# FORM 1

# (I) BASIC INFORMATION

<table>
<tr><th>S. No.</th><th>Item</th><th>Detail</th></tr>
<tr><td>1.</td><td>Name of the projects/s</td><td>Modification of Port Facilities at Haldia Dock-II by Setting up of one liquid cargo Jetty in replacement of one multipurpose dry bulk cargo jetty.</td></tr>
<tr><td>2.</td><td>S. No. in the schedule</td><td>Sl. No. - 7(e) of the Category A of the Schedule of the EIA Notification 2006.<br>(Ports / Harbours ≥ 5 million TPA of Cargo handling capacity).</td></tr>
<tr><td>3.</td><td>Proposed capacity/ area /length/tonnage/ to/be handled/ command area/ lease area/ number of wells to be drilled</td><td>Project scenario as per EC granted by MoEFCC as well as the revised scenario are tabulated
<table>
<tr><th>Attributes</th><th>Project as per EC</th><th>Project - 1st Revised for which TOR is already issued dated 20-9-2016</th><th>Project - 2nd Revised for which TOR amendment is sought</th></tr>
<tr><td>Capacity</td><td>23.4 MMTPA</td><td>20.89 MMTPA</td><td>21.48 MMTPA</td></tr>
<tr><td>Cargo Profile</td><td>Dry Bulk 23.4 MMTPA</td><td>• Dry Bulk 19.05 MMTPA<br>• Liquid Bulk 1.84 MMTPA</td><td>• Dry Bulk 19.05 MMTPA<br>• Liquid Bulk 2.43 MMTPA</td></tr>
<tr><td>No. of Jetty</td><td>4 (all for dry bulk cargo)</td><td>4 (3 for dry bulk cargo & 1 for liquid bulk cargo)</td><td>4 (3 for dry bulk cargo & 1 for liquid bulk cargo)</td></tr>
<tr><td>Jetty location & Length</td><td>Same</td><td>Same</td><td>Same</td></tr>
<tr><td>Project Area</td><td>160 acres</td><td>160 acres</td><td>160 acres</td></tr>
<tr><td>Project Cost</td><td>1707.5 Crores</td><td>1474.0 Crores</td><td>1474.0 Crores</td></tr>
</table>
List of chemicals to be handled at liquid cargo jetty:
<table>
<tr><th>Type of cargo</th><th>Estimated quantity in million metric ton per annum</th></tr>
<tr><td>Paraxylene /<br>Edible Oil & Chemicals /<br>POL Products (Class-A, B & C) / LPG and LNG</td><td>2.43</td></tr>
</table></td></tr>
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|---|---|---|
| | | **Note:**<br>**Environmental Clearance is already granted (F. No. 11-140/2010-IA.III dated 30th July, 2015) by MoEF&CC, Govt. of India for development of Port facilities at Haldia Dock-II, comprising of four jetties (two mechanised and two multipurpose jetties) with associate infrastructure for handling coal & other dry bulk cargo.**<br><br>**Subsequently, Kolkata Port Trust (KoPT) decided to install one liquid cargo Jetty as replacement of one multipurpose dry bulk cargo jetty (at Jetty no. 4) to make project viable. In this connection, the online application with modified Form-1 and Feasibility report for handling bulk liquid cargo at Haldia Dock-II Complex, Shalukkhali was submitted vide letter dated 29-7-2016. Accordingly, TOR was issued vide MoEF&CC letter dated 20-9-2016. In the meantime, the Cargo profile along with the cargo handling capacity has been slightly revised in the context of the prevailing market condition. Project is yet to be implemented.** |
| 4. | New / Expansion / Modernization | New (The project not yet implemented) |
| 5. | Existing Capacity / Area etc. | - |
| 6. | Category of Projects i.e. 'A' or 'B' | A |
| 7. | Does it attract the general condition? If yes, please specify. | No |
| 8. | Does it attract the general condition? If yes, please specify. | No |
| 9. | Location | Latitude – 22˚06′02.82″ N,<br>Longitude – 88˚11′30.35″ E &<br>Latitude – 22˚06′54.30″ N,<br>Longitude – 88˚11′35.50″ E<br>(No change in project location as well as jetty location) |
| | Plot / survey / Khasra No. | As per existing EC obtained. |
| | Village | - |
| | Tehsil | Mouza: Shalukkhali (45 acres) & Rupnarayanchak (115 acres) (no change) |
| | District | Purba Medinipore |
| | State | West Bengal |
| 10. | Nearest railway Station / airport along with distance in kms. | Railway Stations - Haldia near Hatiberia (15 kms), Bandar Railway Station (12.2), Durgachak Town Rly. Station (7.4 kms), Durgachak Railway Station ( 4.7 kms),<br>Airport - Kolkata Airport at Dumdum (66 kms). |
| 11. | Nearest Town, city, District Headquaters along with distance in kms. | Nearest Town – Haldia (within 7 kms)<br>District Headquarters – Tamluk (34 kms) |
| 12. | Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given) | Haldia Municipality<br>Dr. B. R. Ambedkar Bhawan<br>Administrative Building, City Centre<br>P.O.- Debhog, Haldia<br>Purba Medinipore, West Bengal.<br>Tele: (03224) 252996 / 253410 |
| 13. | Name of the applicant | Kolkata Port Trust<br>Haldia Dock Complex |

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|---|---|---|
| 14. | Registered Address | 15 Strand Road, Kolkata-700 001 |
| 15. | Address for correspondence : | |
| | Name | A K Jain |
| | Designation (Owner/Partner/CEO) | Chief Engineer |
| | Address | 15, Strand Road, Kolkata-700 001 |
| | Pin Code | 700 001 |
| | E-mail | ce@kopt.in<br>ak.jain@kopt.in |
| | Telephone No. | 033-2230 0413, 9836277661 (M) |
| | Fax No. | 033-2230 0413 |
| 16. | Details of Alternative Sites examined, if any. Location of these sites should be shown on a topo sheet. | There is no change in project site as per existing EC. |
| 17. | Interlinked Projects | None |
| 18. | Whether separate application of interlinked project has been submitted? | NA |
| 19. | If yes, date of submission | NA |
| 20. | If no, reason | NA |
| 21. | Whether the proposal involves approval/clearance under: if yes, details of the same and their status to be given.<br>(a) The Forest (conversation) Act, 1980?<br>(b) The Wildlife (Protection) Act, 1972?<br>(c) The C.R.Z Notification, 1991? | No |
| 22. | Whether there is any Government Order/Policy relevant/ relating to the site? | None |
| 23. | Forest land involved (hectares) | Nil |
| 24. | Whether there is any litigation pending against the project and/or land in which the projects is purpose to be set up?<br>(a) Name of the Court<br>(b) Case No.<br>(c) Orders/ directions of the court, if any and its relevance with the proposed project. | None |

* *Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.)*

# (II) ACTIVITY

**1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies etc.)**

| S. No. | Information / Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 1.1 | Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan) | Yes | Construction of 4 new Jetties along with associated infrastructure in the river front as per the existing EC. Only jetty no. 4 (multipurpose jetty) will be replaced by one liquid bulk cargo handling jetty. There will be no change of the location. |
| 1.2 | Clearance of existing land, vegetation and buildings? | No | The proposed land area is vacant and barren without any vegetation or habitation and hence no clearance is required |
| 1.3 | Creation of new land uses? | Yes | The project site which is presently lying vacant will be converted into a Port comprising of three dry bulk cargo handling jetty & one liquid bulk cargo handling jetty; hardstand stack yards; cargo handling equipments including ship loading and un-loading cranes, stackers & reclaimers, mechanized wagon loaders, conveyor systems; railway sidings; fire fighting facilities; marine unloading arm; oil containment system; internal roads; different facilities & utilities etc. |
| 1.4 | Pre-construction investigations e.g. bore houses, soil testing? | Yes | The geo-technical investigation of the site has been carried out by M/s ENGICON INDIA PVT LTD. Copy of the same is enclosed in the Prefeasibility Report : - no change from the existing EC. |
| 1.5 | Construction works? | Yes | The construction works will involve construction of 3 bulk dry cargo handling jetty & 1 |

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| | | | liquid cargo handling jetty, rail and road net work, cargo storage and handling facilities, utility and office buildings, etc. |
| 1.6 | Demolition works? | No | The proposed land area is vacant and barren without any vegetation or habitation and hence no demolition is required |
| 1.7 | Temporary sites used for construction works or housing of construction workers? | Yes | Temporary sheds with all amenities such as water supply, fuel, sanitation, etc. will be provided for construction workers and field staff. |
| 1.8 | Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations | Yes | Utility and operational infrastructure shall be developed involving earthworks and reclamation as per necessity. |
| 1.9 | Underground works including mining or tunneling? | No | Not Applicable |
| 1.10 | Reclamation works ? | No | - |
| 1.11 | Dredging? | No | - |
| 1.12 | Offshore structures? | Yes | Riverine jetties with approach trestles connecting each of the jetty from the shore. |
| 1.13 | Production and manufacturing processes? | No | - |
| 1.14 | Facilities for storage of goods or materials? | Yes | Stack yards for storage of dry bulk cargo separately for each of the 3 dry bulk cargo handling jetty for storage of dry bulk cargo will be developed. For liquid bulk cargo jetty there will be separate storage facility. The cargo will be directly discharge & will be transported through pipeline to the end user's storage facilities. |
| 1.15 | Facilities for treatment or disposal of solid waste or liquid effluents? | Yes | Ship related waste management facilities as available in the existing dock system (Dock-I) of Haldia will be utilized for the purpose.<br><br>Solid waste (of domestic and commercial nature) will be disposed of in consultation with the concerned civic authority. |

