EXECUTIVE SUMMARY

Of

ENVIRONMENT IMPACT ASSESSMENT (EIA)

For

Development of Multipurpose Terminal with Jetty (Existing) for cargo handling and ship repairs facility using Floating Dry Dock (small ships)

(Received Terms of Reference from SEAC I, Maharashtra in July 2015)

At

S. NO. 41 & 42, H. NO. 18 & 19/1, VILLAGE KATALE (JAIGAD CREEK), TAL GUHAGAR, DIST. RATNAGIRI, MAHARSHTRA.

Proposed By

Marine Syndicate Pvt. Ltd.

Prepared By

Mahabal Enviro Engineers Pvt. Ltd.
Pollution monitoring, Engineers & Contractors in Environmental Management

Plot No- F-7, Road No. 21, Wagle Estate, Thane (W) – 400 604, Maharashtra, India
Phone: 2582 0658/3139/1663/3154 Fax: 91 – 022- 2582 3543, thane@mahabal.com

INTRODUCTION

Marine Syndicate is proposing development of a multipurpose terminal known as "United Dockyard" with jetty (existing) for cargo handling facility and ship repair. The project site is located on the north bank of Jaigad Creek at village Katale, Tal. Guhagar, Dist. Ratnagiri, Maharashtra.

The project site is under the ownership of Marine Syndicate Pvt. Ltd. Total area of the project plot is 29,030 m^2 (Approx. 7.25 Acres) and is included in the agreement signed with Maharashtra Maritime Board (MMB) for the multipurpose terminal.

Laterite is available in abundant quantity in Konkan region. Bauxite cargo shipments are made from this terminal to Dammam in Saudi Arabia and also to Gujrat Ports successfully. Considering the proximity of cargo shipments such as Laterite, Bauxite, Molasses, Sugar, Fertilizers and liquid cargo etc. and its future demand; it is planned to expand the existing facility of the cargo terminal/jetty by one additional platform (Unloading jetty of size 13 m x 25 m) close to existing jetty. The total capacity with this addition will be 2 lakh ton per year (0.2 million ton per year).

Small ships, barges, tugs etc. are struggling to get the slots in the ship repair yards especially for their underwater repairs. Considering growth of this region and insufficient infrastructure availability in other ports for small vessels; it is proposed to set up ship repair facility using Floating Dry Dock (**FDD**) for small vessels. Proposed ship repair facility with FDD will prove beneficial to small vessels, barges, tugs etc. operating between Mumbai and Goa on Konkan coast. MMB has given approval for cargo shipment and ship repair work at this multipurpose terminal and granted 3500 m^2 water frontage on lease for this purpose.

The ship breaking facility for small ships upto 150 m length & 5 m draft (around 2,000 tonnage weight) is planned **in a separate zone** very close to water frontage already availed for cargo shipment & ship repair work under the agreement signed with MMB.

There is only one large scale ship breaking facility located at Alang on the Gujrat coast. Many Indian and foreign ships are brought to Alang for dismantling and re-cycling. Few old ships are also scrapped at Darukhana near Reay Road-Mazagon in the premises of Mumbai Port Trust. However, this facility in Darukhana will be closed in near future.

There is no other ship breaking facility on the Konkan coast including Goa region. Whereas, many small ships and old barges require space and facility to be broken into scrap instead of goingall the way to Alang in Gujarat. After 20 to 25 years of operations, a ship becomes uneconomical and unsafe to operate. When a ship reaches this stage it becomes necessary to discontinue operation of ship and recover and recycle the materials used in its construction. There are few vessels lying on Konkan coast in unseaworthy condition.

The project proponent with a firm belief in safe and viable environmental practices is willing to provide such a ship breaking facility for small vessels upto 150 m length at this project site. Maharashtra Maritime Board (MMB) has issued letter of intent (LOI) dated 15.12.2014 with an additional water frontage of 125 m to the Company for development of Ship Breaking Facility very close to their existing terminal. Separate

agreement will be signed with MMB for lease of additional 5,000 m^2 water frontages to be used for the proposed ship breaking facility.

The proposed port terminal at village Katale would be beneficial to the local people. It will give opportunities for the local people for their livelihood and bring improvement in the local economic activity. The development of this terminal offers an efficient and cost effective supply chain/value proposition to the local intermingles and exterminates. This will accomplish one of the main aims of the proposed terminal project; which is to bring significant socioeconomic benefits to the local people and also to the region as a whole.

The proposed Project proposal falls under activity no. 7(e) of Category 'B' (Ports and Harbours) of Schedule to the EIA Notification 2006 wherein these facilities require prior Environmental Clearance from SEIAA, Maharashtra, based on an EIA study conducted as per the terms of reference approved by the SEAC I, Maharashtra. The project also requires CRZ Clearance under the CRZ Notification, 2011 as the above proposed activities fall in CRZ IB, III and IVB Zones.

This EIA study has been prepared as per the Terms of Reference (ToR) approved by SEAC I, in July 2015.

Institute of Remote Sensing (IRS), Anna University, Chennai has carried out the demarcation of High Tide Line (HTL), Low Tide Line (LTL) and Coastal Regulation Zone (CRZ) for the project site.

The distances to the identified HTL were measured with respect to the known points such as survey plot boundaries and transferred to the base map. Existing land use and landform in the project area have been used for the identification of CRZ categories.

The project area does not have any sensitive ecosystems such as mangroves, sand dunes, corals, etc. eligible to be categorized as CRZ IA. As per the CZMP of the State the land part adjacent to the project site belongs to CRZ III.

The proposed port development is permissible in CRZ subject to conditions as per the CRZ Notification 2011 as it requires waterfront and foreshore facilities.

