Executive Summary

For

"Deepening and Widening of Approach Channel to Second Chemical Berth (SCB)" at Pir Pau, Mumbai"

By,

Mumbai Port Trust

EXECUTIVE SUMMARY

1.1 INTRODUCTION

The MbPT has proposed Deepening and widening of Approach channel to Second Chemical Berth (SCB) at Pir Pau, Mumbai. The Second Chemical Berth (SCB) was partly commissioned in June 2015 and fully commissioned in January 2016. The Environmental Clearance for the SCB was obtained on 21.03.2007 vide letter no. 10-18/2006.IA-III from MoEF&CC New Delhi.

The Second Liquid Chemical Berth is constructed 650 meter south of existing First Chemical Berth (FCB) off Pir Pau and in the same alignment as that of the FCB. The capacity of the Second Liquid Chemical Berth is of 2 MMTPA. It was initially designed for handling tankers of 37,000 DWT. For the Second Liquid Chemical Berth, the berth pocket of 300 m x 60 m is dredged to 13m below Chart Datum and the existing navigational approach channel is widened by about 60m for vessels of 9.00 mt. draft. The SCB is connected to FCB by a approach trestle of 650m length. The berth structure of SCB consists of -

- 2 Nos. of Breasting Dolphins supported on piles with concrete deck on top. It is provided with fenders and quick release mooring hooks.
- 4 Nos. of Mooring Dolphins on piles with concrete deck and quick release mooring hooks.

Unloading platform (The Marine Loading Arms (MLAs) on top of the platform are provided by the Users.) The dredging & civil works were done by MbPT through its internal resources. The liquid cargo will be unloaded/ loaded by the MLAs and will be transported through extension of product pipelines from FCB to SCB. The expenditure on loading arms & pipelines is borne by the Users. Before completion of the construction of SCB, MbPT decided to check the adequacy of the structure for vessel berthing up to 55,000 DWT. Accordingly MbPT appointed IIT Madras to verify the layout, configuration, analysis and design for 55,000 DWT vessels. M/s IIT Madras vetted the design and accordingly the construction was carried out so that vessels in the range of 15,000 to 55,000 DWT can be accommodated.

Considering the growth of chemical industries in and around Maharashtra and as per the requirement of Users of Pir Pau terminals it is proposed to carry out deepening and widening of SCB Channel to handle bigger size vessel at SCB.

The existing world fleet of tankers for various types of liquid cargo and the ships normally calling at Indian Ports and in particular at the existing Chemical berths has been considered to arrive at an optimum design vessel size and the deepening and widening parameters of Channel leading to Second Chemical Berth have been worked out accordingly**.** The Design Vessel size considered is as under:

Size of Vessel 55,000 DWT

LOA	230 M
Beam	36 M
Draft	12.8 M

Based on the above design vessel size, the dimensions of the proposed deepening and widening of SCB Channel is as under

Width of the Channel = 300 m

Depth of the Channel = up to 11.0 m below Chart Datum (CD)

Radius of Turning Circle = 460 m

Depth at Berth pocket = 14.0m below CD

For the proposed widening and deepening of existing approach Channel to SCB, the quantum of soil dredging estimated is as 5 lakhs cu.m and rock dredging as 1.5 lakhs cu.M. The dredged materials will be dumped at the designated dumping ground DS3. It is assumed that the soil dredging will be carried out by Trailing Suction Hopper Dredger (TSHD) and Cutter Section Dredger (CSD) will be deployed for weathered rock dredging. In case hard rock is encountered the same will be removed by underwater controlled drilling and blasting method. The estimated cost of the project is 84 Crore exclusive of GST and the expenditure will be met through internal resources of Mumbai Port Trust. For execution of works Mumbai Port Trust seeks prior environmental clearance for the dredging works.

1.2 BRIEF DESCRIPTION OF PROJECT

The MbPT has proposed Deepning and widening of Approach channel to Second Chemical Berth (SCB) at Pir Pau, Mumbai. The Second Chemical Berth (SCB) was partly commissioned in June 2015 and fully commissioned in January 2016. The Second Liquid Chemical Berth is constructed

650 meter south of existing First Chemical Berth (FCB) off Pir Pau and in the same alignment as that of the FCB. The capacity of the Second Liquid Chemical Berth is of 2MMTPA. It was initially designed for handling tankers of 37,000 DWT. For the Second Liquid Chemical Berth, the berth pocket of 300 m x 60 m is dredged to 13m below Chart Datum and the existing navigational approach channel is widened by about 60m for vessels of 9.00 mt. draft. The SCB is connected to FCB by a approach trestle of 650m length.