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| | | | Wastewater from domestic and other areas will be treated in a Wastewater treatment plant based on extended aeration system. Treated effluent meeting the relevant standard will be used in greening and other non critical purposes within the Port area. |
| 1.16 | Facilities for long term housing of operational workers? | No | - |
| 1.17 | New road, rail or sea traffic during construction or operation? | Yes | About 8 kms. of rail link for aggregation and evacuation of cargo will be needed. Road link already exists which requires to be widened. |
| 1.18 | New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc? | Yes | New rail road connectivity is proposed. |
| 1.19 | Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements? | No | - |
| 1.20 | New or diverted transmission lines or pipelines? | Yes | No transmission lines will be diverted. |
| 1.21 | Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers? | No | No water course exists in the site and hence no change to hydrology of water course or aquifers is expected. |
| 1.22 | Stream crossings? | No | No stream exists in the proposed site. |
| 1.23 | Abstraction or transfers of water from ground or surface waters? | Yes (Surface Water) | Water demand of the proposed dock complex is expected to be around 540 kld. Such water will be sourced from piped water supply of Haldia Development Authority. |
| 1.24 | Changes in water bodies or the land surface affecting drainage or run-off? | Yes | The rail-road embankment, reclamation of port site will affect surface run-off for which appropriate drainage plan has been prepared and will be implemented. |
| 1.25 | Transport of personnel or materials for construction, operation or decommissioning? | Yes | The plant location has proper road, rail and river linkages. These systems will be used for transportation of materials, equipment and personnel during construction and |

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| | | | operation phases. |
| 1.26 | Long-term dismantling or decommissioning or restoration works? | No | There will be no dismantling or decommissioning work. |
| 1.27 | Ongoing activity during decommissioning which could have an impact on the environment? | No | No decommissioning activity will be carried out. |
| 1.28 | Influx of people to an area in either temporarily or permanently? | Yes | Construction engineers, operators and skilled workers will be deployed during construction and operational stages. Expected manpower during construction and operation phases will be around 1500 & 1000 respectively. |
| 1.29 | Introduction of alien species? | No | There will be no chance of introduction of alien species. |
| 1.30 | Loss of native species or genetic diversity? | No | The proposed site being a barren mud flat, there will be no occasion of loss of native species or genetic diversity. Rather native species will be propagated in green belt and landscape gardening |
| 1.31 | Any other actions? | No | No other activities are envisaged. |

## 2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply)

| **S. No.** | **Information/checklist confirmation** | **Yes/No** | **Details thereof (with approximate quantities / rates, wherever possible) with source of information data** |
|---|---|---|---|
| 2.1 | Land especially undeveloped or agricultural land (ha) | Yes | The proposed project area covers undeveloped Govt. land around 160 acres. |
| 2.2 | Water (expected source & competing users) unit: KLD | Yes | Water will be sourced from Haldia Development Authority.<br><br>Water demand during construction stage is about 150 KLD and during operational stage 540 KLD. |
| 2.3 | Minerals (MT) | No | Not applicable |
| 2.4 | Construction material – stone, aggregates, sand / soil (expected source – MT) | Yes | Sand and course aggregates shall be needed which will in general be sourced locally. |

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| 2.5 | Forests and timber (source – MT) | No | - |
| 2.6 | Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW) | Yes | About 100 KVA of electricity will be required during construction stage and 12 MVA during operational stage. Such power will be made available from the supply of WBSEDCL. There will be no competing user from this source. |
| 2.7 | Any other natural resources (use appropriate standard units) | No | - |

## 3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health

| S.No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 3.1 | Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies) | Yes | This is due to introduction of liquid bulk cargo handling Jetty as replacement of one multipurpose dry bulk cargo jetty under compliance of safety requirement for handling hazardous chemicals (as per OISD-standard 113). |
| 3.2 | Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases) | No | - |
| 3.3 | Affect the welfare of people e.g. by changing living conditions? | Yes | The project will generate job opportunity for the local people both during construction and operational stage which will have positive impact on the socio-economic environment of the locality. |
| 3.4 | Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc., | No | - |
| 3.5 | Any other causes | No | There will not be any other cause for adverse impact on human health or the environment. |

## 4. Production of solid wastes during construction or operation or decommissioning (MT/month)

| S.No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 4.1 | Spoil, overburden or mine wastes | No | No mining activity is involved in this project. |
| 4.2 | Municipal waste (domestic and or commercial wastes) | Yes | Solid waste of domestic/commercial origin that would be generated in the proposed dock complex will be disposed of suitably in consultation with the concerned Civic body. |
| 4.3 | Hazardous wastes (as per Hazardous Waste Management Rules) | No | - |
| 4.4 | Other industrial process wastes | Yes | Wastes generated from material handling like coal/ iron ore will be reused. |
| 4.5 | Surplus product | No | There will be no surplus products. |
| 4.6 | Sewage sludge or other sludge from effluent treatment | Yes | Sewage sludge or other sludge will be used in plantation. Arrangements will also be made for off-site disposal of such wastes in consultation with the concerned local authority. |
| 4.7 | Construction or demolition wastes | Yes | Very less quantity of construction waste will be generated which will be disposed off suitably in consultation with concerned local body without causing any public nuisance and environmental contamination. |
| 4.8 | Redundant machinery or equipment | No | - |
| 4.9 | Contaminated soils or other materials | No | There will be no soil contamination as the entire cargo stack yard will be of hard stand.<br><br>No storage facility for liquid cargo. The cargo will be directly transported to the end user storage facilities. |

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| 4.10 | Agricultural wastes | No | No agricultural waste will be generated |
| 4.11 | Other solid wastes | Yes | Dust generated during dry bulk handling will be stacked separately for further disposal/ rehandling. |

## 5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

| S.No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 5.1 | Emissions from combustion of fossil fuels from stationary or mobile sources | Yes | Due to fuel combustion of transport vehicles, berthed ships and DG sets. Appropriate pollution control measures as per standard guideline, will be implemented to mitigate such eventualities. |
| 5.2 | Emissions from production processes | No | No production process is involved. |
| 5.3 | Emissions from materials handling including storage or transport | Yes | Dust generated during dry bulk handling will be stacked separately for further disposal/ rehandling. There will be no emission from handling of liquid cargo at Jetty no. 4. |
| 5.4 | Emissions from construction activities including plant and equipment | Yes | Necessary control measures will be incorporated to control fugitive emissions due to such activities. |
| 5.5 | Dust or odours from handling of materials including construction materials, sewage and waste | Yes | Fugitive dust emission from unloading / loading and stacking. Dust suppression system will be installed. |
| 5.6 | Emissions from incineration of waste | No | - |
| 5.7 | Emissions from burning of waste in open air (e.g. slash materials, construction debris) | No | Open air burning of debris within port premises shall be strictly prohibited. |
| 5.8 | Emissions from any other sources | No | - |

## 6. Generation of Noise and Vibration, and Emissions of Light and Heat

| S. No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities/ rates, wherever possible) with source of information data with source of information data |
|---|---|---|---|
| 6.1 | From operation of equipment e.g. engines, ventilation plant, crushers | Yes | From Stackers, Re-claimers & Conveyor system. All the machinery will be of highest standard of reputed make and will comply with national / international standards that take care of air and noise pollution control / vibration control. |
| 6.2 | From industrial or similar processes | No | - |
| 6.3 | From construction or demolition | Yes | From construction equipments such as excavators, dumpers, compressors, trucks etc. Best practices will be followed during all construction and installation activities to maintain noise level within permissible limit. |
| 6.4 | From blasting or piling | No | - |
| 6.5 | From construction or operational traffic | Yes | From rail wagons and trucks |
| 6.6 | From lighting or cooling systems | No | Effective measures will be undertaken. |
| 6.7 | From any other sources | No | - |

## 7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

| S. No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 7.1 | From handling, storage, use or spillage of hazardous materials | No | - |
| 7.2 | From discharge of sewage or other effluents to water or the land (expected mode and place of discharge) | No | Sewage or other effluents will be properly treated and will be used in non critical purposes. Arrangements will however be made to dispose of such treated wastewater (meeting relevant discharge standards) into the |

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| | | | river to meet any exigency. |
| 7.3 | By deposition of pollutants emitted to air into the land or into water | No | Dust will be generated during construction phase from earthworks, movement of vehicles and by wind erosion of areas cleared of vegetation. Appropriate fugitive dust control measures, including watering, water sprinkling of exposed areas and dust covers for trucks, would be employed to minimize any impact. No significant air quality impacts from fugitive dust emissions are anticipated during construction and during operation phases of the proposed dock complex. |
| 7.4 | From any other sources | No | - |
| 7.5 | Is there a risk of long term build up of pollutants in the environment from these sources? | No | - |

## 8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

| **S.No.** | **Information/Checklist confirmation** | **Yes/No** | **Details thereof (with approximate quantities / rates, wherever possible) with source of information data** |
|---|---|---|---|
| 8.1 | From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances | Yes | This is due to introduction of liquid bulk cargo handling Jetty as replacement of one multipurpose dry bulk cargo jetty under compliance of safety requirement for handling hazardous chemicals (as per OISD-standard 113). |
| 8.2 | From any other causes | No | - |
| 8.3 | Could the project be affected by natural disasters causing environmental damage (e.g. Floods, earthquakes, landslides, cloudburst etc)? | No | Effective design will be adopted to counter such calamities. |

**9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality**

| S. No. | Information/Checklist confirmation | Yes/No | Details thereof (with approximate quantities / rates, wherever possible) with source of information data |
|---|---|---|---|
| 9.1 | Lead to development of supporting utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:<br>• Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)<br>• housing development<br>• extractive industries<br>• supply industries<br>• other | No | All supporting infrastructure such as rail, power supply ETP etc will be developed. No other industries will come up in the dock area. |
| 9.2 | Lead to after-use of the site, which could have an impact on the environment | No | No after use of the site is envisaged. |
| 9.3 | Set a precedent for later developments | No | - |
| 9.4 | Have cumulative effects due to proximity to other existing or planned projects with similar effects | No | No other projects are in close proximity of the proposed port. |

