.
- Reducing project traffic routing community areas wherever possible.
- Provision of Personal Protective Equipments and their proper usage for eardrum protection of the workers as well as visitors.
- Periodic monitoring of sound level at suggested places.

- Periodical maintenance of all equipments and transport vehicles.

9.4 WATER ENVIRONMENT:

9.4.1 Construction Phase:

The major impacts on marine water quality are envisaged due to civil works activities like driving of piles, construction of berth, approach way, movement of construction equipments etc. Other sources of potential impacts arise from uncontrolled run –off and accidental spill of oil etc in surface water bodies.

Recommended water pollution management strategies include:

- During concrete work, care will be taken that no mortar or cementing material shall fall in the water as this will not only pose impacts but also would lead to loss of material.
- Runoff from the construction work should be carefully managed to ensure the prevention of entry of contaminants arising from construction work.
- Spillage or leakage of construction material in the nearby aquatic habitat is envisaged.
- Construction materials like concrete will be prepared out site the coastal area.

9.4.2 Operation Phase:

Sources of Waste water generation include sewage, ballast water, bilge water, vessel cleaning waste water from ships. Ship sewage and waste water contains high levels of BOD and Coliform bacteria, low pH levels. Pollutants in bilge water contain elevated levels of BOD, COD, dissolved solids, oil and other chemicals.

The following are the recommendation for Port Sewage & Storm water management:

- Avoiding installation of storm drainage catch basins that discharge directly into surface waters, using containment basins in areas with a high risk of accidental releases of oil or hazardous materials and oil/grit or oil/water separators in all runoff collection areas.
- As the Chennai Port is old one and is disposing its sewage through CMWSSB sewer.

- As part of up gradation of its infrastructure it is proposed to construct 50 KL STP near officer quarters.

9.4.3 Ship Waste Water Management:

CPT will provide collection, sewage and transfer and/or treatment services and facilities of sufficient capacity and type for all waste water generated by vessels at the port in accordance with MARPOL and national regulations.

Oily waste and waste water should be collected in barges, vehicles or central collection systems and storage tanks; the capacity of oily waste collection should be established based on applicable MARPOL provisions.

Waste water with noxious chemicals from bulk tank cleaning will be collected through appropriate onsite or off-site treatment prior to discharge.

9.5 WASTE MANAGEMENT:

9.5.1 Construction Phase:

Non-hazardous solid waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals and small concrete spills.

9.5.2 Operation Phase:

Hazardous solid waste includes contaminated soils, which could potentially be encountered on-site due to previous land use activities or small amounts of machinery maintenance materials, such as oily rags, used oil filters and used oil as well as spill cleanup materials from oil and fuel spills.

Waste generating from the proposed project includes inert solid waste from cargo packaging and from administrative offices, as well as hazardous or potentially hazardous waste associated with vehicle maintenance operations.

Waste material from vessels includes plastic, paper, glass, metals and food wastes. Hazardous waste such as waste oil, batteries, paints, solvents, pesticides will be generated.

9.5.3 Ship Wastes Management:

Discharge of solid waste from vessels should be prohibited while in port in accordance with MARPOL and national regulations.

Food waste from ships delivered to the port should be managed according to applicable local regulations intended to protect human and animal health.

9.6 DREDGED MATERIALS MANAGEMENT:

Construction and maintenance dredging and dredge spoil disposal may impact habitats and pose a significant hazard to human health and the environment.

9.6.1 Dredge planning activities:**9.6.2 Dredging:**

Excavation and dredging methods will be selected to minimize suspension of sediments, minimize destruction of benthic habitat, increase the accuracy of the operation and maintain the density of the dredge material, especially if the dredge material includes contaminated areas.

Sensitive areas of marine life such as feeding, breeding, calving and spawning areas will be identified. In those sensitive areas, dredging will be conducted in a manner so as to avoid fish migration or spawning seasons, routes and grounds.

Inspection and monitoring of dredging activities should be conducted to evaluate the effectiveness of impact prevention strategies and re-adjusted wherever necessary.

9.7 HAZARDOUS MATERIALS AND OIL MANAGEMENT:

Chennai Port Trust will be handling Dry and Liquid cargo. However, Hazardous materials at ports include large oil and fuels and hazardous substances used in port activities including vessel, vehicle and grounds maintenance. Spills may occur due to accidents, equipment failure or improper operating procedures during cargo transfer or fueling and involve crude oils, refined products or residual fuels, liquid substances and

substances in packaged form. Additionally, equipment maintenance may involve the use of potentially hazardous materials including solvents and lubricants.

9.7.1 Spill Prevention:

Oil and chemical handling facilities should be located with consideration of natural drainage systems and environmentally sensitive areas. Hazardous materials storage and handling facilities should be constructed away from active traffic and protect storage areas from vehicle accidents.

9.7.2 Spill Control Planning:

- ❖ CPT prepared oil spill contingency plan
- ❖ Identifies areas within the port that are sensitive to spills and releases of hazardous materials and locations of any water intakes.
- ❖ Training of response personnel in deployment of equipment and testing of the contingency plan through regular reporting and alerting exercises and less frequent deployment of the specialized spill response equipment.

9.7.3 Goods Handling:

CPT implement systems for the proper screening, acceptance and transport of dangerous cargo based on local including the following:

- ❖ Requesting goods manifests for hazardous materials whether in transit, loading or unloading to and from ships, including proper shipping.
- ❖ Establishment of segregated and access-controlled storage areas with the means to collect or contain accidental releases.
- ❖ Training staff in relevant aspects of dangerous goods management.
- ❖ Emergency response procedure.