The dredging & civil works were done by MbPT through its internal resources. The liquid cargo will be unloaded/ loaded by the MLAs and will be transported through extension of product pipelines from FCB to SCB. The expenditure on loading arms & pipelines is borne by the Users. Before completion of the construction of SCB, MbPT decided to check the adequacy of the structure for vessel berthing up to 55,000 DWT. Accordingly MbPT appointed IIT Madras to verify the layout, configuration, analysis and design for 55,000 DWT vessels. M/s IIT Madras vetted the design and accordingly the construction was carried out so that vessels in the range of 15,000 to 55,000 DWT can be accommodated.

1.3 NEED OF THE PROJECT

Considering the growth of chemical industries in and around Maharashtra and as per the requirement of Users of Pir Pau terminals it is proposed to carry out deepening and widening of SCB Channel to handle bigger size vessel at SCB.

1.4 SITE LOCATION

The MbPT has proposed Deepning and widening of Approach channel to Second Chemical Berth (SCB) at Pir Pau, Mumbai. The Mumbai Harbour is a natural deep water harbor, situated, on the west coast of India **(Latitude 18° 54, N, Longitude 72° 49'E)** and inside the protected waters of the Mumbai Gulf area. The Second Liquid Chemical Berth is constructed 650 meter on the south of existing First Chemical Berth Off Pir Pau and in the same alignment as that of the First Chemical Berth (WGS Coordinate of SCB 280522.0E, 2099481.1N).

1.5 PROJECT COST

Cost Estimate for Alternative I (Channel depth: 10 m)

Sr. No	Description	Quantity	Rate	Amount Rs (in crores)
1	Soil Dredging	3,90,000 cu.m	Rs 110 /cu.m	4.29

2	Roch Dredging	1,45,000 cu.m	Rs 4000/ cu.m	58.00
3	Mob + Demobilization	LS		6.23
4	Procurement of Navigational Aids	LS		0.50
5	EIA Study and EMP	LS		0.50
Total (Sr No. 1 to 5)				69.52
Add 3% contingencies				2.09
Grand Total				71.61

Say Rs 72 crores

Sr. No	Description	Quantity	Rate	Amount Rs (in crores)
1	Soil Dredging	5,25,000 cu.m	Rs 110 /cu.m	5.78
2	Rock Dredging	2,15,000 cu.m	Rs 4000/ cu.m	86.00
3	Mob + Demobilization	LS		9.18
4	Procurement of Navigational Aids	LS		0.50
5	EIA Study and EMP	LS		0.50
Total (Sr No. 1 to 5)				101.96
Add 3% contingencies				3.06
Grand Total				105.02

Say Rs 105.02 crores

1.6 BASELINE ENVIRONMENT

1.6.1 Ambient Air Quality Monitoring

The locations for ambient air quality monitoring study were selected within the 10 km radius of the proposed project. Ambient air quality was monitored on 8 locations to generate representative ambient air quality data. Ambient Air Quality Monitoring was monitored on 24 hourly average bases as per guidelines of Central Pollution Control Board (CPCB) and National Ambient Air Quality Standards (NAAQS).

The status of the ambient air quality in the study area was established by carrying out monitoring for air quality parameters like $PM_{2.5}$, PM_{10}, SO_2, NO_X, CO, Pb, O_3, As, Benzne, BaP etc. at 8 locations in the study area.

Conclusion

- **Sulphur Dioxide (SO_2)**

The average value of the SO_2 within study area observed was 19.91 µg/m^3. The maximum average value of SO_2 was 21.5 µg/m^3 at JNPT and minimum of 18.1 µg/m^3 at Gharapuri. The SO_2 values are below permissible level of 80µg/m^3.

- **Oxides of Nitrogen (NOx)**

The average value of the NOx within study observed was 20.84 µg/m^3. The maximum average value of NOx was 22.9 µg/m^3 at JNPT and minimum of 19.3 µg/m^3 Gharapuri. The NOx values are below permissible level 80µg/m^3.