# (III) Environmental Sensitivity

| S.No. | Areas | Name/ Identity | Aerial distance (within 15 km.) Proposed project location boundary |
|---|---|---|---|
| 1 | Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value | None | - |
| 2 | Areas which are important or sensitive for ecological reasons – Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests | Yes | River in the vicinity:<br>Hooghly River |

| S.No. | Areas | Name/ Identity | Aerial distance (within 15 km.) Proposed project location boundary |
|---|---|---|---|
| 3 | Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration | None | - |
| 4 | Inland, coastal, marine or underground waters | Yes | River in the vicinity:<br>Hooghly River |
| 5 | State, National boundaries | None | - |
| 6 | Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas | None | - |
| 7 | Defence installations | None | - |
| 8 | Densely populated or built-up area | • Haldia Township<br>• Diamond Harbour<br>• Kulpi | • Around 15 kms from project site in SW<br>• Around 9 kms from project site in North<br>• Around 5.5 kms from project site in SE |
| 9 | Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)* | • Haldia Institute of Technology<br>• Global Institute of Science & Technology<br>• Haldia Institute of Maritime Studies & Research<br>• Dr. Meghnad Saha Institute of Technology<br>• Golden Regency Institute of Hospitality Management<br>• Vivekananda School<br>• Haldia Govt. College<br>• Barghasipur High School<br>• Debghoge Shyamacharan Milan Vidyapith<br>• Punar Basan High School<br>• Haldia High School<br>• I.T.I, Haldia<br>• Diamond Harbour Hospital<br>• Fakir Chand College<br>• Diamond Harbour High School<br>• Diamond Harbour Girls' Higher Secondary School<br>• Ram Krishna Mission High School<br>• Ramrampur School | • 13.9 kms from project site, SW<br>• 13.6 kms from project site, SW<br>• 13.7 kms from project site, SW<br>• 13.5 kms from project site, SW<br>• 13.2 kms from project site, SW<br>• 12.5 kms from project site, SW<br>• 12.4 kms from project site, SW<br>• 14.6 kms from project site, SW<br>• 13.6 kms from project site, W<br>• 7.0 kms from project site, SW<br>• 7.0 kms from project site, SW<br>• 6.9 kms from project site, SW<br>• 10.0 kms from project site, N<br>• 9.9 kms from project site, N<br>• 9.6 kms from project site, N<br>• 9.2 kms from project site, N<br>• 10.2 kms from project site, N<br>• 10.3 kms from project site, N |

| S.No. | Areas | Name/ Identity | Aerial distance (within 15 km.) Proposed project location boundary |
|---|---|---|---|
| | | • Kulpi Janapriya High School<br>• Kulpi Hospital etc. | • 6.5 kms from project site, SE<br>• 6.4 kms from project site, SE |
| 10 | Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)* | None | - |
| 11 | Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)* | Haldia | Within 7.5 kms from project site in SW. |
| 12 | Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*) | None | - |

## (IV) Proposed Terms of Reference for EIA studies

Not applicable.

I do hereby give this undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

Date: February 9, 2018
Place: Kolkata

P. P. Datta
Manager (Environment)
for Chief Engineer
Kolkata Port Trust

***Address:*** Chief Engineer
Civil Engineering Department
Kolkata Port Trust
15, Strand Road, Kolkata-700001

***Note:***

1. The projects involving clearance under Coastal Regulation Zone Notification, 1991 shall submit with the application a C.R.Z map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t. C.R.Z. (at the stage of TOR) and the recommendations of the State Coastal Zone Management Authority (at the stage of EC). Simultaneous action shall also be taken to obtain the requisite clearance under the provisions of the C.R.Z. Notification, 1991 for the activities to be located in the CRZ.

2. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon (at the stage of EC)."

3. All correspondence with the Ministry of Environment & Forests including submission of application for TOR/ Environmental Clearance, subsequent clarifications, as may be required from time to time, participation in the EAC Meeting on behalf of the project proponent shall be made by the authorized signatory only. The authorized signatory should also submit a document in support of his claim of being an authorized signatory for the specific project."

**REVISED FEASIBILITY REPORT**

# FEASIBILITY REPORT ON DEVELOPMENT OF PORT FACILITIES AT SHALUK KHALI, HALDIA DOCK II

## SETTING UP OF THE JETTY FOR HANDLING LIQUID CARGO


**INDIAN PORTS ASSOCIATION**
**1st Floor, South Tower, NBCC Place,**
**Bhisham Pitamah Marg, Lodi Road,**
**New Delhi-110003**

**REVISED FEASIBILITY REPORT ON SETTING UP OF A LIQUID JETTY**

**AT**

**HALDIA DOCK-II SHALUKKHALI, HALDIA**

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# EXECUTIVE SUMMARY

1. The proposal relates to Setting up of a Liquid Jetty at Haldia Dock-II in Shalukkhali , Haldia at accommodate additional liquid cargo and ease the congestion at the existing berths..

2. Based on the traffic projections, the expected future traffic in liquid bulk (excluding edible oils) will be as given hereunder:

| | **2014-15** | **2019-20** | **2024-25** |
|---|---|---|---|
| Crude Oil | 0.50 MTPA | 6.60 MTPA | 6.60 MTPA |
| LPG | 1.91 MTPA | 3.50 MTPA | 4.50 MTPA |
| POL Products | 3.11 MTPA | 4.00 MTPA | 5.00 MTPA |
| Chemicals | 1.49 MTPA | 2.00 MTPA | 2.75 MTPA |
| LNG | --- | 0.5 MTPA | 1.00 MTPA |
| **Total** | **7.01 MTPA** | **16.60 MTPA** | **19.85 MTPA** |

*(The projection include 6 MTPA of crude oil for Numaligarh Refinery of BPCL. Since BPCL is considering other alternatives also, this crude oil requirement is excluded for planning purposes.)*

3. Considering the above projections and productivity norms, the requirements of berths are as under;

| **Commodity** | **Productivity in TPD** | **2014-15** | | **2019-20** | | **2024-25** | |
|---|---|---|---|---|---|---|---|
| | | **Est. Traffic** | **Required Berthdays** | **Est. Traffic** | **Required Berthdays** | **Est. Traffic** | **Required Berthdays** |
| Crude oil * | 31,000 | 500000 | 16 | 600000 | 19 | 600000 | 19 |
| POL products | 10,000 | 3110000 | 311 | 4000000 | 400 | 5000000 | 500 |
| LPG | 10,000 | 1910000 | 191 | 3500000 | 350 | 4500000 | 450 |
| Chemicals | 5,700 | 1490000 | 261 | 2000000 | 351 | 2750000 | 482 |
| | | 7010000 | 779 | 10100000 | 1120 | 12850000 | 1451 |
| **No. of berths req. Assuming 70% occupancy** | | **3.04** | | **4.38** | | **5.67** | |

This gives a total requirement of around 5 to 6 berths. Presently, there are only three exclusive oil jetties. The Dock basin berths 2,3,5,6 & 7 which handle chemicals and some POL products provide combined berth days equivalent to ¾ of an exclusive

berth. This leaves a gap of around 1 to 2 berths. If the present situation continues, by 2019-20, all the berths handling liquid bulk will be operating at 82% occupancy which is very high. This will result in high pre-berthing detention. By 2024-25, the situation will further worsen leading to an occupancy rate of 102%.

If 70% berth occupancy as prescribed by TAMP is adopted, it could be seen that by 2019-20 another berth is required and this may have to augmented by yet another one by 2024-25. Hence it is concluded that one additional berth is to be constructed immediately.

4. The port has already initiated action for developing Haldia Dock II at Shalukkhali to take advantage of marginal increase in draft. There is provision of two more berths at Shalukkhali and it is recommended that the new oil jetty be located there.

Considering the present liquid handing systems installed by the liquid/ POL companies, recent developments that are taking place and future requirements, it is recommended that the new jetty at Shalukkhali can handle the Paraxylene and other chemicals traffic. As per the demand analysis, the chemicals would comprise PY Gas, Benzene, Butadiene, Butene-1, Streyene Monomer, Acetic Acid, Phosphoric Acid, Ammonia, MEG and CBFS.

The Tariff Authority for Major Ports while approving the tariff has estimated the capacity and cargo profile of the proposed liquid cargo jetty at Shalukkhali as follows:-

| **Sl. No.** | **Type of cargo** | **Estimated quantity in million metric ton per annum** |
|---|---|---|
| 1 | Paraxzylene | 0.61 |
| 2 | Edible Oil & Chemicals | 0.61 |
| 3 | POL Products (Class-A, B & C) | 0.61 |
| 4 | LPG and LNG | 0.60 |
| | **Total** | **2.43** |

The actual handling of the above commodities may however, vary both upward and downward depending upon the market situation prevailing at the relevant point of time. Keeping in mind this fact, it has been decided to keep the optimum capacity of 2.43 MTPA for respective cargos maintaining the ultimate capacity as 2.43 MTPA as shown in the following table,

| Sl. No. | Type of cargo | Estimated quantity in million metric ton per annum |
|---|---|---|
| 1. | Paraxzylene / Edible Oil & Chemicals / POL Products (Class-A, B & C) / LPG and LNG | 2.43 |
| **Total** | | **2.43** |

5. The liquid bulk berth with isolated structures for berthing and mooring of tankers and a service platform where the handling facilities and utilities are provided is proposed, this would optimise the cost of construction of the berth. The major structures/ topside facilities include breasting dolphins, mooring dolphins, interconnecting walkways, approach trestle, jetty accessories, marine unloading arms, fire fighting system etc.

6. The total capital cost of the project is estimated at Rs.172.52 Crores. The above estimate includes cost of civil construction works viz berth cost and equipment cost for Marine unloading arms, Electrical installations and fire fighting etc. The entire project is expected to be completed in 36 months time from the date of commencement of the pre- project activities.

7. The annual operation and maintenance cost of the proposal is estimated at Rs.13.89 crores, based on TAMP Guidelines for fixation of up-front tariff.

8. The estimated annual revenue from the project on constant tariff is given below

| S.No. | Particulars | 2019-20 | 2021-22 | 2024-25 |
|---|---|---|---|---|
| **1.** | **Estimated Throughput** (Lakh tonnes) | **12.10** | **15.20** | **18.40** |
| | • Handled by Marine Unloading arms | 6.05 | 7.60 | 9.20 |
| | • Handled by Flexible Hoses | 6.05 | 7.60 | 9.20 |
| **2.** | **Liquid Handling Rate** ( Rs. per Ton) | | | |
| | • Handled by Marine Unloading arms | 176.73 | 176.73 | 176.73 |
| | • Handled by Flexible Hoses | 162.95 | 162.95 | 162.95 |

| | | | | |
|---|---|---|---|---|
| **3.** | **Revenue on Liquid Handling** (Rs. In lakhs) | **2055.07** | **2581.57** | **3125.06** |
| | Handled by Marine Unloading arms | 1069.22 | 1343.15 | 1625.92 |
| | Handled by Flexible Hoses | 985.85 | 1238.42 | 1499.14 |
| **4.** | **Estimated GRT** ( Lakh GRT hours ) | **403.33** | **506.67** | **613.2** |
| **5.** | **Berth hire (Rs./ GRT hour)** | **1.672** | **1.672** | **1.672** |
| **6.** | **Revenue on Berth hire** (Rs. In lakhs) | **674.37** | **847.15** | **1025.27** |
| | **Total Estimated Income (Rs. In lakhs)** | **2729.44** | **3428.72** | **4150.33** |

9. The detailed working of the net effective revenue after deduction of likely loss of revenue and adding the likely incremental revenue to be accrued in the saving in berth days due to shift of Para-xylene from the existing berths to proposed berths is indicated below.

