Executive Summary
Environmental Impact Assessment of Development of a Multipurpose Jetty Terminal (Coastal Cargo) in Panvel Creek near Village Targhar Dist. Raigad

Project Proponent

SHREE SAIBABA SAND DREDGING COMPANY PRIVATE LIMITED (SSSDCPL)

Prepared By

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EXECUTIVE SUMMARY

Identification of project & project proponent

M/s Shree Saibaba Sand Dredging Company Private Limited is engaged in the business of Dredging, Marine and Earthmoving field; having an office premises at Mumbai and work site-work shop at Belapur, Navi Mumbai.

M/s Shree Saibaba Sand Dredging Company Private Limited have successfully executed the work for Capital Dredging, Pipeline Trenching, Marine Infrastructure Project, Pipeline Laying, Land Reclamation, Major-Minor Port Development, Infrastructure Developments, Channel Cleaning, Mining/Soil/Earth filling, Bulk Material Handling, Erection of Dams/Power House Projects, Infrastructure Construction and Development, Civil Project and many other related projects.

M/s Shree Saibaba Sand Dredging Company Private Limited is a company working in marine sector for last 36 years and is having fleet of Dredgers, Barges, and Tugs etc. They are engaged in diversified activities of sand dredging, barging, stevedoring and hiring of cranes and barges.

M/s Shree Saibaba Sand Dredging Company Private Limited has already using waterfront near Village Targhar in Panvel creek for parking of vessels. The present use of waterfront can be enhanced further and has sufficient back up land to develop a Multipurpose Jetty Terminal in view of the locational advantage and business potential.

Considering above potential and locational advantage, M/s. Shree Saibaba Sand Dredging Company Private Limited, has proposed to develop Multipurpose Jetty Terminal near Village Targhar, Tal: Panvel, Dist: Raigad.

M/s Shree Saibaba Sand Dredging Company Private Limited submitted the application for allotment of said waterfront along with intertidal land to Maharashtra Maritime Board (MMB) and MMB on 2nd November 2019 issued the Letter of intent (LOI) allotting the waterfront of about 100 m along with intertidal area for the development of Multipurpose jetty project in Panvel Creek at village Targhar (Tal. Panvel, District Raigad).

Salient Feature of the Proposed Project

The construction of a multipurpose Jetty terminal with Approach cum berthing jetty, has been promoted as special purpose vehicle as a venture of Shree Saibaba Sand Dredging Company

Private Limited. The proposed multipurpose jetty is meant for handling domestic non-hazardous cargo such as bulk, break bulk, container and other cargo with projected throughout of 1.50 lakhs TPA in the initial years to about 10.00 lakhs TPA or more in the later years. The proposed capacity. No hazardous chemicals will be handled for proposed project. The detail of projected cargo handling is as under:

Projected Annual Cargo		
Sr. No.	**Particulars**	**Quantity (In Lakhs Tonnes)**
1	Steel Coils	2.00
2	Bulk Cement/Bagged Cement	3.00
3	Silica Sand	1.00
4	Coarse Aggregate/Fine Aggregate	3.00
5	Other Cargo	1.00
	TOTAL :	**10.00**

The infrastructure plan consists of a main berth about 200m away from shoreline connected by approach trestle connecting to the shore line for cargo handling. It is proposed to provide storage area for bulk, container and general cargo along with area for administrative block and utility services for multipurpose jetty and workshop, repair / building bay, stores and utility areas for jetty operations.

Area Statement of Proposed Facilities

S. No.	**Proposed facilities**	**Approximate Area (m^2)**
	Bulk Cargo	3000
	Break Bulk Cargo	2500
	Other Cargo	3000
	Fabrication Work	2000
	General Storage	2000

	Admin Block	1000
	Parking Area	1000
	Security Cabin	200
	Greenbelt Area	5000
Total Area		**19700**

NOTE: The areas given are indicative only

No dredging is foreseen except in the initial phases dredging that may be required for forming basin in front of the proposed berth or area between deep waters and present waterfront / shoreline.