- **Particulate Matter (PM_{10})**

PM_{10} values within study area was below permissible level of 100 µg/m^3. The average value of PM_{10} recorded at site was 66.09 µg/m^3. The maximum value of 68.9 µg/m^3 and a minimum 62.5 µg/m^3 were recorded at Byculla & Worli respectively in the study area.

- **Particulate Matter ($PM_{2.5}$)**

$PM_{2.5}$ values within study area were below permissible level of 60 µg/m^3. The maximum 40.56 µg/m^3 and a minimum 39.5 µg/m^3 were recorded at Fort & Worli respectively in the study area. The average value of 42.9 µg/m^3 was observed within study area. The values of the $PM_{2.5}$ withtin study area were well below the limiting standards.

- **Ammonia (NH_3)**

Ammonia values within study area was below permissible level of 400 µg/m^3. The average velue of NH_3 recorded at site was 4.87 µg/m^3. The maximum value of 5.25 µg/m^3 and a minimum 4.66 µg/m^3 were recorded at Fort & Worli respectively in the study area.

1.6.2 Ambient Noise Level

The ambient noise levels were monitored at the selected 8 locations within the study area during day and nighttime. Equivalent noise level is a scale for measurement of long-term noise exposure and has been accepted by International Standard Organization for the measurement of both communities. To establish the baseline noise scenario, results of noise level monitoring carried out during the study period at 8 locations in the study area have been considered. At each ambient noise monitoring station, Leq. noise level has been recorded at hourly intervals for 24 hours. Readings were taken by keeping the noise recording instrument on for fifteen (15) minutes for each reading.

Observation and Conclusion

Noise monitoring was carried out at 8 locations. Noise levels studied in the project area show that the levels of noise are lower than the permissible limits both during the day as well as at night time.

1.6.3 Surface Water Quality (Marine)

Marine Surface water samples were collected from two locations Nhavakhadi & Elephanta Jetty and were analysed for physicochemical and biological parameters. The pH, DO, BOD COD, Oil & Grease & Total Coliform are observed to be as per Primary Water Quality Criteria for Class SW-IV Waters (For Harbour Waters) of CPCB

1.6.4 Groundwater Quality

Groundwater sample was collected from P. J Hinduja Gymkhana and was analysed for physicochemical parameters. All the parameters of the ground water are observed to be within the Acceptable Limits and Permissible Limit in the absence of alternative source of IS 10500:2012

1.7 ENVIRONMENTAL IMPACTS & MITGATRION MEASURES

1.7.1 Ambient Air Quality

Proposed project pertains to dredging work for deepening & widening of navigational channel to for cater vessels of larger drafts. Such activities not have long term impact on air environment; impacts are generally restricted to construction phase only. Details of impact and their management / mitigation as tabulated below:

Dredging (Construction) Phase

During dredging (construction) phase, suspended particulate matter is the main pollutant generated during the project activitity due to operation of DG sets, dredger, construction vessels and other construction equipments etc. The DG sets and barges used during the dredging activity will emit the pollutants by burning fuel (diesel). The impact of emissions from barges will be negligible due to the longer distance of human settlements from the project. DG sets will only be used during the emergency. The full capacity of barges will be utilized to avoid extra trips which may cause increase in emissions.

Mitigation Measures

1. A dredge material disposal option shall be in place
2. Adequate capacity shall be available at the disposal location for the quantity of the material to be removed, taking into account bulking factors and water content

3. All necessary environmental and planning approvals shall be in place in relation to dredge material disposal
4. Testing of dredged material shall be undertaken on regular basis
5. Harbour Master shall be notify of dredging program, including timing, locations to be dredged, equipment to be used and any access restrictions or hazards to vessels using the navigation access channel.
6. Harbour Master shall be notify of completion of the dredging program
7. Fishermen shall be notify of proposed works
8. Proper signage shall be in place to notify Fishermen
9. It shall be ensure that the dredging equipment and associated vessels comply with all the necessary requirements
10. It shall be ensure that access to the project area limit is maintained throughout the dredging program.
11. It shall be ensure that pipelines and other floating, partially submerged or fully submerged components are marked so as to be clearly visible to all boat operators. If left in place at night, ensure that warning lights are used.
12. It shall be ensure that there are no discharges from the dredging vessels
13. It shall be ensure that there are no sewage discharges within the marine area / port area
14. It shall be ensure that litter and other wastes are fully contained on all barges and vessels associated with dredging.
15. Waste materials shall be removed from barges and vessels each day, and the minimum required amount of hydrocarbons shall be kept on board
16. Any chemicals shall not be carried on barges or vessels associated with dredging. Only fuel and oils contained within equipment shall be carried.
17. Do not wash down decks of barges or vessels unless all wash down water is fully contained on the barge.
18. Spill kit suitable for small to medium spills shall be carried.
19. Confirm that all dredging will take place within the originally approved port limit and navigation access channel. If dredging outside this area is required, seek additional approvals.
20. Clearly delineate area to be dredged and review with dredging contractor. Provided written advice to dredging contractor on dredging area.
21. Dredge only in delineated areas
22. Ensure that silt curtains are available for deployment if required.