(Rs. In lakhs)

| S. No. | Particulars | 2024-25 |
|---|---|---|
| 1. | **Estimated Throughput** (Lakh tonnes) | **18.40** |
| 2. | **Estimated Income from the project** | **4149.40** |
| 3. | **Less:** Loss of Wharfage income at the present berth due to shift of Paraxylene cargo to proposed berth (Rs. 91.80 per ton x 4.43 LTPA*) | **406.67** |
| 4. | **Add:** Additional Revenue on handling of coal in the savings in the berth days at Berth no.3 due to shift of cargo ( 78 berth days ** x 8200 T x Rs. 46.66 per ton) | **298.44** |
| **Net Benefit** | | **4041.17** |

* Based on actual 2013-14

10. The pre tax project IRR from the private operator perspective is as follows

| Sl. No. | Pre-Tax Project IRR at Constant prices | IRR (%) |
|---|---|---|
| 1 | Base case | 14.94 |
| 2 | Capital Cost up by 10% | 13.54 |
| 3 | Annual O&M Cost up by 10% | 14.63 |
| 4 | Revenue down by 10% | 13.08 |
| 5 | Combined effect of Sl. no. 2, 3 & 4 | 11.47 |

## 11. RECOMMENDATION

Based on the foregoing, the following conclusions are made:

- There is a need and a potential for the new liquid bulk jetty at Shalukkhali. This will benefit the port in attracting additional liquid cargo traffic including LPG and LNG.
- There is compelling advantages for the users in using this jetty.

- The Port also stands to gain by reducing the congestion at the existing oil jetties.

It is finally recommended that the Port immediately take action for constructing the new liquid bulk jetty at Shalukkhali through PPP mode.

* * *

# SECTION 1

# PROJECT BACKGROUND

1.1 Haldia Dock Complex (HDC), commissioned during 1977, is an integral part of Kolkata Port Trust, which is one of the major ports of India. It is located on the western bank of river Hooghly at Latitude : $22^0$ 02' N and Longitude : $88^0$ 06' E. It is about 104 km downstream of Kolkata and 130 km upstream from Sandheads. It handles a major share of Kolkata Port traffic. The layout of the HDC is given at ***Drg.No. 1***. The details of berthing facilities available at HDC are presented in ***Appendix 1.1.***

1.2 HDC handles mainly dry bulk cargo like coal and iron ore, liquid bulk including crude oil, POL products, LPG, chemicals and edible oil, containers and fertilisers. The liquid bulk cargo forms almost one third of the total traffic handled. The statistics for the past five years are given hereunder with the share of liquid bulk cargo.

| SL,No. | YEAR | TOTAL TRAFFIC | LIQUID BULK | SHARE |
|---|---|---|---|---|
| | | | | |
| | | | | |
| 1 | 2012 - 13 | 28.08 MMT | 9.32 MMT | 33% |
| | | | | |
| 2 | 2013 - 14 | 28.51 MMT | 9.45 MMT | 33% |
| | | | | |
| 3 | 2014 - 15 | 30.01 MMT | 9.42 MMT | 30% |
| | | | | |
| 4 | 2015 - 16 | 33.51 MMT | 11.52 | 34% |
| | | | | |
| 5 | 2016 - 17 | 34.14 MMT | 11.13 | 33% |

1.3 The reduction in the overall liquid bulk traffic over the years have been due to the shifting of crude oil traffic by IOC to its SBM facility at Paradip. However, there has been increase in the traffic of LPG, Chemicals and Edible oil during these years. The break-up of liquid bulk traffic during the past five years are given in the table hereunder.

| | | 2016-17 | 2015 - 16 | 2014 - 15 | 2013-14 | 2012-13 | CAGR |
|---|---|---|---|---|---|---|---|
| | | | | | | | % |
| 1 | CRUDE OIL | 0.54 | 0.45 | 0.50 | 0.79 | 0.54 | 0 |
| | | | | | | | |
| 2 | POL PRODUCTS | 4.22 | 4.62 | 3.11 | 3.75 | 4.25 | -0.18 |
| | | | | | | | |
| 3 | LPG | 2.02 | 2.01 | 1.91 | 1.53 | 1.40 | 9.6 |
| | | | | | | | |
| 4 | CHEMICALS | 2.15 | 2.03 | 1.94 | 1.83 | 1.59 | 7.8 |
| | | | | | | | |
| 5 | EDIBLE OIL | 2.20 | 2.41 | 1.96 | 1.55 | 1.54 | 9.3 |
| | | | | | | | |
| | TOTAL | 11.13 | 11.52 | 9.42 | 9.45 | **9.32** | 4.5 |

1.4 A major portion of the liquid bulk cargo is handled in the riverine oil jetties HOJ 1, 2 & 3. These are mainly crude oil, POL products, LPG, Ammonia and a small quantity of chemicals. The bulk of chemicals and edible oil and to some extent POL products are handled at the dock basin berths 2, 3, 5, 6 & 7. The berth-wise traffic of liquid bulk handled during the past five years along with the berth occupancy is given in the table hereunder.

**PERFORMANCE OF BERTHS HANDLNG LIQUID BULK IN HDC**

| SL.NO. | BERTHS | 2012-13 | | 2013-14 | | 2014-15 | | 2015-16 | | 2016-17 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Traffic | Occupancy | Traffic | Occupancy | Traffic | Occupancy | Traffic | Occupancy | Traffic | Occupancy |
| | | | | | | | | | | | |
| 1 | HOJ 1 | 1.90 | 79% | 1.99 | 80% | 2.12 | 78% | 1.94 | 82% | 1.99 | 79% |
| | | | | | | | | | | | |
| 2 | HOJ 2 | 2.56 | 71% | 2.71 | 68% | 2.70 | 67% | 2.84 | 69% | 2.54 | 66% |
| | | | | | | | | | | | |
| 3 | HOJ 3 | 1.46 | 17% | 1.14 | 16% | 0.69 | 9% | 2.32 | 32% | 2.42 | 44% |
| | | | | | | | | | | | |
| 4 | BERTH 2 | 0.29 | 46% | 0.04 | 81% | 0.02 | 86% | 0.03 | 86% | 0.03 | 78% |
| | | | | | | | | | | | |
| 5 | BERTH 3 | 0.61 | 65% | 0.97 | 65% | 0.70 | 49% | 0.87 | 84% | 0.94 | 64% |
| | | | | | | | | | | | |
| 6 | BERTH 5 | 0.62 | 95% | 0.62 | 96% | 0.87 | 90% | 0.91 | 94% | 0.72 | 81% |
| | | | | | | | | | | | |
| 7 | BERTH 6 | 1.23 | 79% | 1.11 | 80% | 1.56 | 84% | 1.37 | 85% | 1.12 | 86% |
| | | | | | | | | | | | |
| 8 | BERTH 7 | 0.37 | 77% | 0.65 | 80% | 0.54 | 82% | 0.85 | 80% | 1.02 | 76% |

1.4 It could be seen that over the years the share of dock basin berths have increased with the increased berth occupancy of riverine jetties. The berth occupancy of riverine jetty HOJ 3 is much less than the other berths since the bulk of crude oil

traffic has been shifted. It could be seen that in recent years the berth occupancy of the key berths have increased beyond permissible level resulting in unacceptable pre-berthing detentions.

In addition to this, HDC has recently awarded the operation of HOJ 3 to BPCL based on an EOI process to utilise its reserve capacity. It is understood that BPCL plan to handle about 1 MTPA of LPG at this berth. Moreover, HDC has asked for EOI for operating a Floating Storage & Offloading facilty (FSO) at Sandheads with a fleet of shuttle tankers especially to handle crude for Numaligarh Refinery in Assam. Further, Reliance who have suspended their marketing operations plan to restrat their operations soon. They have their pipelines connected to this jetty. As and when they start their operations, their volumes of MS & HSD have also to be handled here.

This situation has necessitated a study of the existing facilities as to their optimum capacity and to examine the need for a additional facilties to be created so that the entire projected traffic is handled with acceptable berth occupancy levels. This may need rationalising the handling of the cargo at specific berths.

1.5 The port has already initiated action for development of Port facilities at Shalukkhali for Haldia Dock II to take advantage of marginal increase in draft. Initially Port has envisaged two terminals Haldia Dock -II (North) and Haldia Dock -II (South), each with one Multipurpose and Mechanised berths for handling coal and other dry bulk cargo. Out of these two terminals, HDC has awarded the one terminal with two jetties No. 1

& 2 to a consortium under Haldia Dock II (north) project. Even though the other terminal, Haldia Dock -II (South) consists two jetties were also concurrently tendered out, there were no takers. In view of this situation, it is now recommended that the southernmost jetty No. 4, which is proposed as multipurpose jetty, may now be converted as a liquid bulk jetty. This jetty is farther away from the other three jetties and this may make it a bit isolated for handling hazardous liquid cargo.

1.6 Keeping these requirements in mind HDC has commissioned IPA to prepare a Feasibility Report. The Scope of Consultancy Services has been broadly indicated in ***Appendix 1.2.***

1.7 On receipt of the work order IPA team visited HDC during 27th -30th January, 2015. The team held discussions with HDC officials and visited the jetty installations. HDC had arranged an interaction with the key users of liquid bulk handling facilties to get an idea about their operations, the constraints faced by them and their future plans. The highlights of the discussion with the users are presented in Appendix 1.3.

1.8 This draft report was prepared taking into account the views expressed by HDC officials as well as the port users and was submitted to HDC during May, 2015. During mid June, HDC gave their comments and these were discussed with HDC officials on 22$^{nd}$ June at Haldia by IPA team. The team also held another round of discussions with selected users like Aegis Logistics, Reliance and MCC PTA Ltd. This final report is prepared and submitted taking into account the views expressed during this interaction.