The existing seabed level is ranging from +3.00 m near shore to about -2.00 m, 100 m away from the shoreline. In future, it is proposed to dredge the entire area in front of waterfront of about 100 m X 200 m up to the channel to -3 m to have vessel entry and exit at all tides.

The reclamation is proposed in the intertidal area for developing additional land area for operations. Total reclamation area will be 3000 m^2. Reclamation will be carried out using materials from excavated / dredged soil or filling materials from approved borrow pits in the nearby areas. The filling will be done using conventional method in layers of about 300mm to 400 mm and with necessary compaction as practicable.

Water Requirement for the Proposed Project

Sr.No.	**Water Use Category**	**Construction Phase (m^3 per day)**	**Operation Phase (m^3 per day)**
1	Domestic	3.6	3.0
2	Curing	6.4	--
3	Sprinkling	10.0	9.0
4	Green Belt	--	20.0
Total water requirement (m^3 per day)		**20.0**	**32.0**

Power Requirement

Power will be taken from Maharashtra State Electricity Distribution Company Limited or by developing a captive power plant.

Initial Power requirement will be 150 KVA which will get increased to about 500 KVA in the later stages.

The electrical supply will be taken from MSEDCL from a nearby substation installing transformer of required capacity. In the initial stages, the power requirement would be 150 KVA which will get increased to about 500 KVA at later stages If need arises.

Standby generators of about 75 KVA to 125 KVA will be provided for continuing critical operations in case of power failure.

Manpower Requirement

Construction phase will generate employment for local people including various subcontractors, electricians, machinists, welders, painters, blasters, riggers, pipe fitters and a number of administrative and managerial staff. The proposed Multipurpose Jetty Terminal will create employment opportunity in skilled and unskilled sectors. Most of the man power required will be procured through the subcontractors, not directly employed by the SSSDCPL.

The expected manpower requirement during construction phase is about 60 Nos. Although the workforce requirement will be temporary in nature, it will be met from the local population as far as possible hence there will be positive impact. Local businessmen will get opportunity to supply construction materials. Demands generated from the labour force for basic facilities including eatables etc. will increase the local business activity of the area.

Similar to the construction phase, the operation phase of the Multipurpose Jetty Terminal will also provide opportunities for employment mostly in the skilled and semi-skilled categories. In the initial stage of the operation phase, there will be a requirement of about 130 operational workers, out of which, 50 workers will be deployed directly and 80 workers indirectly. This will enhance the income of the people associated with subcontracting business. All these activities will need support services like food, transport, medical facility etc. ultimately leading to improvement in quality of life of local people.

Project Cost

The facilities which will be implemented phase wise and the project cost is estimated of INR 480.00 lacs for phase 1 of development which includes cost of surveys, earthwork, onshore facilities, marine works, utilities such as water, power and sewage treatment, engineering and other miscellaneous costs and contingencies. The details of the Environment Management Plan are given in Chapter 6.

Environmental Setting of Project area

Panvel is one of the cities in the district Raigad. It is also called the gate of Raigad because Panvel is the first city when you enter in Raigad. It is also one of the most developed cities in the whole Raidag district. Panvel is situated on the banks of the Gadhi river which flows and connects all the way to the Arabian sea.

Project location is accessible from other parts of Navi Mumbai and from Mumbai by road and rail transport facilities. Belapur railway station lies on the harbour line and SionPanvel Highway passes through Belapur. BEST buses are available from CBD Belapur to Mumbai and NMMT buses are available from Belapur to Vashi, Thane, Dombivali, Kalyan, Badlapur, Uran, Taloja and Panvel.