23. Check water quality monitoring results for any non-compliance with the water quality triggers or guidelines. Initiate corrective action as required to address any non-compliance or trends towards triggers.

Operation Phase

During operation phase there will be no increase in air pollution load as the project profile during operation phase will remain same.

Mitigation Measures

- All vehicles shall have a valid PUC certificate and regular maintenance shall be mandated.
- All the roads in the vicinity of the project site will be paved or black topped to minimize the entrainment of fugitive emissions.
- If any of the road stretches cannot be blacktopped or paved due to some reason or the other, then adequate arrangements will be made to spray water on such stretches of the road.
- For wind generated dust, a windshield with a wire mesh fencing with fast growing creepers up to a height of 10 m around the stockyard shall be installed.
- In addition to all the above measures, a 10 m wide greenbelt will be developed for dust arresting proposes.
- No unauthorized labour settlement shall be allowed in the vicinity of the port.
- It will be a responsibility of labour contractors to provide for clean fuel to the labours.

1.7.2 Water Quality

As the major acitivity of the proposed project is dredging of navigation channel for widening & deepening thus it may pose impacts on the water quality.

Suspended solids and turbidity

Dredging disturb bottom sediments and induce resuspension, dispersal and settlement of such sediments. Dumping of dredged material directly alters bottom configuration and biota and may disperse toxic or harmful chemicals around the disposal site. Dredging removes bottom habitat and may lead to a loss of fishery resources. During dredging the main environmental effect is the increase in the suspended sediments and thereby turbidity in the water column. All methods of excavation release suspended sediments in the water column during the excavation itself and during the flow of sediments through barges. The increase in the turbidity decreases the depth of the light penetration in the water column.

Mitigations Measures

A survey of contamination of bottom sediments should be undertaken before dredging. In case substances or materials listed in the annexes of the London Dumping Convention are found during the survey, the dredged material should be treated in accordance with the respective provisions of the convention. Selection of disposal site, disposal methods and requirements for capping are key issues in undertaking disposal at sea. In shallow water, silt curtains, as well as careful selection of the dredging method, could be effective in minimizing dispersal of resuspended sediments. Specific Guidelines for the Disposal of Dredged Material at Sea have been adopted by the Contracting Parties to the London Dumping Convention.

Organic matter and nutrients and depletion in oxygen content

The release of organic rich sediments during dredging can cause the removal of oxygen from the surrounding water. However it is important to stress that the removal of oxygen from the water column is a temporary phenomenon and the oxygen content is replenished with the tidal exchange. Therefore the depletion of oxygen will have a very negligible impact on the marine organisms.

The re- suspension of sediments during dredging may also result in an increase in the levels of organic matter and nutrients in the water column. The nutrient enrichment can cause an algal bloom in the localized area which is adapted low nutrient condition. The blooms can affect the surrounding area by depleting oxygen content from water column or by release of toxins in the water.

Mitigation measure

- Grabs shall be used as dredging equipment as it is observed that grabs limits the increase of turbidity and possible contamination in the surrounding water.
- The dredged shall be disposed on the land in containments, isolated from the river

1.7.3 Marine/coastal ecology

Disturbance from dredging activities may cause displacement of fishery resources and other mobile bottom biota. Dredging removes bottom biota and dumping of dredged material covers bottom habitat, both of which may reduce fishery resources. Settlement of resuspended sediments on fragile marine fauna and flora damages the ecosystem particularly coral reefs, which are formed by the extracellular product of symbiotic plants. The great number of coral polyps attached need dissolved oxygen for respiration and the plants need sunlight for photosynthesis.

Mitigations Measures

Careful survey of a fragile marine and coastal ecology is essential for appropriate planning of dredging and disposal of dredged material.