1.9 IPA gratefully acknowledges the data support and valuable suggestions received from the Port for finalisation of the report.

***DRAWING NO. 1***

**HALDIA DOCK COMPLEX WITH RIVERINE LIQUID JETTIES**

*Appendix- 1.1*

## BERTHING FACILITIES AT HALDIA DOCK COMPLEX

| Berth | Length in m | Cargo Handled | Remarks |
|---|---|---|---|
| HOJ 1 | 290 | POL products, LPG, Ammonia, Chemicals | |
| HOJ 2 | 330 | Crude, POL products, LPG, Ammonia | |
| HOJ 3 | 345 | Crude, POL products | |
| Berth 2 | 260 | Coal, Coke, Limestone, Iron ore | |
| Berth 3 | 337 | Iron ore, POL products, chemicals | |
| Berth 4 | 284 | Coal, Coke, Ore | |
| Berth 4 A | 245 | Coal | Operated by private licensee ISPHL |
| Berth 4 B | 181 | Coal, coke, iron ore | |
| Berth 5 | 242 | Vegetable oils | |
| Berth 6 & 7 | 190 | Vegetable oil, chemicals , iron ore | Berth no. 7 is presently used as Lay-up berth |
| Berth 8 & Berth 9 | 218 | Coal, coke, Fertiliser, iron ore, General cargo | |
| Berth 10 | 224 | Containers | |
| Berth 11 | 208 | Containers | |
| Berth 12 | 220 | Fertiliser, General cargo | Operated by private licensee TMILL |
| Berth 13 | 248 | Fertilisers, General cargo | |
| Barge Jetty | .. | | |

*Appendix- 1.2*

## SCOPE OF CONSULTANCY SERVICES:

### *1.0 Traffic Projections:*

IPA will review the traffic projections for liquid bulk made in the past.

For this study, interaction with port officials, the existing users of the liquid bulk berth including IOCL, IPPL, and Reliance regarding their future plans, Chemical Industry, Confederation of Indian Industries and other related agencies to update the market status.

The possibility of handling the crude oil requirement of Numaligarh Refinery for their expansion through FSO and shuttle tankers will also be considered.

Based on these, the traffic scenario will be projected for a period upto the year 2035. The realistic traffic for the immediate 10 years will be projected yearwise.

### *2.0 Performance of the existing oil jetties*

IPA will take an inventory of the existing facilities including the users, their tank farm location and capacity, the number and size of pipelines connecting the berths to the tank farm in each case, the topside facilities at the berths etc.

IPA shall thereafter carryout a technical audit of the existing liquid bulk terminal. This will cover the performance of the jetties during the past 5 years. The audit will cover the performance grouping the products handled under several heads such as crude oil, POL products, LPG, chemicals and edible oil. The study parameters will cover the total traffic, average tanker size, average parcel size, average pumping rate, pre-berthing detention for the different product tankers and origin/destination tankfarm.

Any constraints or limitations in the utilisation of these existing jetties will be identified and remdial measures examined. The optimum available capacity of the existing oil jetties will be determined.

### *3.0 Establishing the need for a new POL jetty & its location*

Based on the findings of the traffic study as regards the future demand and the optimum available capacity of the existing oil jetties, the need for the new jetty will be established.

IPA will interact with the Hydraulic Study Department of KoPT regarding the bathymetry of the navigable channel, the location, alignment and protrusion of the riverine jetty.

## *4.0 Preparation of Feasibility Report*

Based on the type of tankers to be handled, the dimensions of the berth and the approach will be established.

The number and size of the marine unloading arms as well as the number and size of the pipelines for product evacuation/ receipt will be determined. An indicative layout of the jetty topside facilities with the marine arms, pipeline manifold and the pipelines shall be prepared

The berth will be provided with a full-fledged fire fighting system based on OISD Guidelines.

The other infrastructure and service facilities including water supply, power supply, control buildings, security gate, approach road etc. will also be indicated.

Block cost estimates will be prepared for the capital investment. The annual O&M costs will also be estimated.

A project implementation schedule for this project will be prepared.

Taking all these into consideration, the financial viability of the project will be worked out in terms of FIRR, EIRR etc.

IPA will examine different options for implementing this project – directly by the Port; Port in a joint venture with an oil company either in the public sector or private sector; through PPP mode on DBFOT basis. A recommendation with proper justification will be given.

***Appendix- 1.3***

**Discussions held with the users of Liquid Bulk handling facilities in HDC on 28th & 30th January 2015**

IPA team which visited Haldia during 28th to 30th January, 2015 held discussions with the some of the key users of the port liquid bulk facilities. They explained the products they import, their plant activities, their infrastructure for handling the products, the constraints they are facing etc. The highlights of the discussions which will be useful for the proposed feasibiliy report of IPA are presented hereunder. They are presented under broad groups such as POL products, LPG, Chemicals and Edible oils.

**CHEMICALS:**

**(1) MCC PTA India Corp. Private Limited (**28.01.15 @ 1530 hrs)

*Represented by Mr. Gautam Mukherjee (Head – Commercial) and Mr. Rajib Kumar Banerjee (Manager – Logistisc)*

| | |
|---|---|
| Products Imported : | Paraxylene ≈ 1 MTPA<br>Acetic acid ≈ 60,000 TPA |
| Berths used: | OJ I; Dock basin berths 2 & 3 |
| Average Ship size: | 10,000 to 12,000 DWT |
| Average Parcel size: | 7,000 to 8,000 T<br>Because of draft limitation the tankers are deadfreighted upto 20 % to 25% |
| Ship-shore transfer : | through 6" flexible hoses. |
| Tankers' discharge: | at 6 bar rail pressure and<br>the average discharge rate is 500 TPH. |
| Tankers frequency: | On an average 8 to 10 tankers per month |
| Plant infrastructure: | Plant storage capacity is 60,000 T |
| | Their plant consumptions is about 2,000 TPD and they would like to have minimum 15 days storage. |
| | The plant is about 13 km away from port facilities. The berths are connected by 2 x 18" pipelines. |

Constraints: They are paying an extra premium of $12/T for the tankers to call at Haldia. Since the raw material component is almost 70% of their production costs, this is hurting them most.

Under pressure from the suppliers they would like to handle at least 12,000 to 15,000 T parcels for which they need at least one metre increase in depth. Moreover, if new facilities are created at Shalukkhali, the pipeline length will come down from the present 13 km to about 4.5 Km to 5 km. This will ensure increased draft as well as higher discharge rate.

**(2) Haldia Petrochemicals Limited (**28.01.15 @ 1530 hrs)

No representative could attend the meeting due to pre-occupation. It was indicated that they going for the expansion and likely to handle about 0.82 MTPA of chemicals. Their plant is located at a distance of about 5 to 7 km from HDC berths. The distance from Shalukkhali will be about 9.5 km and they may shift to Shalukkhali if required.

**(3) Dhunseri Petrochem & Tea Limited (Petrochem Division)** (30.01.15 @ 1530 hrs)

*Represented by Mr. Saroja K. Patnaik (Asst Manager- Raw Materials Store)*

| | |
|---|---|
| Products Imported : | MEG (Methyl Ethyl Glycol) – 0.15 MTPA |
| Berths used: | Dock basin berths 6 & 7 |
| Average Ship size: | 6,000 to 7,000 DWT |
| Average Parcel size: | 5,000 T |
| Ship-shore transfer : | through 6" flexible hoses. |
| Tankers' discharge: | at 6 to 6.5 bar rail pressure and<br>the average discharge rate is 250 to 300 TPH. |
| Plant infrastructure: | Plant storage capacity is 20,000 T |
| | The plant is about 8 km away from port facilities. The berths are connected by 1 x 12" pipelines. |

Constraints: Presently their tankers suffer a detention of 1 day to a maximum of 3 days. At berths 6 & 7 which is a finger jetty coal in dry bulk is also handled. When MEG is handled in one berth of this finger jetty, coal is handled in the other berth. Hence the safety issues have to be looked into.

As regards future plans there is no proposal for increase in MEG, but have plans to import De Ethylene Glycol in small quantity of about 4000 Tons per annum and will be brought in 1000 T parcels.

**(4) Aegis Logistics Limited (30**.01.15 @ 1530 hrs)

*Represented by Mr. M.S. Banerjee (Chief Manager- Haldia Terminal)*

| | |
|---|---|
| Products Imported : | Edible oil (50%); CBFS (30%); LAB, Acetic Acid, Bitumen – combined traffic 0,25 MTPA |
| Berths used: | Dock basin berths 6 & 7 |
| Plant infrastructure: | Plant storage capacity is presently 63,000 T (17 tanks); Proposed addition 10,000 T (7tanks) |
| | The plant is about 0.7 km away from port facilities. The berths are connected by 3 x 12" pipelines. |

As regards future plans they are planning to import LPG for which they will construct 2 x 12,500 T refrigerated tanks. The traffic is likely to be about 1 MTPA. The LPG terminal will be located at about 12 km from port facilities behind Shaw Wallace plot. The present status of this terminal is that the required land is in place and land filling is going on This terminal is likely to be commissioned in 2 years time.

**POL PRODUCTS AND LPG:**

**(5) Bharat Petroleum Corporation Limited (**30.01.15 @ 1530 hrs)

*Represented by Mr. Subhashish Pal ( Manager- Operations)*

| | |
|---|---|
| Products Imported : | HSD - 240,000 T<br>MS - 65,000 T<br>FO - 60,000 T<br>SKO - 7,000 T |
| Berths used: | OJ 1 & 2 |
| Parcel size: | 15,000 T Ship-shore |
| transfer: | Marine arms |

Tankers' discharge: MS – 800 TPH
HSD – 1200 TPH
SKO - 800 TPH
FO - 600 to 800 TPH

Plant infrastructure: The tankage is about 13 km away from port facilities. The berths are connected by 2 x 16" pipelines for MS & SKO; 1 x 20" for HSD and 1 x 24" for FO.

During 2015-16, they expect about 20% increase in the traffic of MS & HSD.

As regards future plans they are planning to import LPG for which they will construct 2 x 12,500 T refrigerated tanks. The traffic is likely to be about 1 to 1.5 MTPA. In response to the EOI for using the surplus capacity of OJ 3, they have been selected and the agreement between BPCL and HDC is in progress.