<table>
<tr><th>Particulars</th><th>Details</th></tr>
<tr><td>Name of the Project</td><td>Development of a Multipurpose Jetty Terminal (Coastal Cargo) in Panvel Creek Near Village Targhar Dist. Raigad</td></tr>
<tr><td>Location of the Project</td><td>Panvel Creek
Village: Targhar, Taluk: Panvel
District: Raigad, State: Maharashtra</td></tr>
<tr><td>Geographical Coordinates:</td><td>The site lies in Raigad district of coastal Konkan division of Maharashtra and the coordinates are:
<table>
<tr><th>Sl.No.</th><th>Latitude</th><th>Longitude</th></tr>
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Particulars	Details
	<table><tr><td></td><td>19° 0'7.58"N</td><td>73° 2'1.91"E</td></tr><tr><td></td><td>19° 0'3.57"N</td><td>73° 2'6.63"E</td></tr><tr><td></td><td>18°59'58.76"N</td><td>73° 2'7.19"E</td></tr><tr><td></td><td>19° 0'3.04"N</td><td>73° 2'2.74"E</td></tr></table>
Plot/Survey Nos.	Plot No. 58/1
Nearest Highways	Uran Road – Abutting Site Mumbai Pune Expressway-2.50 km
Nearest railway station	Bamandongri Railway Station – 3 km Seawoods – Darave Railway Station- 2.80 km
Nearest Airport	Chhatrapati Shivaji Maharaj International Airport – 20 km Proposed Navi Mumbai International Airport – 0.2 km
Nearest town/City	Belapur City - 3.0 km (N)
Sea Port	Jawaharlal Nehru Port Trust 10.50 km Nhava Sheva International Container Terminal - Government office-9.60 km
Ecologically sensitive zones	None at the project site Nearest Mangroves – 0.40 km (W) Mangroves in Panvel Creek – 0.60 km (E) Mangroves in Nhava Creek – 1.30 km (S)

Particulars	**Details**
Major water bodies/reservoirs within 10 km radius	Panvel Creek – Abutting Thane Creek – 4 km
Mud flats	Mudflats are present in Panvel Creek
Sand dunes	None within 10 km
Corals, coral reefs and associated biodiversity	None within 10 km
Salt marshes, Turtle nesting grounds, Horse shoe crab habitats, Sea grass beds	None within 10 km
Archaeologically important places	As per Archeological Survey of India, no Grade I site is present at the project site Belapur Fort – 0.65 km (N)
Protected areas as per Wildlife Protection Act (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Reserve Forest near Belpada Village-Approx.6.65 km Reserve Forest near Padeghar Village-Approx. 5.00 km Reserve Forest Near Jambhulpada-Approx.6.50 km Reserve Forest near Pargaon -Approx. 5.30 km Reserve Forest near Kharghar -Approx. 5.00 km
Biosphere Reserves	None within 10 km radius
Critically polluted areas as per MoEF notification	Navi Mumbai – 3.51 km

Particulars	Details
Defense Installations and specially those of security importance	None within 15 kms
Seismicity	The proposed project is located in Seismic Zone III - Moderate Risk Zone as per IS: 1893 (Part 1: 2002)

Purpose of the Report

The principal Environmental Regulatory Agency in India is the Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India. MoEF&CC formulates environmental policies and accords environmental clearance for the projects which attracts EIA notification. As per Environmental Impact Assessment (EIA) Notification dated 14th September 2006, proposed project falls under category- 'B' of project activity 7(e) and requires prior Environmental/CRZ Clearance to be obtained from Ministry of Environment, Forest & Climate Change (MoEF&CC) before the commencement of ground activity. The application No: 66846 & proposal No: SIA/MH/IND/66846 for prior EC (Form-1 and Pre-Feasibility Report) for the proposed project has been submitted to State Expert Appraisal Committee (SEAC) - 1 and same was reviewed by the SEAC in its 207th meeting held during 11th to 14th October, 2021 to grant Terms of Reference (TORs) for the preparation of EIA/EMP report. Copy of Minutes of Meeting (MOM) of the SEAC – 1 enclosed as Annexure-I. Since, the project is proposed in the coastal area it attracts CRZ Clearance, as per CRZ notification January 2011 and its subsequent amendments.

The proposed activity is permissible as per CRZ Notification 2011, Paragraph 3 - Sub Paragraph (i) Clause (a) "Those directly related to waterfront or directly needing foreshore facilities". In this connection, Form-I along with TOR in the prescribed format was submitted to SEIAA,

Baseline Environment

The establishment of baseline data for different environmental components in the designated study area and at the project site has been conducted by field monitoring / investigation for baseline data generation**.** The baseline study carried out for the proposed project from October 2021 to January 2022 (winter season).