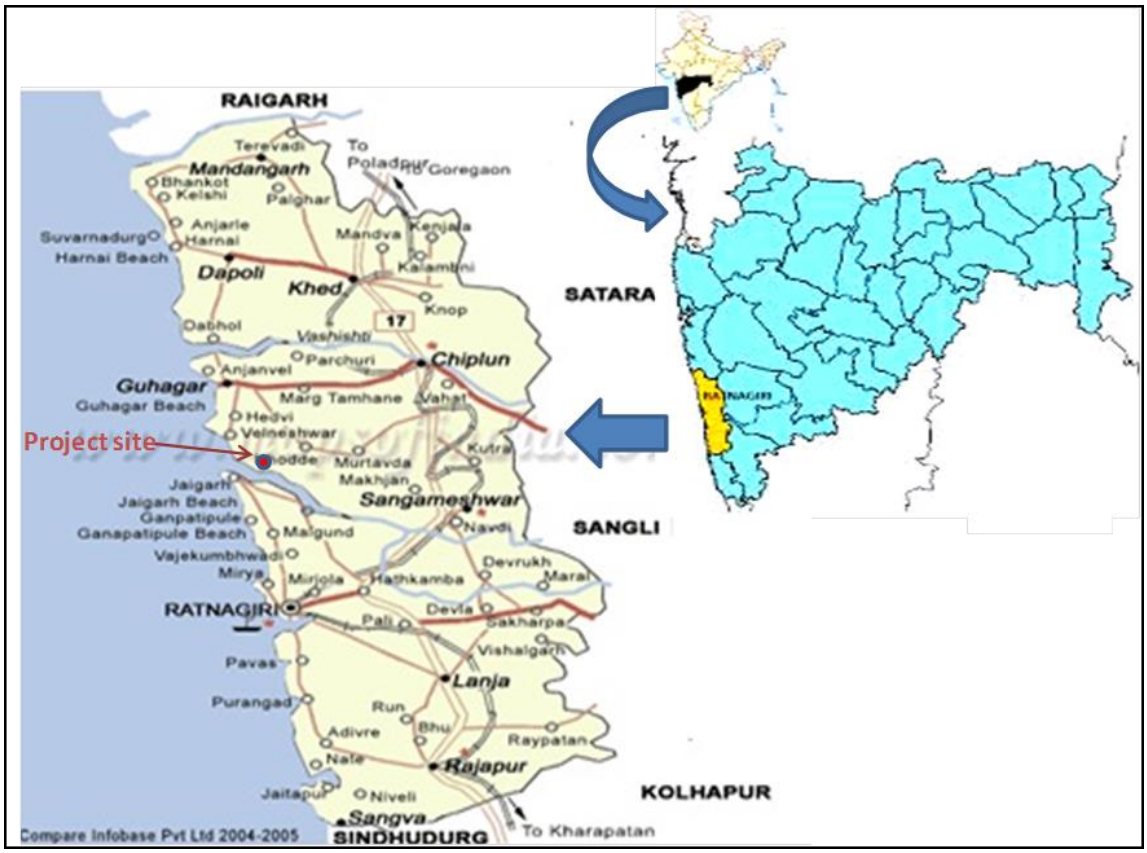
PROJECT LOCATION

The project site is located at Katale village (Figure 1)on the North bank of the Jaigad creek (Shastri River) in its inland waterways. This site is 3 nautical miles upstream from the Jaigad harbour and 4 nautical miles from the sea mouth. The site is at 72 km from Ratnagiri &52 km from Chiplun city. It is connected to Mumbai-Goa National highway no. 66 (old No. 17) at 40 km at Sawarde,via SH 105.The coordinates of the project site are as follows.

S. No.	Latitude	Longitude
Cargo Loading Ramp		
1	17^{0}17’25.08”N	73^{0}16’36.84”E

S. No.	Latitude	Longitude
Coordinates of the proposed Ship Repairing Facility (FDD)		
1	17^{0}17’18.4”N	73^{0}16’43.3”E
2	17^{0}17’17.6”N	73^{0}16’46.3”E
3	17^{0}17’17.6”N	73^{0}16’43.7”E
4	17^{0}17’18.4”N	73^{0}16’43.7”E

Figure 1- Location of the Proposed Project



PROJECT HIGHLIGHTS

Sr. No.	Particulars	Details	Unit
1	Cargo Handling	0.2	MTPA
2	Ship Repair (small ships: 75 m length X 5 m draft)	24 to 30	Nos/year
3	Ship Breaking (small ships: 150 m length X 5 m draft)	10 to 15	Nos/year
4	Manpower (Workmen + Staff)	100-125	No.
5	Total Land available	2.9	Ha
6	Existing Piled Jetty	7 X 2.4	m
7	Proposed Jetty	13 X 25	m
8	Floating Dry Dock	80 X 24	m
9	Water Requirement	10	m^3/day
10	Waste Water Generation	4.2	m^3/day
11	STP capacity (for Domestic sewage)	10	m^3/day
12	ETP Capacity (for Bilge and slop water)	10	m^3/day
13	Power Requirement	415	V
14	DG set Capacity	250	kVA
15	Total Project Cost (Rs.)	4.23	Cr

PRODUCT AND INFRASTRUCTURE REQUIRED

In this proposed project the multipurpose terminal will provide three types of facilities with required infrastructure, which are listed and described below:

a) Cargo shipments

Cargo shipments are also planned in separate zone very close and nearer to water frontage available with ships and barges of maximum 4 m draft from this terminal up to mother vessels at anchorage and upto nearby coastal ports. Cargo shipments of Bauxite, Laterite, Coal, Fertilizers, Molasses etc. as well as bulk, bagged and liquid cargo is planned at this terminal. Total cargo quantum will be maximum 2 lakh ton (0.2 million ton) per year at this terminal. This terminal has Customs notification for export of Bauxite material.

Open ground is made available as stockyard for Bauxite material and approx. 60,000 ton material will be stacked at one time. Bauxite cargo will be unloaded from lorries in this stockyard for storage.

One cargo loading ramp is installed (existing) for loading cargos into barges. One small base platform (Pile Cap) of size 7000 mm. x 2400 mm is installed on total 6 Nos. RCC piles each of 600 mm dia. on struts and beams. Tidal water moves freely between the piles without significantly obstructing the tidal flow.

Barges rest on this platform during loading cargo with mooring ropes given ashore to shore bollards.

The draft available at this loading pier is 4.0 m at low tide and 6.5 m at average high tide.

One unloading jetty for cargo is planned closed to the existing jetty with RCC pile cap of size 13 m x 25 m.

b) Ship repair

Ship repair work by using steel Floating Dry Dock will also be carried out at this terminal. Small ships, barges, tugs, supply vessels etc. up to 75 m. length and 5 m. draft will be docked on this Floating Dry Dock. Floating Dry Dock will be moored and operated in the water frontage granted by MMB on lease. Total 2 Nos. mooring buoys will be placed in the bay for mooring small ships and barges for afloat repairs. Whereas, 80 m long one steel floating dry dock owned by other company namely M/s Katale Shipyard Pvt. Ltd., Mumbai will be used in the bay availed for this multipurpose terminal. Marine Syndicate Pvt. Ltd. will execute operations of this FDD. MMB has granted permission for operation of this FDD in the bay.