Constraints: Consequent to the congestion at OJ 1 & 2, their tankers experience pre-berthing detention ranging from 4 to 6 days for each tanker. Sometimes it goes up to even 8 days.

**(6) Hindustan Petroleum Corporation Limited (30**.01.15 @ 1530 hrs)

*Represented by Mr. Tapan Kanti Das (Finance Deptt.)*

Not much of technical information was made available.

They handle HSD, MS and also SK. The parcel size varies from 4000 T to 8000 T. The products are handled in berths HOJ 1, 2 & 3. The terminal is located at about 8 kms from the port facilities and opposite to Hindustan Unilever where 63 acres of land is available.

They do not have any plans for expansion in the immediate future. As regards LPG, they have stake in IPPL and hence do not plan to import separately.

**EDIBLE OIL:**

**(7) Adani Wilmar Limited (30**.01.15 @ 1530 hrs)

*Represented by Mr. Sunil Kumar Raturi ( Manager - Commercial) and Mr. Sunil Sandip Kumar Bosei ( Asst. Manager - Commercial)*

Products Imported: Crude palm oil and refined edible oils - combined traffic 0.35 MTPA

| | |
|---|---|
| Berths used: | Dock basin berths 5 & 6 and sometimes 7 |
| Average Ship size: | 13,000 DWT |
| Average Parcel size: | 7,500 T to 13,000 T |
| Ship-shore transfer: | flexible hoses |
| Tankers' discharge: | at 3.5 bar tanker rail pressure and at an average discharge rate of 250 to 280 TPH |
| Plant infrastructure: | Plant storage capacity is presently 32,000 T The plant is about 4.2 km away from port facilities. The berths are connected by 2 x 12" pipelines. |

Constraints: Edible oil tankers get the last priority for berthing. The pre berthing detention is usually 4 to 6 days and sometimes goes up to 15 days.

**(8) Ruchi Infrastructure Limited (30**.01.15 @ 1530 hrs)

*Represented by Mr. Raja Sekhar (Senior Manager)*

| | | |
|---|---|---|
| Products | : | Crude palm oil imports - traffic 0.40 MTPA<br>Phosphoric acid imports – traffic 60,000 T<br>Styrene exports - traffic 5,000 T may go up to 15,000 T |
| Berths used: | | Dock basin berths 6 & 7. They have a temporary connection to berth 5. They have plans to connect to berth 3. |
| Ship-shore transfer: | | flexible hoses |
| Plant infrastructure: | | Plant storage capacity is presently 38,000 T. The plant is about 4.2 km away from port facilities. The berths are connected by 1 x 12" and 1 x 10" pipelines.<br><br>They also have a 10,000 T capacity tank for phosphoric acid which is located at about 490 m from the berth. |

Constraints: Edible oil tankers get the last priority for berthing. They would prefer water depths of minimum 8 m. However, Shalukkhali is alomost 20 km from their installations and they would not like to shift. If such a proposal materialises, they may consider setting up a new facility near

Shalukkhali as there is good potential for edible oil. Even here they are expecting about 15% annual growth in traffic.

**(9) Gokul Refoils & Solvent Limited (30**.01.15 @ 1530 hrs)

*Represented by Mr. Debjit Mahapatra (Senior Manager- Exim & Tank Farm)*

| | | |
|---|---|---|
| Products | : | Crude palm oil imports - traffic 0.25 MTPA |
| Berths used: | | Dock basin berths 5 & 6. |
| Average Parcel size: | | 7000 T to 9000 T |
| Ship-shore transfer: | | flexible hoses |
| Tankers' discharge: | | at 3.5 bar tanker rail pressure and average discharge rate of 200 to 300 TPH. |
| Plant infrastructure: | | Plant storage capacity is presently 65,000 T (43 tanks. The plant is about 2.5 km away from port facilities. |

Constraints: They import raw material from Malaysia and the transit time is only 5 days. However, the pre-berthing detention is more than this. During last month the waiting time was 10 to 15 days. These tankers involve demurrage of US $ 15,000 per day.

They do not have any plans for enhancing the plant capacity.

**(10) Emami Biotech Limited (**30.01.15 @ 1530 hrs)

*Represented by Mr. Arup Sinha (Asst. General Manager – Import & Export)*

| | | |
|---|---|---|
| Products | : | Crude palm oil imports - traffic 0.43 MTPA<br>Bio diesel exports - traffic 12,000 T |

Berths used: Dock basin berths 6 & 7.

Ship-shore transfer : flexible hoses

Plant infrastructure: Plant storage capacity is presently 68,000 T (82 tanks).

The plant is about 4.5 km away from port facilities. The berths are connected by 1 x 12" and 1 x 10" pipelines. Bio diesel is handled by the 12" line after cleaning it.

Constraints: They have incurred a total demurrage of Rs. 2.5 crores during the three months October/November/December 2014

## SECTION 2

# EXISTING LIQUID BULK HANDLING FACILITIES

2.1 The liquid bulk traffic at Haldia Dock Complex are handled primarily at HOJ 1, 2 & 3 with the Dock basin berths 2,3, 5, 6& 7 also being used. During the past three years, when the crude oil traffic was at negligible level, the share of Dock basin berths was about 35% while HOJ 1, 2 & 3 handled 65% of the total liquid bulk traffic. In this section the facilities available at these berths and the users being served are discussed in detail.

## 2.1 HALDIA OIL JETTY (HOJ) 1

HOJ- 1 is located at Latitude 22° 01’ 52.4” N and Longitude 088° 05’ 3.41” E .The aerial view of the jetty is presented hereunder.

The design tanker size is 89,000 DWT deadfreighted to the scheduled depth in the river Hooghly. The distance between the outermost mooring dolphins is 290 m and the maximum permissible LOA is 200m while the minimum LOA is 84 m.

Oil Jetty 1 handles the following cargo:

- POL Produts : *MS; Naphtha; HSD; FO; ATF; SKO; Lube oil*
- LPG; Ammonia
- Chemicals : *PY Gas, Paraxylene; Butene, Butadiene; Benzene; Bitumen*

The average traffic handled at this jetty during the past 5 years in 1.96 million tonnes.

The user agencies that are connected to this berth are

- IOCL/HPCL/BPCL - (*POL Products)*
- Indianoil Petronas Pvt. Ltd. - (*LPG*)
- Mitsubishi Chemical Corporation (PTA) Ltd. - (*Parxylene*)
- Haldia Petrochemicals Limited – (*Naphtha;Butene; MS; PY Gas; Butadiene; Benzene)*
- Indian Molasses Company – (*POL Products)*
- Tata Chemicals – (*Ammonia)*

The ship-shore transfer is effected through marine unloading arms and flexible hoses as detailed hereunder.

| | | |
|---|---|---|
| LPG | ; | 2 x 10” Chikson marine unloading arms |
| Ammonia/ PY Gas | : | 1 x 8” Chikson marine unloading arms |
| Paraxylene | : | 2 x 6” flexible hoses |
| Benzene | : | 1 x 6” flexible hose |
| Butene | : | 1 x 6” flexible hose |
| Butadine | : | 1 x 6” flexible hose |
| Bitumen | : | 1 x 8” flexible hose |

| | | | |
|---|---|---|---|
| ATF | : | 4 x 8” | flexible hoses |
| Naphtha | : | 3 x 8” | flexible hoses |
| HSD | : | 2 x 8” | flexible hoses |
| SKO | : | 2 x 8” | flexible hoses |
| MS | : | 2 x 8” | flexible hoses |
| FO | : | 2 x 8” | flexible hoses |
| Lube oil | : | 2 x 8” | flexible hoses |

**JETTY HEAD WITH UNLOADING ARMS & FLEXIBLE HOSES**

**MANIFOLDS FOR FLEXIBLE HOSE CONNECTIONS**

**MARINE UNLOADING ARMS 2 X 10” AND 1 X 8”**

**INSULATED LPG PIPELINES**


**PARAXYLENE PIPELINE END MANIFOLD**

**FLEXIBLE HOSES**

## 2.2 HALDIA OIL JETTY (HOJ) 2

HOJ- 2is located at Latitude 22° 01’ 43.1” N and Longitude 088° 05’ 50.1” E . The aerial view of the jetty is presented hereunder.

The design tanker size is 150,000 DWT dead freighted to the scheduled depth in the river Hooghly. The distance between the outermost mooring dolphins is 330 m and the maximum permissible LOA is 250m while the minimum LOA is 160 m.

Oil Jetty 2 handles the following cargo:

- Crude oil
- POL Products: *MS; Naphtha; HSD; FO; ATF; SKO; Lube oil*
- LPG

The average traffic handled at this jetty during the past 5 years in 2.88 million tonnes.

The user agencies that are connected to this berth are

- IOCL – (*Crude oil*)
- IOCL/HPCL/BPCL - (*POL Products)*
- Indianoil Petronas Pvt. Ltd. - (*LPG*)

The ship-shore transfer is effected through marine unloading arms as detailed hereunder.

| | | |
|---|---|---|
| Crude oil / FO | : | 2 x 16” Chickson marine unloading arms |
| LPG | ; | 2 x 12” Chikson marine unloading arms |
| HSD/SKO/MS/Naphtha | : | 2 x 12” Chikson marine unloading arms |

**MARINE UNLOADING ARMS – 2 X 16” & 4 X 12”**

**INSULATED LPG PIPELINES**

**CRUDE OIL & POL PRODUCT PIPELINES**

**TOWER MONITOR & MOORING DOLPHINS**

**FLEXIBLE BERTHING DOLPHIN WITH FENDERS**

## 2.3 HALDIA OIL JETTY (HOJ) 3

HOJ- 3is located at Latitude 022° 00’57.5” N and Longitude 088° 04’16.5” E . The aerial view of the jetty is presented hereunder.

The design tanker size is 150,000 DWT dead freighted to the scheduled depth in the river Hooghly. The distance between the outermost mooring dolphins is 345 m and the maximum permissible LOA is 250m while the minimum LOA is 160 m.

Oil Jetty 3 handles the following cargo:

- Crude oil
- POL Produts : *MS; Naphtha; HSD;*

The average traffic handled at this jetty during the past 3years in.1.10 million tonnes.