The data generation was carried out covering Ambient Air Quality, Noise Levels, Water Quality, Land Use, Soil Quality, Ecology, Hydrology and Socioeconomic features. Additional data/information regarding geology, ecology, demographic pattern and socio-economic conditions were also collected from secondary sources.

S. No	Attribute	Stations	Parameters
1	AAQM	5	PM_{10}, $PM_{2.5}$, SOx, NOx, CO
2	Noise-24 hrs Leq	5	As per Standard ToR
3	Soil	5	As per Standard ToR
4	Surface Water	4	As per IS10500
5	Groundwater	3	As per IS10500
6	Marine Water	5	As per Standard ToR
7	Sediment	5	As per Standard ToR

Ambient Air Quality Monitoring Results

Observations from the data:

PM10: The maximum value for PM10 is observed at AAQM 1 as 76 µg/m3with the minimum value observed at AAQM 05 as 53 µg/m3 during the study period.

PM2.5: The maximum value for PM 2.5 is observed at AAQM 03 as 30 µg/m3with the minimum value observed at AAQM 05 as 21 µg/m3during the study period.

SO2: The maximum value for SO2 is observed at AAQM 01 and AAQM 05 as 15 µg/m3 with the minimum value observed at AAQM 02, AAQM 03, AAQM 04 and AAQM 05, as 8 µg/m3during the study period.

NOx: The maximum value for NOX is observed at AAQM 01 as 29µg/m3with the minimum value observed at AAQM 04 & AAQM 02 as 13 µg/m3during the study period.

CO: The maximum value for CO is observed at AAQM 05, as 1.5 mg/m3with the minimum value observed at project site AAQM 02 as 1 mg/m3during the study period.

The results of the monitored data indicate that the ambient air quality of the region is in conformity with respect to residential norms of the National Ambient Air Quality Standards of CPCB with present level of activities. Ambient air quality monitoring results attached as Appendix I of EIA report

Noise level observations:

The maximum Leq (day) value is found to be 50.6 dB(A) at ANQM 1 whereas the minimum Leq (day) is found to be 46.9 dB(A) at ANQM 2. However, the maximum Leq (night) is found to be 52.7 dB(A) at ANQM 1 whereas the minimum is found to be 47.9 dB(A) at ANQMS 2. The noise levels are found to be well within the standards of the study area.

Marine Water observations

pH is an important parameter to determine the acidity or alkalinity and neutral scale. It greatly affects the microbial population as well as the solubility of metal ions and regulates nutrient availability. pH is in the range of 7.4-8. The electrical conductivity ranges of 40320 to 46800 mS/cm. Dissolved oxygen is found between range of 4.3-5.8 mg/L. Total dissolved solids detected in range of 26210 to 30420 mg/L.

Marine Sediment observations

It was observed that the sediments are slightly alkaline as their pH is in the range of 7.4 to 8.1.Organic matter present in sediment influences its physical and chemical properties. Coastal sediment analysis shows that the concentration of organic matter is in the range of 0.7-1.3% and organic carbon is in the range of 0.4 – 0.7%. Sediment analysis shows lower values of organic carbon.

Socio-Economic Study

Questions were asked to respondents to seek their opinions, perceptions and aspirations regarding the proposed project. Opinions are 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, 85 percent of the respondents were males while 15 percent were females.

The average household size was found to be 4 members.

Education is one of the keys to success and development and as such, people pay much attention to their educational status. Most of the sample respondents interviewed had some kind of formal education. Nearly three fourth of the respondents had attained education till SSC/HSC, 30 percent of the respondents have education till primary (Class 1-5) as the formal education, also 5 percent of the respondents have completed graduation. Questions were asked about the number of earning members in the family their type of income and their respective jobs. Most of the respondents are private employee working in private sector. Also some peoples having self-employed occupation like Motor garage, small shops, fruit and vegetables seller.