Total 4 Nos. anchors/sinkers will be placed to hold this FDD in position during its operations. Ship repair work will be attended as per orders. Around 24 to 30 ships every year will be attended. Total 3500 m^2 water frontage is availed from MMB on lease for cargo shipment and ship repair work. **The estimated project cost for Cargo shipment and ship repairing facility is Rs. 1.8 Crore.**

c) Ship breaking facility

The ship breaking facility for small ships upto 150 m length & 5 m draft is planned in a separate zone very close to water frontage already availed for cargo shipment & ship repair work under the agreement signed with MMB. Separate agreement will be signed with MMB for lease of additional 5000 m^2 water frontage to be used for proposed ship breaking facility. Around 10-15 nos. of ships/barges will be dismantled every year in this ship breaking facility.

Total 4 Nos. shore bollards will be installed ashore to hold the vessels very close to shore. Small ships and barges arriving for dismantling purpose will be beached in soft mud at this terminal. Total 2 Nos. mooring buoys will be placed for stern lines of the vessel when beached for dismantling purpose.

In addition to shore bollards, there will be one winch used ashore to pull the vessel closer as and when required. One weigh bridge of 30 ton capacity will be installed ashore.**The estimated project cost for ship breaking facility is Rs. 2.43 Crore.**

RESOURCE REQUIREMENT

Water

Based on the requirements of proposed port development, the water demand at the port is estimated to be 10 KLD. Out of this, the potable water demand for the port personnel is 2 KLD with the balance being raw water.

Source of Water Supply: Daily requirement of 2 KL water will be made available from the well water (existing outside the CRZ) within the premises. Additional water supply will be available from village water supply scheme. Tanker water supply from Abloli village at 10 km distance is also available. Toilets facility &sewage disposal arrangement are at site as per the approval accordance by District Health Officer.

Land: All the port facilities are proposed to be developed entirely on private land whereas the entire infrastructure facilities like administrative buildings, backup areas, warehouse, truck terminal areas, etc. are planned to be developed on the 2.90 Ha (i.e. around 7.25 Acre) owned by MSPL.A Greenbelt Development Plan will be implemented around the various project components of the proposed port. This will help to achieve environmental protection and mitigation of pollution levels in the vicinity of the proposed project.

Workforce: During operational phase, the port is likely to generate direct employment of 100 Nos. and nearly 20-25 indirect employment opportunities. Local people will be given preference based on their qualification and skill set.

Sewerage Treatment Plan

Phytorid based STP of 10KLD will be designed for the project. Treated water will be recycled for flushing, green belt development or Dust suppression measures. Proper maintenance and operation of the STP will be ensured by employed trained labours at the STP and following Standard Operating Procedures (SOP).

Effluent Treatment Plan

The ETP of capacity 10 m^3/day will be provided to treat Bilgeand slop water from ships (repairing and breaking activity) by physico-chemical and biological means. Oily water will be collected from the ships and transported in drums to the ETP. Treated water is stored in storage tank and will be utilized for dust suppression measures.

Solid Waste Management

Municipal Solid Waste (MSW) from the project will be collected and segregated. The composition of MSW will mostly be inert. The solid waste generated is expected to be around 20 kg/day. Wet garbage will be composted by using Vermicomposting pit (used as manure for gardening) and Non-biodegradable will be handed over to authorized recyclers.

Hazardous Waste Management

Hazardous waste (during ship repairing and breaking activities) such as used oil, waste oil, slop oil, paint waste/residue will be segregated and stored separately on site (designated area), and given to Common Hazardous Waste Treatment, Storage & Disposal Facility (CHWTSDF) for disposal/or to authorized recyclers. The Hazardous

waste generated from the project will be disposed as per the "Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2016".

Storm Water Management

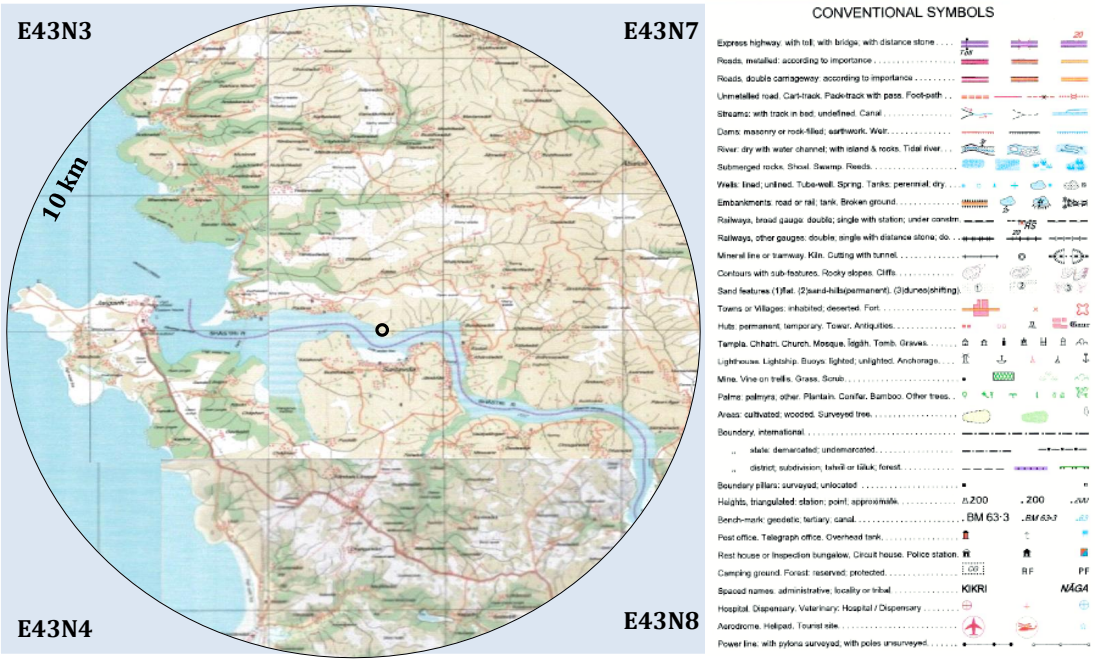
A properly designed drain network on entire area will be constructed with sloping surfaces towards drainage pits conducting the storm water directly to the harbour basin. An oil /sediment in-line unit is recommended to provide basic treatment to the storm water before discharging through outfalls. Storm water from the entire site shall be collected at one place and the same will be passed through the settling pits so that any coarse particles are arrested from entering into the creek.