The user agencies that are connected to this berth are

- IOCL – (*Crude oil*)
- HPL/Reliance - (*POL Products)*

The ship-shore transfer is effected through marine unloading arms as detailed hereunder.

| | | |
|---|---|---|
| Crude oil | : | 2 x 16” chickson marine unloading arms |
| HSD/MS | : | 1 x 12” flexible hoses |
| Naphtha | : | 2 x 12” flexible hoses |

**2 x 16” MARINE UNLOADING ARMS**

**MANIFOLDS FOR FLEXIBLE HOSE CONNECTION**

**FLEXIBLE HOSES**

**VIEW OF APPROACH TRESTLE**

**ANOTHER VIEW OF APPROACH TRESTLE**

## 2.4 DOCK BASIN BERTHS 2 & 3

The aerial view of the dock basin berths 2 & 3 are shown hereunder.


Dock basin berth 2 is a dry bulk berth handling coal, coke, limestones, ore, fertilisers. The overall length of the berth is 260 m and it can accommodate vessels upto a maximum LOA of 236 m. For the past 4 years this berth is used to handle Paraxylene. While the average traffic through this berth over the past 4 years is 1.975 MTPA, the average volumes of Para xylene handled at this berth during the past 4 years is 0.124 MTP.

Berth 3 is also a dry bulk berth handling iron ore and coal. However, it also handles considerable volumes of POL products and Para-xylene. The overall length of the berth is 339 m and it can accommodate vessels upto a maximum LOA of 240 m. While the average traffic through this berth over the past 4 years is 1.51 MTPA, the average volumes of POL products & Para-xylene handled at this berth during the past 4 years is 0.636 MTP.

The user agencies that are connected to this berth are

- IOCL – (*POL products*)
- Mitsubishi Chemical Corporation (PTA) Ltd. - (*Para-xylene*)

The ship-shore transfer is effected through flexible hoses as detailed hereunder.

DOCK- 2 & 3

| | | |
|---|---|---|
| Paraxylene | : | 2 x 6” flexible hoses |

DOCK- 3

| | | |
|---|---|---|
| HSD | : | 2 x 8” flexible hoses |
| SKO | : | 2 x 8” flexible hoses |
| FO | : | 2 x 8” flexible hoses |

**MANIFOLDS FOR BERTHS 2 & 3**

**PARAXYLENE PIPELINES**

**POL PRODUCT PIPELINES**

## 2.5 DOCK BASIN BERTHS 6 & 7 (FINGER JETTY)

The aerial view of the berth 5 as well as finger jetty accommodating beths 6 & 7 is given hereunder:

Berth 5 mainly handles edible oil and some volumes of coal, coke and ore. The finger jetty accommodating berths 6 & 7 which are 234 m long each. These berths handle dry bulk such as coal, coke, ore and gypsum. The liquid cargo include phosphoric acid, liquid carbon black, bitumen, acetic acid, MEG and edible oil.

During the past 4 years, the average total traffic handled at berth 6 was 1.18 MTPA out of which 1.00 MTPA was liquid bulk while the average total traffic handled at berth 7 was 1.1 MTPA out of which 0.47 MTPA was liquid bulk.

## SECTION 3

# PRESENT PERFORMANCE OF LIQUID BULK HANDLING FACILITIES

**3.1** In this section the performance of these berths and the users being served are discussed in detail. This analysis does not include edible oil traffic.

## 3.2 USER AGENCIES

### 3.2.1 INDIAN OIL CORPORATION LTD.

Indian Oil Corporation is having a refinery at Haldia and has the maximum liquid bulk traffic through the port. It imports some amount of crude and exports POL products. For local marketing it also imports certain products based on demands.

| | | | |
|---|---|---|---|
| Storage Tanks | | Refinery tankage | |
| Berths used: | HOJ I & III | Crude | |
| | HOJ I & II | POL Products : | MS; HSD; SKO; Naptha; ATF; FO; Lube & Bitumen |
| | Berth No. 3 | POL Products | HSD;SKO; FO |
| Pipelines | HOJ I | Crude | 1 x 36” x 8 km |
| | HOJ III | Crude | 1 x 48” x 11 km |
| | HOJ I & II | MS | 1 x 14” x 0.8 km |
| | | HSD | 1 x 24” x 1.5 km |
| | | SKO | 1 x 30” x 1.5 km |
| | | Naphtha | 1 x 14” x 0.8 km |
| | | ATF | 1 x 12’ x 0.8 km |
| | | FO Lube | 1 x 24” x 1.5 km |
| | | Bitumen | 1 x 12” x 0.8 km |
| | | | 1 x 12” x 0.8 km |

### 3.2.2 BHARAT PETROLEUM CORPORATION LTD.

Bharat Petroleum Corporation is having a marketing terminal at Haldia and it imports MS; HSD; SKO & FO.

| | | | |
|---|---|---|---|
| Storage Tanks: | | MS | 31, 115 KL |
| | | HSD | 39, 640 KL |
| | | SKO | 5, 900 KL |
| | | FO | 19, 470 KL |
| Berths used: | HOJ I | FO | |
| | HOJ II | MS; HSD; SKO | |

| | | | |
|---|---|---|---|
| Pipelines | HOJ I | FO | 1 x 24” x 5.9 km |
| | HOJ II | MS | 1 x 16” x 5.9 km |
| | | HSD | 1 x 16” x 5.9 km |
| | | SKO | 1 x 16” x 5.9 km |

### 3.2.3 HINDUSTAN PETROLEUM CORPORATION LTD.

Hindustan Petroleum Corporation is having a marketing terminal at Haldia and it imports MS; HSD; SKO & FO.

| | | |
|---|---|---|
| Storage Tanks: | MS | 6,000 KL |
| | HSD | 30, 000 KL |
| | SKO | 8, 000 KL |
| | FO | 15, 000 KL |

Berths used: HOJ I & II

| | | |
|---|---|---|
| Pipelines | FO | 1 x 24” x 8.1 km |
| | MS | 1 x 16” x 8.1 km |
| | HSD | 1 x 20” x 8.1 km |
| | SKO | 1 x 16” x 8.1 km |

### 3.2.4 RELIANCE INDUSTRIES LTD.

Reliance Industries is having a marketing terminal at Haldia and it imports MS& HSD; They had suspended their operations for sometime and now they propose to re-start.

| | | |
|---|---|---|
| Storage Tanks: | MS | 63,160 KL |
| | HSD | 35, 160 KL |

Berths used: HOJ III

| | | |
|---|---|---|
| Pipelines | MS | 1 x 24” x 8.11 km |
| | HSD | 1 x 24” x 8.11 km |

### 3.2.5 INDIANOIL PETRONAS PRIVATE LTD.

Indian oil Petronas is having a LPG terminal at Haldia. They import Propane & Butane in refrigerated condition and blend them as LPG for distribution to industries. Storage Tanks:

| | |
|---|---|
| Propane | 16,000 Tonnes |
| Butane | 16,000 Tonnes |

Berths used: HOJ I & II

Pipelines 2 x 16" x 8. Km (insulated pipelines)

### 3.2.6 HALDIA PETROCHEMICALS LTD.

Haldia Petrochemicals at Haldia import Naphtha & Butene 1 and export Benzene, Butadiene and PY Gas.

| | | |
|---|---|---|
| Storage Tanks: | Naphtha | 150,000 Tonnes |
| | Butene 1 | 4,400 Tonnes |
| | Butadiene | 5,200 Tonnes |
| | Benzene | 11,400 Tonnes |
| | PY Gas | 7,400 Tonnes |

Berths used: HOJ I , HOJ II & HOJ III

| | | | |
|---|---|---|---|
| Pipelines | HOJ I | Naphtha | 1 x 24" x 6.0 km |
| | | Butene 1 | 1 x 8" x 7.0 km |
| | | Benzene | 1 x 8" x 7.0 km |
| | | Butadiene | 1 x 6" x 7.0 km |
| | | PY Gas | 1 x 16" x 6.0 km |
| | HOJ II | Naphtha | 1 x 24" x 6.0 km |
| | HOJ III | Naphtha | 1 x 24" x 6.0 km |

(*A single naphtha line is connected to all the three jetties*)

### 3.2.7 MITSUBISHI CHEMICAL CORPORATION (PTA) INDIA LTD.

Mitsubishi Chemical Corporation is having a PTA plant at Haldia. They import Paraxylene and Acetic Acid.

Storage Tanks: 60,000 Tonnes

Berths used: HOJ I ; Berth No.2 & Berth No. 3

| | | |
|---|---|---|
| Pipelines | HOJ I | 2 x 18" x 13 Km |
| | Berth No.2 | 2 x 18" x 13 km |
| | Berth No. 3 | 2 x 18" x 13 km |

### 3.2.8 TATA CHEMICALS LTD.

Tata Chemicals import Ammonia through Haldia for their plant

| | | |
|---|---|---|
| Storage Tanks: | 10,000 Tonnes | |
| Berths used: | HOJ I | |
| Pipelines | HOJ I | 1 x 16" x 8 Km (insulated pipeline) |

### 3.2.9 IMC LTD.

IMC has a multi-user tankage terminal near the Docks and handles CBFS, Sulphuric Acid, Bitumen and edible oil. They have another tankage terminal at Patikhali where they handle POL Class A. B & C and non-hazardous chemicals.

| | | |
|---|---|---|
| Storage Tanks | 82,838 KL (20 tanks) near Docks<br>33,650 KL (10 tanks) at Patikhali | |
| Berths used: | Finger Jetty berths 6 & 7<br>HOJ 1 | |
| Pipelines: | Berths 6 & 7 | 1 x 8" x 946 m<br>1 x 10" x 540 m<br>1 x 14" x 868 m |
| | HOJ 1 | 1 x 12" x 4.86 km |

## 3.3 LIQUID BULK TRAFFIC AT HALDIA

The total liquid bulk traffic at Haldia for the past four years is furnished hereunder. It could be seen that apart from crude oil and edible oil, the traffic in POL products, chemicals and LPG has been more or less consistent at around $7^{+}$ MTPA.

| | | 2014 - 15 | 2013-14 | 2012-13 | 2011-12 | 2010-11 | CAGR |
|---|---|---|---|---|---|---|---|
| | | | | | | | % |
| 1 | CRUDE OIL | 0.50 | 0.79 | 0.54 | 2.16 | 4.41 | -41.97 |
| 2 | POL PRODUCTS | 3.11 | 3.75 | 4.25 | 4.42 | 5.16 | -11.89 |
| 3 | LPG | 1.91 | 1.53 | 1.40 | 1.32 | 1.11 | 14.53 |
| 4 | CHEMICALS | 1.94 | 1.83 | 1.59 | 1.48 | 1.61 | 4.77 |
| 5 | EDIBLE OIL | 1.96 | 1.55 | 1.54 | 1.19 | 1.02 | 17.74 |
| | TOTAL | **9.42** | **9.45** | **9.32** | **10.57** | **13.31** | -8.28 |

## 3.4 PERFORMANCE OF PRODUCT VESSELS

Here an analysis will be made on the total traffic handled, number of ships, average vessel size, average parcel size and the average rate of discharge from the tankers. This will be done for each of the product handled including crude oil, POL products and Chemicals. These data will be later used as design parameters for estimating the optimum capacity of the berthing facilities at Haldia Dock Complex. The representative data two years have been considered for this analysis.