House constitutes the most vital aspect of the basic needs of man and basic amenities form an integral part of the housing facility. Most of the respondent having pacca type house (Cement concrete, Teen roof), Basic amenities are measured through the availability of drinking water facility, toilet, drainage, garbage disposal, electricity, cooking fuel etc. all respondent using LPG Gas for cooking fuel. Municipal Corporation and local Grampanchayat provide drinking water and basic facility in study area.

Availability of toilet is an important indicator of the sanitation. manyrespondent are using private own toilet also some are using public toilet facility.

When asked about the most pressing problem faced in surrounding area respondent highlighted the sanitation problem in project area. But still the peoples are happy.

Questions were asked to respondents to seek their opinions, perceptions and aspirations regarding the project. Opinions are important vehicle through which one could understand the existing mental attitude of people in general and groups, and community in particular.

Many respondents are aware of the project, all respondents are in support of the project, and 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.

Anticipated Environmental Impacts

The construction activities like excavation for foundation, earth-filling, clearing, leveling the sites and vehicular movements will entail changes in the landscape, which are expected to be of

short duration and not much significant. The excavated earth material if stacked loosely may result into runoff to the mud flats resulting in loss of topsoil.

As the topography at project site is undulated with slope, proposed project would result in significant effect of soil erosion and silt run off during the heavy rains, if top soil is not managed properly. The project does not require extensive work on the excavation and removal of soil hence will temporarily affect soil structure and stability.

Excavated earth will be stacked covered with plastic/tarpaulin sheets and will be maintained separately and reused for landscape development along the corridor. Excavated topsoil shall be used for backfilling/greenbelt development & plantation. The solid wastes generated from the domestic activities of construction workforce which will be collected properly and disposed off through municipal solid waste disposal system to avoid any adverse impacts on land. The construction wastes shall be utilized for PCC works, road construction and other filling requirement etc. Proponent shall develop greenbelt and lawns (33% of Plot area) which will enhance the beauty of the site as well as act as a pollution barrier.

Under ordinary and safe operating conditions, there will not be any adverse impact on land. The only source of land pollution would be the solid/hazardous waste generated from the both processing and non-processing zones of the project. Detailed hazardous/solid waste generation is mentioned in the separate section. Municipal solid waste generated shall be segregated on site and disposed according to standard regulations

The biodegradable part of solid waste would be treated in organic waste converter at site. The remains of this treatment would be then used as manure in garden. The non-biodegradable part generated from building will be disposed-off to dumping ground. The hazardous waste generated will be disposed through MPCB authorized dealers/ recyclers.

Waste water generated during operational phase, shall be treated in STP and treated water shall be used for green cover. Spillage of fuel oil and lubricants shall be collected in the trench and disposed to authorized recyclers.

The only major impacts on ambient air during construction phase are predicted to be caused due to dust arising from the construction activities as well as gaseous pollutants from vehicles used

for transportation of construction materials and emission from the equipment used during construction phase.

Further, the air pollutants like PM, SO_2, NOx, HC and CO will be emitted from the DG sets, exhaust of transport vehicles and other machineries. The impacts on the environment generated during construction phase will be limited to the construction tenure and will be local.

For control of the airborne particles of cement enclosed storage facility shall be provided & material shall be covered with tarpaulin during the transportation. Only vehicles having PUC shall be allowed & well equipped handling & transportation facilities shall be provided throughout the construction phase. For control of emission from DG set stack of adequate height shall be provided to minimize the impacts of emission. The residual impacts of emission from the stack would not be significant to cause any considerable impacts on air. The adverse impacts will be almost eliminated or minimized to the lowest extent of damage by implementing the proper mitigation measures

During operational phase of Jetty Terminal, vehicular and vessel movement and emission from D.G. set may lead to deterioration to air quality in the project area in terms of PM, SO_2, NOx, HC and CO in an around the premises.

The D.G. sets, engines and auxiliaries must be provided with filters and adequate height stacks. All roads shall be of concrete and adequate green cover shall be developed near project site. All equipment shall be maintained and repaired on regular intervals.