Garland drains will be constructed on sides of the ship cutting area. The garland drains will also be routed to a settling pit to settle out suspended solids in the storm water. The settling pit will be a permanent structure and will also be provided with oil and grease trap. The settling pits and drains will be cleaned periodically, especially before monsoons.

BASELINE ENVIRONMENT

The baseline environmental status of the study region has been collected by the study team to ascertain the present environmental conditions around the proposed site. The study region for baseline data generation has been confined to 10 km radius around the project site (Figure 2).

Figure 2: Study area 10 km radius



Site Setting

The proposed project is at village Katale on the north bank of Jaigad creek in its inland waterways. The proposed site is at 72 km from Ratnagiri city and 52 km from Chiplun city. The Proposed site is accessible by 9 m wide road which is connected to the State highway no. 105 (Tavsal- Abloli). The site is 3 nautical miles upstream from the Jaigad Harbour and 4 nautical miles from the sea mouth. Existing Creek has 7 m depth from Jaigad harbour upto the site even during Low tides.

Data Sources

Data was collected covering one season i.e. winter season (October 2016–December 2016). The study team has collected the secondary information as well as the primary information on various environmental attributes. Information on existing environmental conditions has been gathered from several sources including: Site surveys and field experiments to gather the information on Meteorology, Air Quality, Water Quality, Marine water and sediment quality, Noise Quality, Soil Quality, Land, Biological and Socioeconomic environment. The Environmental Key aspects of prevailing baseline environmental qualities are as follows:

Meteorology

The climate of Ratnagiri is mainly governed by the Arabian Sea and the Western Ghats (range of mountain spread over the Western side of India), which acts as a shield and protects the District from the dry winds blowing North to South. Also, the Ghats play a significant role in the onset of the monsoon. Presence of the sea also plays an important role in the diurnal variation of climatic condition. The landward sea breeze in the evening keeps the temperature at a pleasant range.

Wind speed and direction: During the said monitoring period, the monthly mean wind speed measured on-site varied between 5.2 km/hr in Oct, 5.8 km/h in Nov 2016 and6.4 km/hr in December, 2016. The overall mean wind speed during the period was 5.8 km/hr.

Winds blow from the western or south-western direction during the rainy seasons from June to September. In the post-monsoon months and up to the month of December, the pre-dominant wind direction is from east. However, during this period, decrease in wind speed is observed. During the months from December to March, winds blow from east, northeast and southeast direction in the morning and west and north-western direction in the evening.

Rainfall

The average annual rainfall in the Ratnagiri district is about 2,875 mm. The average annual rainfall for the Ratnagiri city is 2,575 mm. On an average, the project area district has about 95 rainy days per year. Most of the rainfall (93.2%) is received in the months from June to September under the influence of south-west monsoons.

Humidity

The humidity is generally high throughout the year. During the monsoon months i.e. June to September, humidity ranges from 81% to 90%. During rest of the year, the humidity varies from 58% to 80%. The average humidity observed over the year is 73%.

Ambient Air Quality

Air quality was measured at five locations in the study area considering the prevalent upwind and downwind directions. Concentrations of particulate matter (PM 10 and PM 2.5), sulphur dioxide, oxides of nitrogen, carbon monoxide and VOCs were measured. The ambient Air Quality Status in Study Area is given below:

Ambient Air Quality Status (Average)

Sr. No	Location	PM10 (µg/m³)	PM2.5 (µg/m³)	SO_2 (µg/m³)	NOx (µg/m³)	CO (mg/m³)	VOC (µg/m³)
1	Project site	52.4	23.7	9.0	13.8	0.2	BDL
2	At Satkondi Village	46.4	20.2	7.7	12.4	0.2	BDL
3	At Katale Village	46.8	20.6	8.5	13.7	0.4	BDL
4	At Abloli Village	51.6	22.6	8.6	15.1	0.3	BDL
5	At Vaidyalaogan Village	44.5	20.4	8.8	11.6	0.3	BDL

The salient observations of the average results and their compliance to the 24 hourly average NAAQ standards are as follows:

- The peak PM_{10} and $PM_{2.5}$ values are observed at Project site which confirms the standard of 100 µg/m³ and 60 µg/m³ respectively..
- The Sulphur dioxide levels monitored at all the locations conforms to the standard of 80 µg/m³, with highest value of 9.0 µg/m³.
- The Oxides of Nitrogen levels monitored at all the locations also complies with the stipulated standard of 80 µg/m³ with highest value 15.1 µg/m³.
- The Carbon monoxide levels also complied with the stipulated standards of 2.0 mg/m³, The CO levels at all the locations were within the stipulated limit.
- The volatile organic matters (VOCs) are monitored at all the locations were below detectable limits (BDL).

Water Quality

In order to get an idea about the water quality in the region, analysis of water was done from surface and ground water sources for various parameters. Surface and ground water samples were collected and analysed at 3and 2 locations respectively.

Marine water (Surface water) and sediment Quality:

The three samples were taken for the monitoring of marine water quality. Sea water quality isin the range expected for marine coastal waters (Water quality criteria Class SW-IV).

Sediment sample from 3 stations were collected to analyse the physico-chemical andbiological characteristics. Physico-chemical characteristics of the sediment did not show the presence of anypollutants or heavy metals harmful to the aquatic fauna.The concentrations of copper, cadmium, lead and zinc are either low or below detection limit indicating absence of anthropogenic contamination of sediment by these metals. The high concentration of iron in sediment is typical of the sediment of the west coast of India and is due to the parent basaltic rock from which the sediment is derived.

Ground water quality: The groundwater samples were collected from wells. Ground water quality when compared with the IS: 10500 (1993) indicates that all the parameters are within the Desirable Limits and signify that the groundwater is devoid of any pollution.