- All care shall be taken that trees shall be protected as far as possible while site clearing and infrastructure development.
- Detailed ecological survey shall be conducted during detailed EIA study to assess the impacts.
- No construction activity will be allowed during the monsoon season so as to avoid breeding period of fishes.
- Use of silt curtains is recommended to confine areas of high turbidity during dredging and pile diving.
- Areas with high fish yield or used by locals for fishing shall be avoided.

1.7.4 Oil Spill

Leakage or spill of oil form dredger and other dredging vessels is envisaged dueing the dredging (construction phase). The release of oil in long run may cause bioaccumulation of these substances in sediment as well as marine flora and fauna. The constituents of oil are toxic to marine life and release of oil contents on to water will result in formation of a shining film on the surface of water which prevents dissolution of oxygen across the surface of water. Moreover, oil gets accumulated on the body of the small species of fish or invertebrates and coat feathers and fur, reducing birds' and mammals' ability to maintain their body temperatures.

Mitigation Measures

The following actions shall be taken to avoid any major damage due to oil spill:

- Oil spill contingency plan shall be in place to deal with the eventualities of the oil spill.
- Mopping system shall be deployed for cleaning of the oil from the surface waters.
- Turbid waste water shall be mitigated and treated in sedimentation pond, if required.

1.7.5 Disposal of sewage/ effluent in marine area

The most likely impacts from the operation phase of the project will be on the marine water, primarily due to (a) oily wastes such as bilge water, washing water, lubricant oil and other residues from vessels and machineries (b) sewage; All these may lead to odour and degradation of water quality.

Possible discharges from dredging vessels that could be sources of water pollution are bilge water, oily wastes, sewage, garbage and other residues in a ship. Spills of oils, lubricants, fuels and other oily liquids may be other sources of water pollution. Once an oil or oily compound is discharged into water, it is spread on the surface by winds and currents, forming a thin layer. On the surface of seas in tropical or temperate zones, oils can be polymerized gradually by biodegradation and eventually form dense particles which sink. Concentration of oily compounds in water is an important indicator of water quality, particularly in recreational water areas. Repair docks may be a possible source of toxic or harmful materials such as antifoulants, paints, or heavy metals.

Mitigation Measures

Appropriate regulations on ship discharges and provision of reception facilities are indispensable for proper control of emissions and effluent from ships. Detection of spills is also important for regulating ship discharges. Since accidental spills are unavoidable, recovery vessels, oil fences, and treatment chemicals should be prepared with a view to minimizing dispersal. Proper contingency plans and a prompt reporting system are keys to prevention of oil dispersal. Periodical clean-up of floating wastes is also necessary for preservation of port water quality.

- To combat oil pollution near the port, inflatable type containment boom with oil skimmers will be provided at the berth. A clean sweep oil recovery unit consisting of a power pack and the recovery unit mounted on a system will also be deployed for this purpose.
- The ships will not be allowed to discharge their sewage in the marine water.
- The International Convention Guidelines for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL, 73/78) will be strictly adhered.

Budget for Environmental Management Plan

Sr. No.	Items	Cost (INR in lakh)
1	Air Environment	10.00
2	Water Environment	10.00
3	Marine Biodiveristy	12.00
4	Noise Environment	7.00
5	Training and Education	6.0

6	Social Awareness	5.0
	Total EMP Cost	50.00

1.8 PROJECT BENEFITS

Channel widening and deepening is a process of removal of material from the bed of navigation channel and disposing it in another part of the water body, where it will not be re suspended and move into the main channel or is disposed on land. Dredging operations are primarily for the purpose of deepening or widening navigation channel.

- Increased depth and width of the channel will cater the need of larger new generation vessels to board at MbPT.
- Time will be saved due to better movement by vessels.
- Fright cost will be reduced due to larger vessels.
- The development is envisaged to play a significant role in strengthening connectivity along the Maharashtra coastline.
- Enhancement in economy of Maharashtra.
- Substantial positive impact on socio-economic profile of the area, in Particular, and Raigad, in general, both in terms of overall employment and skill development of local workforce.
- Direct as well as indirect employment potential is envisaged

1.9 CONCLUSION

It is necessary to widen and deepen the existing channel and the turning circle to increase berthing capacity. There will be negligible impact on the environment due to proposed project activity. The project proponent will take at most care to maintain the environmental baseline quality.