The major Impact on noise level of the proposed project, during the construction phase, is envisaged due to the noise generation by the operation of the machineries, equipment and some mechanical works

Proper lubrication, muffling and modernization of equipment shall be done to reduce the noise, D.G. Set with acoustic enclosure shall be provided. These noises will be temporary and limited to construction phase only.

During the operation phase the major source expected to increase the noise level at the shipyard area are arrival of vessels, vehicular movement, working of equipment and operation of D.G set for emergency power supply

Modernization of equipment shall be done to reduce the noise during operation. D.G. Set with acoustic enclosure shall be provided. However, this increase in noise level will be lower compared to the construction phase

No fresh water surface bodies are present at project site. Moreover, construction activities are confined to marine areas. Hence, there will be no significant impacts on surface water. Approximately 20 KLD water will be required for the domestic purpose and construction activity. Source of water will be tanker water.

The nearest surface water body is located significantly away from construction site. Maximum care shall be taken during construction phase to avoid misuse of fresh water. Proper sanitation facilities shall be provided to construction workers during construction period. No impacts are envisaged on surface water bodies during operation phase. Approx. sewage generation will be 9 KLD from the staff/workforce during operation and it will be treated in the proposed STP having capacity of 5 KLD. The staff/workforce employed will be provided potable water to avoid any waterborne diseases

The setting up of any kind project would undoubtedly include significant impact on socio-economic and cultural life of the people in the project area. Here, an attempt is made to visualize and discuss such tentative impacts likely to be induced by the project. The likely impacts due to project activity are described below:

Positive Impacts

The proposed project does not involve any displacement of inhabitants and so issues like resettlement and rehabilitation does not figure.

There was a growth in indirect jobs and business opportunities to the local and surrounding people such as contractors, transporters and raw material suppliers etc. due to the proposed project in the area.

The expected manpower requirement during construction phase is about 60 Nos. Although the workforce requirement will be temporary in nature, it will be met from the local population as far as possible hence there will be positive impact.

In the initial stage of the operation phase, there will be a requirement of about 130 operational workers, out of which, 50 workers will be deployed directly and 80 workers indirectly.

Demands of community services and create additional employment for the poor strata of society by way of security guard, driver, servant, sweeper, gardener etc.

The proposed project is development of multipurpose jetty in existing jetty area.

Proposed project is located in Panvel creek area. In project surrounding area there is no any fishing activity are found during site visit and local information, so there is no any direct or indirect impact on fisherman and fishing activities.

Negative Impacts

Due to the proposed project activity, influx of population may increase during the construction phase. This may lead to strain on infrastructure facilities in the area as well as increase in population at local level. However, this impact is only for the short duration and temporary in nature.

During construction phase, increase level of dust and other air pollutants may lead to health problems.

Vehicular traffic and construction activities may create noise pollution.

Socio Economic Environment: Mitigating Measures

In order to mitigate the adverse impacts likely to arise in the surrounding area due to proposed project activity, it is necessary to formulate an effective mitigation plan. The suggestions are as follows:

Before Commencing and During Initial Phase:

Communication with the local community should be institutionalized and done on a regular basis. The forum could provide opportunities to discuss local critical issues and prepare programmers of mutual benefits.

Information regarding the proposed development plan, community programmes etc. should be communicated to the local community in the form of booklets and audio-visuals.

Construction Phase:

Project proponent should take appropriate steps to keep environment clean and healthy during construction phase.

Provision of adequate drinking water, toilet and bathing facilities should be made available on project site.

Water shall be sprinkle/spread to suppress dust during construction phase to control air pollution and thereby avoid adverse health impact.

Proper living condition with appropriate facilities for residential labours should be provided.

Proper Training and awareness programme should be carried out so that the workers understand the importance of wearing the personal protective safety equipment's while construction and operation.

Operation Phase:

The colony management collectively will need a pool of skilled population, unskilled population, watchmen, gardeners, sweepers, plumbers, fitters, ETP operators and solid waste collectors. Preference should be given to local people for all this.

The project authority should help in promoting local people for livelihood commensurate with their will, skill and abilities by utilizing the minimum amount.

The project development is away from offshore fishing areas. The project is no detrimental effect on fish, hence fisheries can be allowed during the operations phase.