Noise Quality

In order to have an idea about the existing ambient noise level of the study area, noise monitoring was carried out at five locations during post-monsoon season 2016. The results indicate that during October and December, 2016the noise levels were within the norms prescribed by Ministry of Environmental and forest, GOI, notification dated 14.02.2000.

The day time noise levels were found in the range of 40.3-53.6 dB (A). The night time noise levels were found in the range of 37.1-42.6 dB (A).

Land use/Land coverBased on the satellite image:

As evident from table below, the "settlement" and "Coastal Sand" (beach area) respectively constitute about 6.01% and 0.15% of the total area. The remaining area of 35.89% is covered by vegetation.

Classification	Area m^2	Area Ha	Area km^2	Area %
Vegetation	112711550	11271.16	112.71	35.89
Mangroves	157325	15.73	0.16	0.05
Open land	108587050	10858.71	108.59	34.58
Fallow Land	11307300	1130.73	11.31	3.60
Water	61935450	6193.55	61.94	19.72
Beach	480325	48.03	0.48	0.15
Settlements	18861325	1886.13	18.86	6.01
Total	**314040325**	**31404.03**	**314.04**	**100.00**

Flora and Fauna

Proposed area falls under Konkan region of Maharashtra and ecosystem composition within the study area is not very complex. Project area including its 10 km surroundings has good vegetation cover (around 36%) while water bodies too contribute substantially (around 20%) to the land cover. Among vegetation Mangroves are very low and sparse contributing less than 1% to the total vegetation cover.

Floristic studies revealed that the natural vegetation was dominated by deciduous elements.The secondary vegetation has large number of species of economic importance such as Tectona Grandis, Carrisacarandas, Holarrhenaantidysenterica, Terminalia paniculata and T. bellerica.Large scale and small-scale plantation of Mangifera indica (Mango), Anacardiumoccidentale, Cocus nucifera, and Garcinia indica from fruits and Acacia catechuoides for tannin source are seen.

Species of rare or threatened category were not in the sampled area. The vegetation is very sparse on private lands as most of the private land is put to agriculture. Areas near the stream are less inhabited and few patches of dense vegetation still exist.

Marine Ecology

The sampling for phytoplankton and Zooplankton was done at 4 sampling locations during low tides and high tides. The phytoplankton includes a wide range of photosynthetic and phototrophic organisms.Marine phytoplankton is mostly microscopic and unicellular floating flora, which are the primary producers that support the pelagic food-chain. During this sampling run, Trachophore larvae of Polychaete were observed in their various growing stages.

The phytoplankton density varied from 172-223 Units/L in Jaigad creek area during high tide period and 133-161 Units/L during low tide period.

The chlorophyll-A was varying from 1.2 -1.9 mg/m^3. Pheophytin level was below detectable limit in the all 4 sampling stations.

Zooplankton community was represented by five groups of plankton; Titinids, Copepods, Decapoda, Urochordata Arrow worms, and larval forms of Crustaceans, Brachurian larvae, and Trachophore larvae,. Among these holoplankton of this region; Copepods were the most dominant group followed by Tintinids, Nauplius Larvae and Zoea larvae also dominated the net plankton at all the sampling locations. During this sampling run, Trachophore larvae of Polychaete were observed in their various growing stages. The zooplankton density varied from 78-103 No/L in Jaigad creek area during high tide period and 71-91 No/L during low tide period.

The benthic organism collected along with sediments by using the Van-veen grabs were represented by one group of benthic organisms, Polychaetes with, their number varying from 210 to 360 N/m^2. The sediments were dominated by many dead shells of bivalves and Gastropods but no live forms were recorded during this sampling run.

Traffic survey

Traffic surveywas carried out on SH 105 near Katale village. The traffic survey was conducted to ascertain the present traffic scenario along SH105 to evaluate traffic impact that will result from proposed development. The two key components of study included in the assessment were, the present Scenario and impact on traffic due to the proposed development. As per the traffic survey, the existing traffic density is very low.

The proposed cargo handling capacity is around 0.2 MTPA. However the activity will be carried out only for 8 months in a year except monsoon period. It is expected that around 75-100 trucks/day (heavy load vehicles) will be plying on the said road considering 10-15 T capacity/truck.

Along with the cargo handling on the site, ship breaking activity will alsotake place. During the proposed activity of ship breaking around 10-15 Nos. of ships/ barges of around 2,000 T capacity will be dismantled. However the activity will be carried onlyfor 10 months in a year. It is expected that around 20-25trucks/day of heavy vehicles will be plying on said road considering 10-15 T capacity/truck.

Overall increase of traffic will be around 100-125 trucks/day during full operation of the project considering both the activities of the project i.e. cargo handling and ship breaking.

The SH 105 & the access road is adequate to handle the additional traffic load considering the present Level of Service (LOS).

Truck parking facility: Truck parking facility will be provide for easy accessibility of vehicles for transporting scrap and other materials and to relieve the traffic congestion around the yards.

Socio-economic Environment

Total population of the study area as recorded in 2011 census is 37,404. The sex ratio in the study area is 1223 females per 1000 males. SC and ST categories constitute about 6.83% and 0.21% of the population respectively. Literacy rate is around 72%. Working population constitute 47.44% of the total population. Main and marginal workers constitute 39.25% and 8.19% of total population respectively. The proposed port is likely to have positive impact on the socio economic conditions of the region. The social infrastructure in the region is likely to improve due to the creation of job opportunities and avenues for income generation. People will have income due to direct as well as indirect employment.