9.8 SUMMARY OF CRITICAL IMPACTS/ISSUES

The major impacts due to different project activities and their mitigation measures have been identified in chapter – 5. These measures together constitute part of Environmental Management Plan (EMP).

Table. 9.1 : Critical Impacts/Issues

S.No	Issues	Description
1	Ambient Air Quality	During excavation to some extent and minor effect during transportation of the dredged material.
2	Ambient Noise Level	
3	Ecology	Marine ecology shall be impacted due to the activities but the impact will be temporary and reversible in nature.
4	Water Quality	During excavation activities. All the care will be taken to avoid any water bodies issues.

In the Environmental Management Plan (EMP), impact mitigation and monitoring requirements are specified and the institutional arrangements for implementation of the project identified. The EMP also includes the cost of implementing mitigation and monitoring requirements.

9.9 IDENTIFICATION OF IMPLEMENTING AUTHORITY:

The responsibility for the implementation of the EMP will be with the project proponent. An environmental management cell (EMC) is already established by the Chennai Port Trust and regular monitoring of environmental attributes is being carried out by third party which is recognized by MoEF. The EMC will ensure timely implementation of various mitigative measures at different stages of the project i.e., during construction and operation stage and the completion of the project within scheduled time frame.

IMPLEMENTATION OF RECOMMENDED MITIGATION MEASURES:

Different activities to be addressed in the management plan have been considered and discussed above. The major instruments of environmental management will be monitoring performance of

the construction by the EMC. The conditions, which must fulfilled documents, are suggested below:

1. All necessary measures and precautions will be cited so that the execution of the works and all associated operations on site or off site are carried out in conformity with statutory and regulatory environmental requirements.
2. Necessary measures and precautions to avoid nuisance or disturbance arising from the execution of the works will be included, preferably at the source itself.
3. Wastes such as spoil or debris or silt from the sites will be immediately removed and the affected areas will be restored to their original state.

BUDGET FOR ENVIRONMENTAL MANAGEMENT PLAN

The estimated environmental cost considered here includes:

1. Provision of air, barriers for project area
2. Air pollution monitoring
3. Noise monitoring
4. Water quality monitoring

Table.9.2 : Budget for Environmental Management Plan

S. No	Items	Activity	Capital (in Lakhs)	Recurring (in Lakhs)
1	Pollution Control	Sweeping Machine / Fogging Machine *	126	24
		Green Belt Plantation	75	
		Barrier Wall along green area	150	
		Waste Water Treatment (STP/OWS)	80	5
2	CSR	Skill Development*		87
3	Energy Conservation	Solar PV system (400 KW)	379	
4	Environmental Monitoring	Monitoring		19
		Continuous Monitoring*	367	
	Total EMP Cost		1147	135

(*Ongoing and proposed in this financial year)

9.10 CORPORATE SOCIAL RESPONSIBILITY (CSR):

9.10.1 Minister wants ports to allot 10% of income for CSR

The ministry launched CSR activities recently to enable ports to serve the interests of society and identify activities that would create social impact, Vasan said while participating in a CSR activity of Ennore Port Trust near Chennai.

The ministry wants the port trusts to implement CSR activities through Non-government Organization (NGO), renowned agencies and government bodies.

Throughout the current financial year, the Chennai Port had taken up several activities under CSR, which includes women medical camp, meritorious scholarship to the students of corporation schools and painting competition.

9.11 CSR ACTIVITIES DONE BY CHENNAI PORT TRUST:

9.11.1 Chennai Port Trust :

As a part of CSR Activity, Summer Internship Training Programme to encourage students community, is commenced from 11th May 2015 and held for a month in Chennai Port Trust on the topics of HR, Operations, Finance & Port in General without any fee. The inauguration programme presided by Shri. C. Harichandran, Secretary, Chennai Port Trust held on

06.05.2015. Around 293 students from 33 different colleges have enrolled for training for the year 2015.



9.11.2. Training In Tailoring:

With a view to provide better opportunity in self-employment to the women dependents of the employees residing at the Tondiarpet Housing Colony, a Tailoring Training Centre is functioning at the Colony. Now, there are 17 sewing machines provided to the Tailoring Training Centre for the welfare of women dependents of the employees.

9.11.3 Ritual Shed

A Ritual Shed has been constructed at Tondiarpet Housing Colony for the allotment of the residents of the Tondiarpet Housing Colony and other employees at a nominal rent of Rs.1/- per day so as to enable them to perform rituals without incurring expenses.

9.11.4 Environment Management Cell:

Chennai Port has created separate Environment Management Cell in the year 2016 by integrating all the line departments includes Environment, Safety, Marine (Oil Spill), Horticulture etc. It has been formed on 11.08.2016 comprising Dr. K. Manickam, Dy. C.E(M)I as in-charge of Environment Cell under the control of Chief Engineer, Dr. K. Kathiravan, M.Sc., MPhil., PhD(Environmental Science) an expert who has joined on 19.08.2016 as Manager I

(Environment, Safety & Consent for operation), Shri.P. Shanmugam, Executive Engineer (EC) as Manager II (Environment clearance), Shri. Arasu, Assistant Engineer (CME’s department), Shri. M.Somasekara kumar, Technical Assistant (Marine department) for Marine pollution, 4 Nos. of Junior Engineers and one Assistant Superintendent with the following duties & responsibilities.

Figure 9.1 : Organizational structure of Environment cell