Environment Monitoring Plan- Construction and Operation Phase

Aspects	**Parameters to be monitored**	**Frequency of Monitoring**	**Locations**	**Compliance**
Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO	Twice in a week during entire construction period	Project Sites	NAAQ Standards, 2009
Noise Levels	Day and night noise levels	24 hrs	Project Sites	CPCB Standards

Aspects	Parameters to be monitored	Frequency of Monitoring	Locations	Compliance
Water Quality	pH, Temp, Salinity, TDS, TSS, DO, BOD, Hardness, Alkalinity, Chlorides, Turbidity, Conductivity, Oil and Grease, Heavy Metals	Once in a month during entire construction period	Project Sites	IS10500: 2012
Soil Quality	pH, Electrical Conductivity, Organic Matter, Organic Carbon, Phosphorous (as PO_4^{-3}), Total Kjeldahl Nitrogen, Potassium (as K), Sodium (as Na), Texture, Sand, Clay, Silt, Lead (as Pb)	Once in a month during entire construction period	Project Sites	-
Marine Water Quality	pH, Temp, Salinity, TDS, TSS, DO, BOD, Hardness, Alkalinity, Chlorides, Turbidity, Conductivity, Oil and Grease, Heavy Metals	Once in a month both for low tide and high tide periods during entire construction period	3 locations viz. project site, upstream and downstream	-
Sediment	Organic C, Organic N,	Once in a month	3 locations viz. project	-

Aspects	Parameters to be monitored	Frequency of Monitoring	Locations	Compliance
Quality	heavy metals	during entire construction period	site, upstream and downstream	
Biological Parameters	Phytoplankton, Zooplankton and Benthic Communities	Once in a month during entire construction period	3 locations viz. project site, upstream and downstream	-
STP outlet	pH, BOD, COD, TSS, Oil and Grease	Once in month	-	CPCB Standards

Additional Studies

HTL/LTL Demarcation

CZMP and HTL/LTL demarcation

n studies were conducted by an authorized agency, Institute of Remote Sensing Anna University. The HTL/LTL demarcation for the project site was conducted through Institute of Remote Sensing (IRS) Anna University, Chennai. As per the CZMP map, the project falls into CRZ IA, CRZ IV B and CRZ II category (CRZ notification, 2011) (CRZ notification, 2011).

Risk Assessment

A risk assessment is a careful examination of consequences resulting from the undesired events that could cause harm to people or property, so that sufficient precautions can be taken. Workers and others have a right to be protected from harm caused by a failure to take reasonable control

measures. Risk assessment of proposed shipyard is intended to provide a thorough understanding of the nature of the risks involved and to provide meaningful risk management and reduction guidance to the yards. Risk involved in proposed Multipurpose Jetty project is evaluated in terms of the following areas:

- Environmental and Geographical Risks
- General Site Conditions & Housekeeping
- Site Safety
- Yard equipment
- Theft & Personnel
- Emergency Response Plans
- Fire-Fighting Systems
- Permit to Work Systems
- Atmospheric Monitoring and Control of Industrial Gases
- Launching and Sea Trials
- Quality Assurance/ Quality Control
- Management of subcontractors

A Multipurpose Jetty Terminal's risk exposure can be broadly divided into two categories:

- Those to which the Multipurpose Jetty terminal/Storage yard is exposed.
- Those to which the vessel berthed at Jetty terminal is exposed.

Project Benefits

Maharashtra Maritime Board (MMB), the nodal state government agency to develop the ports in the state of Maharashtra, has laid down various policies, for development through private participation as Greenfield – All Weather Ports, MMB terminals, Captive Terminals, Multipurpose Terminal & Shipyards.

Employment Generation during Construction Phase

Construction phase will generate employment for local people including various subcontractors, electricians, machinists, welders, painters, blasters, riggers, pipe fitters and a number of administrative and managerial staff. The proposed Multipurpose Jetty Terminal will create employment opportunity in skilled and unskilled sectors. Moreover fabrication industries are entirely based on the order received by the concerned yard not a yearlong activity. If the order is more the employment opportunity is also more, if the order is less the employment opportunity is also less. Hence most of the man power required will be procured through the subcontractors, not directly employed by the M/s. Shree Saibaba Sand Dredging Company Private Limited.