IMPACT ANTICIPITATED

Anticipated impacts due to the project implementation and proposed measures to mitigate the likely impacts are listed in the following table:

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
1	**Pilling for proposed Jetty**	• Impacts during civil works activities like driving of piles, construction of berth, movement of construction equipment's etc. will have high potential to disperse the fine grained sediments in to the water, thus increasing the particular load which in turn can negatively influence the photosynthetic activity through locally further affecting the marine life. • Construction phase operations may also lead to potential impacts due to re-suspension and settlement of sediments, increased turbidity decreasing the light penetration and low photosynthetic activity, and, loss of benthic habitats due to disturbance of the sea floor.	• Sediment is a leading cause of impaired water; construction activities can affect the water quality. Best management practices (BMPs) will be conducted during construction phase of the project. Use of Silt curtains to minimize spreading of silt plume. Proper planning and scheduling for construction phase to avoid strong wind, current and tides that will further add to widen the effect of spreading of sediments. • To assess the effects of the construction, daily water quality samples will be taken upstream and downstream from the construction site. The samples will be categorized as baseline, active construction, and post-construction to isolate the effects of the construction activities. • Preventing measures will be taken to prevent runoff from the site containing construction materials, debris, construction waste and excavated earthen materials to prevent impacts on the water environment especially on nearby marine water resources • The construction debris generated during construction phase is very minimum and around 20 m^3. The construction debris will be utilized at site (outside CRZ area) for site formation/levelling/ Road filling wherever possible. • Turbidity levels with baseline levels as reference will be checked during entire monitoring programme • Discharge of untreated waste into creek and streams will be prohibited • Oil Spill control measures will be adopted
2	**Cargo Handling & Storage Area**	**Air Quality** • Emissions during loading & unloading activities	• Material Handling Craneshave been considered using **grab unloaders** or **clamp-shell buckets** for cargo movement between the barges to jetty/ berth.

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
		• Emissions from DG sets (during power failure), vehicular emissions **Noise Quality**	• **Grab unloaders** or **clamp-shell buckets** will reduce dust, spillage, handling loss etc. during cargo discharging from the barges at Jetties. • To mitigate the dust emission during loading and unloading of cargos such as coal, bauxite ore etc., use of chute/hoppers is preferred for loading from the ramp. • Wind screens will be effectively used to reduce fugitive dispersion • Tarpaulin covers will be used to avoid fugitive dust • During the cargo handling, the dust will be controlled by using **water foggers** • Stock piles, excavated earthen materials etc. will be managed with water sprinkling to avoid dust being airborne from the specific site • Use of low sulphur diesel fuel is proposed • Acoustic barriers and enclosures will be provided wherever necessary. • Personal Protecting Equipment (PPE) will be provided for workers wherever necessary • Truck movement will be regulated • Greenbelt will be developed
3	**Sewage and liquid/Oiland other Cargo spills**	**Marine Water Quality** Change in marine quality	• Wastewater and sewage have a potential to pollute marine water or soil, if disposed untreated. However the treatment of sewage in STP as proposed will minimize the impact & increase availability of water for flushing, greenbelt development/ Dust suppression measures. • In the Coal handling yard, proper drains are provided to collect the runoff coming from the coal stock yard during the monsoon. The same is being passed through the settling ponds to arrest any course particle/ material entering the creek and then the supernatant will be discharged to storm water drains. • Liquid cargo storage will be connected to the berths via pipelines. The loading/unloading of liquid cargo will be via tested hoses meeting

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
			required standards (OISD- 135). In case of any cargo spillage during transfer from/to ships, it will be contained and recovered. • Oil spill control equipment such as absorbent pads, containment boom, skimmers etc. will be available for recovery. • Spill contingency plan as a part of the Disaster Management Plan will be prepared in accordance to the cargo to be handled Spill recovery/immediate response measures will be displayed at cargo handling areas, Material Safety Data Sheet (MSDS) of cargo (if applicable) being handled will be also displayed. Mock drills will be conducted at periodic intervals. • All ship related waste with a potential to cause pollution to the marine environment will be disposed in according with the guidelines stipulated by the MARPOL 1973/78 Convention. • Careful storage and usage of fuels, oils (and chemicals). will be ascertained • Fuel and oil stores will be located away from the site drainage system and the shoreline. If this is not possible, adequate measures will be identified to prevent or contain any spillage (e.g. blocking drainage points). • Correctly marking/labelling as to their contents and capacities will be ensured.
4	**Ship breaking and Ship Repair**	**Noise Quality** • Ship repair/ breaking • Diesel Run machine • Vehicles transforming material	• Noise will be maintained below threshold levels stipulated by Central/ State Pollution Control Board (CPCB)/SPCB • Procurement of machinery / equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) • Well-maintained equipment, which meets the regulatory standards for source noise levels, will be used • Any equipment emitting high noise, wherever possible, will be

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
			oriented so that the noise is directed away from sensitive receptors • Noise attenuation will be practised for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers • High noise generating activities will be scheduled at daytime (6.00 am to 10 pm) • Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc.
		Water Quality • Bilge water discharge • Slop and other oil water discharge	• There will be provision of treatment facility (ETP) for bilge and Slop water discharge. • Machines will be washed in a designated area and the effluents will be routed through drains to a settling pit with oil & grease trap. The clarified effluents will be used for dust suppression purposes to minimize the fresh water demand.
		Hazardous waste	
		• PCB (poly chlorinated biphenyl's) containing wastes are paint chips, engine oil, hydraulic fluids, damaged electrical cable insulation, damaged electrical components, rubber and plastics.	• PCB containing wastes will be stored in designated area & handed over to the **CHWTSDF**.
		• TBT (Tri Butyl Tin) is the most toxic compound for aquatic ecosystem, impairs the immune system of organisms, damage	• The use of TBT is prohibited as per international convention on the control of harmful antifouling system on 17thSept. 2008. Hence, any TBT waste generation is not expected. TBT waste if at all generated, it will be sent to CHWTSDF.

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
		the central nervous system and reproductive mechanisms in mammals,	
		• Release, spread or leakage while taking out oil from the ship	• Before breaking of ship, all the engine oil & residual fuel will be removed and stored on shore • As a mitigation measure for spillages an oil spill contingency plan will be implemented. • To combat accidental spillages provision of containment, oil skimmers, Boomswill be used to minimize the damage to marine environment.
		• Generation of dust/fumes during cutting process	• Use of PPE will be compulsory for the workers while cutting/ breaking
		Marine Water Quality • Change in marine water quality due ship repairing activity on floating dry dock • Storm water runoff from port area to harbour basin	• **Oily Compounds**: Oily wastes and other hydrocarbon compounds (fuels and grease) are likely to be generated from ship breaking activity and maintenance activities conducted at the Dry Dock. Oily compounds will be disposed of in accordance with appropriate environmental protocol to ensure that it does not infiltrate the adjacent water and soil. • **Metals**: Ship breaking and repair activity will generate scrap metal in the form of sheet & solid metal off-cuts & it will be disposed for recycling. • **Glass Materials**: The facility may also generate small volume of glass waste. Glass waste will be recycled wherever appropriate or disposed off at the landfill. • **Batteries**: Batteries will generate as solid waste during ship repair &

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
			breaking activity. These batteries will be stored in a designated bounded area until such time as they are recycled or disposed of in an environmentally sensitive manner. • Excavated soil at backup, PAF Zone and ware house area will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. • Settling pits will be provided along with the storm water drain lines to arrest any course particle/material entering into the creek.
5	**Water supply**	• Impact on existing water resource	• Water requirement of 10 KLD during the operation phase and this will be met from Bore-well at project site (outside CRZ) or tanker water supply from nearby village.
6	**Wastewater Discharge**	**Water Quality** • Impact due to discharge of runoff from storage and sewage from port and port premises • Bilge &slop water from ship repair/ breaking activity	• Separate collection and treatment for oil and grease for runoff from workshop area will be available. • Sewage treatment plant will be used to treat waste water generated from Admin bldg, Annex bldg. etc. • Treated wastewater from STP will be used for flushing, greenbelt/dust suppression measures • Bilge &slop water will be collected separately, filtered & then treated in ETP and will be used for dust suppression measures.
7	**Solid Waste Management**	• Groundwater and Soil quality • Impact due to disposal of solid waste on ground without treatment	• An integrated solid waste management plan is proposed for port and associated facilities • Composted bio-degradable waste will be used as manure in greenbelt. • Other recyclable wastes will be sold. • Scrap & salvageable material generated during ship breaking will be sold to authorized vendors.

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
8	**Handling of hazardous wastes**	• Human life and loss of property	• Hazardous materials will be stored as per the prescribed/approved safety norms. • Hazardous wastes (used oil & used battery) will be sent to MPCB/CPCB approved recyclers. • Medical facilities including first aid will be available for attending injured workers • Emergency alarms, provision of fire hydrant system/ extinguishers will be installed. • Effective Disaster Management Plan (DMP) which covers onsite and offsite emergency will be developed. • Recovery of spills to the extent possiblewill be ensured.
9	**Fishing**	• Fishermen and fishing villages	• Interactions will be initiated with the fishing community before commencement of work • Path of incoming vessel traffic will be delineated and communicated to fishermen. • Activities impacting shore areas during fish breeding period (June & July) will be avoided.
10	**Operation of Port**	• Socio-economic conditions of the region • Shoreline change	• During operational phase, the port is likely to generate direct employment of 100 persons and 20-25 indirect employment opportunities. Local people will be given preference based on their qualification and skill set. Together with this employment potential, project will help to enhance the socio economic conditions of the area. • The results of the shoreline change assessment around 2 km either side during 2005 - 2010 reveal spatial variations in the shoreline change rates and also that the shoreline at the proposed port

Sr. No.	Activity	Likely Impacts in the absence of Mitigation Measures	Proposed Mitigation Measures
			development area is stable and does not undergo changes.

ENVIRONMENT MANAGEMENT PLAN

Measures which will be adopted to reduce the magnitude of negative impacts from the proposed project during the construction and the operation phase are discussed below in the Environment Management Plan.

Environmental Management Plan during <u>CONSTRUCTION PHASE</u>

Sr. No.	Environmental Components	Mitigation Measures
1.	Ambient Air Quality	• To reduce impacts from exhausts, emission control norms will be enforced / adhered. • All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards • Adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. will be provided. • Movement of material will be mostly during non-peak hours. • Water sprinkling will be carried out to suppress fugitive dust • Environmental awareness program will be conducted for provided to the personnel involved in developmental works
2.	Noise	• Noise will be maintained below threshold levels stipulated by the Central/ State Pollution Control Board (CPCB)/SPCB • Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels of less than 75 dB (A) • Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used • Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors • Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers • High noise generating activities will be scheduled at daytime (6.00 am to 10 pm) to minimize noise impacts • Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. • Ambient noise levels will be monitored at regular

Sr. No.	Environmental Components	Mitigation Measures
		intervals
3	Water	• Required water for construction activities will be sourced from through tanker water supply from the nearby villages. • Loss of water will be avoided/minimize during conveyance • Use of water will be optimized
4.	Land	• Composted bio-degradable waste will be used as manure in greenbelt. • Other recyclable wastes will be sold. • Excavated soil at backup, PAF Zone and ware house area will be stockpiled in a corner of the site in bonded area to avoid run off with storm water. • General refuse generated on-site will be collected in waste skips and separated from construction waste. • Burning of refuse at construction sites will be prohibited. • All control measure will be taken to avoid contamination of groundwater during the construction phase
5	Marine Environment	• Sediment is a leading cause of impaired water; construction activities can affect the water quality. Best management practices (BMPs) will be conducted during construction phase of the project. Use of Silt curtains to minimize spreading of silt plume. Proper planning and scheduling for construction phase to avoid strong wind, current and tides that will further add to widen the effect of spreading of sediments. • Runoff from the site containing construction materials, debris, construction wastes and excavated earthen materials will not be release to the marine area to prevent impact on nearby marine water resources. • The construction debris generated during construction phase is very minimum and around 20 m^3. The construction debris will be utilized at site (outside CRZ) for site formation/levelling/ Road filling wherever possible. • Turbidity levels will be checked with the baseline as reference during the entire monitoring programme • Discharge of untreated waste into creek and streams will be prohibited • Oil Spill control measures will be adopted • Ensure that slop tanks will be provided to barges/ for collection of liquid/ solid waste

Sr. No.	Environmental Components	Mitigation Measures
		• Marine environmental monitoring as per environmental monitoring programme will be undertaken for timely detection of deviations from the baseline-to enable corrective measures.
6	Fishing and Fishing villages	• Interactions will be initiated with the fishing community before commencement of work • Path of incoming vessel traffic will be delineated and communicated to fishermen. • Activities impacting shore areas will be avoided during fish breeding period (June & July)
7	Safety Measures	• Adequate drinking water, toilet and bathing facilities will be available at the port premises. • Personal protective and safety equipment will be provided. • First aid facility for construction workers will be available. • Regular health checkup for the staff and workers will be mandatory. • Regular pest control will be done on site. • Educational and awareness program with respect to firefighting and safety measures will be organized for staff and workers. • Training to workers in safety will be organized (twice a Year) by the Safety Officer

Environmental Management Plan during Operation Phase

Air environment: The major source of air pollution will be dust from Cargo handling (Bauxite, Laterite, Coal etc.) and emissions from DG sets and vehicles. Use of low sulphur diesel, regularization of truck movement, use of tarpaulin covers,use of grab unloaders or clamp-shell buckets can avoid dust emission in atmosphere. To mitigate the dust emission during loading of cargos such as coal, bauxite ore etc., use of chute/hoppers is preferred for loading from the ramp.Speed regulations will be imposed on vehicles engaged in transportation. Control measures during loading and unloading activities of coal and other cargo to minimise PM concentrations will be in place. Stock piles, excavated earthen materials etc. shall be managed with water sprinkling to avoid dust /soil being airborne from the specific site.