The expected labour force required during construction phase is to the tune of about 60 Nos. Although the workforce requirement will be temporary in nature, it will be met from the local population as far as possible hence there will be positive impact. Local businessmen will get opportunity to supply construction materials. Demands generated from the labour force for basic facilities including eatables etc. will increase the local business activity of the area.

Employment Generation during Operation Phase

Similar to the construction phase, the operation phase of the Multipurpose Jetty Terminal will also provide opportunities for employment mostly in the skilled and semi-skilled categories. This will enhance the income of the people associated with subcontracting business. All these activities will need support services like food, transport, medical facility etc. ultimately leading to improvement in quality of life of local people.

Environmental Management Plan

The Environmental Management Plan (EMP) provides an essential link between predicted impacts and mitigation measures during implementation and operational activities. EMP outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or mitigate adverse environmental impacts, and the actions needed to implement these measures.

The EMP comprises a series of components covering direct mitigation and environmental monitoring, an outline waste management plan and a project site restoration plan. Therefore,

environmental management plan has been prepared for each of the above developmental activities.

During construction phase, all precautionary measures shall be taken for dust suppression, prevention of marine water contamination and noise reduction, etc. The effect on environment during construction phase will be localized, temporary and reversible in nature. Further, operation stage of the multipurpose jetty will usually involve handling of cargos/vessels which may lead to vehicular emission of air pollutants into atmosphere, accidental oil spillage, leakage in cement carrying pipeline, etc.

Dust suppression arrangements should be regularly used to avoid the dust emissions. All construction machines should be well maintained and use appropriate air pollution control equipment as required.

Ambient air quality should be regularly monitored at critical locations near construction sites before start of work and during the execution of work so that increased ambient load can be estimated. If the levels are crossing the permissible values, immediate mitigation measures need to be adopted.

To lessen the gaseous emissions necessary steps must be followed such as only vehicles having PUC shall be allowed, well-equipped handling & transportation facilities shall be provided throughout the construction phase.

Wastewater Management

An average of 60 construction workers will be deployed per day during the construction phase. Temporary toilets will be provided to the construction workers. The estimated quantity of waste water generated from jetty and shipyard operation will be approximately 9KLD. The sewage from the same will be treated in portable STP. Storm water drainage system using rational method with R.C.C drains of various sizes is proposed. The drains will ultimately discharge into sea through outfalls at various locations. The sewerage system will be provided using sewage treatment plant of required capacity as per the design using the standard manual on sewage and sewage treatment.

Since there will not be any manufacturing involved in the operation phase, the source of wastewater generation will only be from the domestic usage. The estimated quantity of

wastewater generated will be 9 KLD which is proposed to be treated in a Sewage Treatment Plant (STP) of capacity 5 KLD. The treated wastewater will be used for greenbelt. The sludge from the STP will be collected, stored and used as manure for greenbelt development within the premises.

Solid Waste Management

The solid waste in the proposed project could also be generated mainly from three sources viz. institutional/ office waste, domestic/kitchen waste and waste from material handling in cargos, etc.

During the construction phase, for an average of 60 workers. The estimated quantity of solid waste generated during the operation phase will be 12 kg per day out of which 4.8 kg will be biodegradable and 7.2 kg will be municipal solid waste. The biodegradable part of solid waste would be treated in organic waste converter at site. The remains of this treatment would be then used as manure in garden. The non-biodegradable part generated from building will be disposed-off to dumping ground. The biodegradable waste is proposed to be treated in an organic converted within the site and the leftover from the outlet of the converted after treatment will be used as manure in the garden. The non-biodegradable waste will be disposed off to the dumping ground.

Hazardous Waste Management

No hazardous solid/liquid is proposed to be handled during construction stage. Hazardous waste will be generated in the form of used oil, batteries, spillage of oil etc. during operation phase which will be disposed off as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 by handing over to authorize agents approved by MPCB.