Material Handling Cranes have been considered using grab unloaders or clamp-shell buckets during cargo handling from barges to the jetty / berth. The aim is to make use of Grab unloaders or clamp-shell buckets to reduce dust, spillage, handling loss etc. during cargo discharging from the barges at Jetties.

Liquid tank farm facilities along with loading bays are planned and will be connected to the berths via pipelines running along the approach trestle.

Noise Environment: The major noise sources will be machinery and DG set. The employees working near the noise generating sources will be provided with earplugs/PPE. The additional extensive greenbelt proposed to be developed around the plant will also help in attenuating the noise levels further.

Marine water Environment: Wastewater (Bilge and Slop water) and sewage have a potential to pollute marine water or soil, if disposed untreated. However the treatment of sewage in STP will minimize the impact & increase availability of water for flushing, greenbelt development/ dust suppression measures. In case of any cargo spillage during transfer from/to ships, it will be recoveredto the possible extent. Oil spill control equipment such as booms / barriers, skimmers, absorption pads etc. will be provided for recovery of spilled oil. The Oil spill contingency plan will be framed to provide quick response to oil spill for efficient recovery.In the Coal handling yard, proper drains are provided to collect the runoff coming from the coal stock yard during the monsoon. The same is being passed through the settling ponds to arrest any course particle/ material entering the creek and then the supernatant will be discharged to storm water drains.

- Ships will be prohibited from discharging waste-water (except treated sewage), bilge, oil wastes, etc. into the near-shore as well as harbour waters.
- Bilge &Slop water will be collected separately, filtered and then treated in ETP.Treated water will be stored in astorage tank and will be used for the dust suppression measures.
- As a mitigation measure for spillages an Oil spill Contingency Plan will be prepared and implemented.
- Storage areas will be protected using garland drains so as to avoid mixing of runoff from these areas.
- A comprehensive greenbelt will be developed within the premises as per CPCB guidelines.
- Native species for plantation and creation of perching sites for birds for birds will be promoted.
- Regular monitoring of the local area will be done to inspect any residual impacts on ecology or marine environment caused by the project operation.

Water Environment: Water requirement will be 10 KLD during operation phase and that will be met from the existing Bore-well at the project site or Tanker water supply. Sewage treatment plant will be constructed within port area and port colony area. Treated wastewater from STP will be used forflushing,greenbelt or dust suppression measures. Bilge &slop water from ships (repair and breaking activity) will be collected separately, filtered & then treated in the ETP. Treated water from ETP will be stored in a storage tank and will be used for the dust suppression measures.

Land Environment All air emission control systems willbe installed and operated to comply with the CPCB/MPCB norms. Effluent treatment plant system will be installed and operated to comply with the norms. All the solid waste will be disposed as per

norms. Hence there will not be any adverse impact on land environment due to the present proposal. Hazardous materials will be stored and handled as per the prescribed/approved norms.

Hazardous wastes (used oil & used batteries etc.) will be sent to MPCB/CPCB approved recyclers. Medical facilities including first aid will be available for attending to injured workers Emergency alarms, provision of fire hydrant system and fire extinguisher will be installed. Effective Disaster Management Plan (DMP) which covers onsite and offsite emergency plans. Oil Spill Contingency Plan will be in place to combat an accidental oil spill and containment and recovery of the spilled oil to the extent possible will be the preferred/approach.

Green belt development: Green belt development will further enhance the environment quality through limitation of air emissions, attenuation of noise levels, balancing eco-environment, prevention of soil erosion and creation of aesthetic environment.

Occupational Safety & Health

During operational phase, the port is likely to generate direct employment of100 persons and 20-25 indirect employment.

Rules and Safety guidelines as stipulated in the Indian Factories Act, 1948 will be followed. Risk assessment will be carried out in the yard on a regular basis. The goal for each risk assessment session is to identify hazards, determine risk ratings and controls and to review the implementation of risk controls from previous risk assessment sessions. Assessed risks and steps for prevention and control of loss / damage due to accidents will be communicated to employees through hoardings, boards, posters and internal company communications. Control room will be provided at Admin & Main building. First Aid Centres will be established at different strategic locations. Workers will be forced to use welders' goggles / masks to protect their eyes and faces from intense heat and light. Fire-retardant gloves shall be used to protect the workers' hands. Workers also issued with fire retardant suits and gas masks. Safety belts, shoes and helmets will also be made available during proposed activity.

ENVIRONMENTAL MANAGEMENT AND MONITORING

In order to achieve all the set goals, a highly committed Environmental Management Cell with a highly qualified and experienced person in the field of Environmental Management of port will be considered for the position of Senior Manager for Environmental Management along with adequate supporting staff.

The major duties and responsibilities of Environment Management Cell are:

- To implement the environmental management plan (EMP)
- Risk identification and control of environmental problems
- Evaluate the efficacy of the EIA, mitigation measures, as stipulated in the EMP.

- Coordination with MoEF and other central/state pollution control boards for prevention and Control of pollution.
- To assure regulatory compliance with all relevant rules and regulations
- To ensure regular operation and maintenance of pollution control devices
- To initiate environmental monitoring as per approved schedule
- Review and interpretation of monitoring as per approved schedule
- Review and interpretation of monitoring results and corrective measures in case of monitored results deviate from the specified limit
- Maintain log of public complaints regarding environmental issues and the action taken (if any)

The effective implementation and close supervision by the environmental management cell to mitigate the environmental impacts, which are likely to arise due to operation phases of the project could be achieved through a suitable institutional mechanism. A budget of Rs. 55 Lakh (capital cost) &28.75 Lakh/year (O&M cost) has been earmarked for the Environmental Management Plan and Environmental Monitoring Plan to address all environmental management requirements.