### 3.4.1 CRUDE OIL

Crude oil is imported by IOCL for their refinery at Haldia. Though almost all the crude oil imports, which were earlier handled at HDC for their Haldia & Barauni refineries have been shifted to the SBM terminal at Paradip, they still use HDC for marginal imports through the facilities at HOJ I & HOJ II. The data pertaining to crude oil for the two years ie. 2013-14 & 2012-13 are furnished hereunder.

| Sl.No. | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ II | 1,40,443 | 0 |
| | | HOJ III | 6,52,492 | 5,43,951 |
| | | **Total** | **7,92,935** | **5,43,951** |
| 2 | Number of Tankers | HOJ II | 6 | 0 |
| | | HOJ III | 24 | 17 |
| | | **Total** | **30** | **17** |
| 3 | Deadweight Tonnage | Average | 97,034 | 1,00,716 |
| | | Maximum | 1,15,611 | 1,14,790 |
| | | Minimum | 73,500 | 73,530 |
| 4 | Parcel Size in Tonnes | Average | 26,431 | 34,234 |
| | | Maximum | 40,631 | 26,021 |
| | | Minimum | 14,364 | 40,202 |
| 5 | Pumping Rate In TPH | HOJ II | 2,053 | Nil |
| | | HOJ III | 2,281 | 2,161 |

### 3.4.2 LIQUEFIED PETROLEUM GAS (LPG)

LPG is being imported by IPPL. This is handled at HOJ I & HOJ II. The data pertaining to LPG for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 61,051 | 0 |
| | | HOJ II | 14,51,852 | 13,99,159 |
| | | **Total** | **15,12,903** | **13,99,159** |
| 2 | Number of Tankers | HOJ I | 11 | 0 |
| | | HOJ II | 88 | 80 |
| | | **Total** | **99** | **80** |
| 3 | Deadweight Tonnage | Average | 48,397 | 49,011 |
| | | Maximum | 59,421 | 59,421 |
| | | Minimum | 9,469 | 3,805 |
| 4 | Parcel Size in Tonnes | Average | 15,009 | 9,078 |
| | | Maximum | 22,421 | 15,486 |
| | | Minimum | 2,872 | 1,430 |
| 5 | Pumping Rate In TPH | HOJ I | 400 | NIL |
| | | HOJ II | 632 | 600 |

### 3.4.3 AMMONIA

Ammonia is being imported by Tata Chemicals. This is handled at HOJ I. The data pertaining to LPG for the two years i.e. 2013-14 & 2012-13 are furnished hereunder**.**

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | | 87,076 | 77,580 |
| 2 | Number of Tankers | | 14 | 14 |
| 3 | Deadweight Tonnage | Average | 19,296 | 20,123 |
| | | Maximum | 26,427 | 26,618 |
| | | Minimum | 17,298 | 16,967 |
| 4 | Parcel Size in Tonnes | Average | 6,220 | 4,760 |
| | | Maximum | 7,701 | 7,344 |
| | | Minimum | 3,000 | 2,001 |
| 5 | Pumping Rate In TPH | HOJ I | 391 | 371 |

### 3.4.4 POL PRODUCT - HSD

HSD is being exported & also imported by IOCL. It is imported by HPCL, BPCL and Reliance for marketing purposes. This is handled at HOJ I & HOJ II by IOCL; HPCL & BPCL. It is also handled at Berth 3 by IOC. Reliance have facilities to handle it at HOJ III. The data pertaining to HSD for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl. No. | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 4,38,249 | 4,62,831 |
| | | HOJ II | 4,03,725 | 4,37,941 |
| | | Berth 3 | 4,11,123 | 3,49,339 |
| | | **Total** | **12,53,097** | **12,50,111** |
| 2 | Number of Tankers | HOJ I | 34 | 46 |
| | | HOJ II | 31 | 42 |
| | | Berth 3 | 25 | 31 |
| | | **Total** | **90** | **119** |
| 3 | Deadweight Tonnage | Average | 49,429 | 47,621 |
| | | Maximum | 74,859 | 75,570 |
| | | Minimum | 29,990 | 29,990 |
| 4 | Parcel Size In Tonnes | Average | 16,722 | 11,072 |
| | | Maximum | 29,922 | 23,579 |
| | | Minimum | 8,265 | 2,027 |
| 5 | Pumping Rate in TPH | HOJ I | 767 | 339 |
| | | HOJ II | 615 | 539 |
| | | Berth 3 | 858 | 665 |

### 3.4.5 POL PRODUCT - MS

MS is being exported & also imported by IOCL. It is imported by HPCL, BPCL and Reliance for marketing purposes. This is handled at HOJ I & HOJ II by IOCL; HPCL & BPCL. Reliance have facilities to handle it at HOJ III. The data pertaining to MS for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl. No. | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 43,576 | 71,612 |
| | | HOJ II | 29,736 | 26,170 |
| | | **Total** | **73,312** | **97,782** |
| 2 | Number of Tankers | HOJ I | 6 | 8 |
| | | HOJ II | 4 | 5 |
| | | **Total** | **10** | **13** |
| 3 | Deadweight Tonnage | Average | 45,622 | 36,207 |
| | | Maximum | 74,859 | 73,530 |
| | | Minimum | 29,997 | 11,527 |
| 4 | Parcel Size in Tonnes | Average | 10,112 | 9,501 |
| | | Maximum | 24,207 | 16,469 |
| | | Minimum | 4,695 | 4,423 |
| 5 | Pumping Rate In TPH | HOJ I | 575 | 373 |
| | | HOJ II | 670 | 474 |

### 3.4.6 POL PRODUCT - SKO

SKO is being exported & also imported by IOCL. It is imported by HPCL and BPCL for marketing purposes. This is handled at HOJ I & HOJ II by IOCL; HPCL & BPCL. It is also handled at Berth 3 by IOC. The data pertaining to SKO for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl.No. | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 7,879 | 8,923 |
| | | HOJ II | 43,337 | 73,231 |
| | | Berth 3 | 6,350 | 7,150 |
| | | **Total** | **51,216** | **82,154** |
| 2 | Number of Tankers | HOJ I | 2 | 2 |
| | | HOJ II | 7 | 15 |
| | | Berth 3 | 1 | 1 |
| | | **Total** | **10** | **18** |
| 3 | Deadweight Tonnage | Average | 52,404 | 36,233 |
| | | Maximum | 74,811 | 47,878 |
| | | Minimum | 29,997 | 29,990 |
| 4 | Parcel Size In Tonnes | Average | 9,324 | 7,509 |
| | | Maximum | 13,882 | 11,035 |
| | | Minimum | 4,766 | 2,568 |
| 5 | Pumping Rate in TPH | HOJ I | 670 | 186 |
| | | HOJ II | 489 | 613 |
| | | Berth 3 | 551 | 745 |

### 3.4.7 POL PRODUCT - FO

FO is being exported by IOCL. It is imported by HPCL and BPCL for marketing purposes. This is handled at HOJ I & HOJ II by IOCL; HPCL & BPCL. The data pertaining to FO for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 3,25,088 | 2,91,276 |
| | | HOJ II | 4,60,400 | 4,02,124 |
| | | **Total** | **7,85,488** | **6,93,400** |
| 2 | Number of Tankers | HOJ I | 43 | 33 |
| | | HOJ II | 34 | 35 |
| | | **Total** | **77** | **68** |
| 3 | Deadweight Tonnage | Average | 26,631 | 23,917 |
| | | Maximum | 50,238 | 34,671 |
| | | Minimum | 7,095 | 7,525 |
| 4 | Parcel Size in Tonnes | Average | 11,573 | 6,516 |
| | | Maximum | 17,467 | 10,359 |
| | | Minimum | 2,783 | 3,396 |
| 5 | Pumping Rate in TPH | HOJ I | 586.38 | 367.77 |
| | | HOJ II | 803.32 | 786.63 |

### 3.4.8 POL PRODUCT - Naphtha

**N**aphtha is being exported by IOCL. It is imported by HPL for their petrochemcial plant as feedstock. This is handled at HOJ I & HOJ II by IOCL; and at HOJ III by HPL The data pertaining to Naptha for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 2,58,390 | 2,13,447 |
| | | HOJ II | 57,027 | 48,817 |
| | | HOJ III | 4,87,374 | 9,17,405 |
| | | **Total** | **8,02,791** | **11,79,669** |
| 2 | Number of Tankers | HOJ I | 22 | 19 |
| | | HOJ II | 5 | 4 |
| | | HOJ III | 33 | 45 |
| | | **Total** | **60** | **68** |
| 3 | Deadweight Tonnage | Average | 41,743 | 60,033 |
| | | Maximum | 99,997 | 76,925 |
| | | Minimum | 9,010 | 8,956 |
| 4 | Parcel Size In Tonnes | Average | 14,054 | 21,082 |
| | | Maximum | 29,556 | 28,308 |
| | | Minimum | 3,328 | 3,806 |
| 5 | Pumping Rate In TPH | HOJ I | 408 | 468 |
| | | HOJ II | 635 | 685 |
| | | HOJ III | 863 | 1,215 |

### 3.4.9 POL PRODUCT - ATF

ATF is being exported by IOCL. This is handled mostly at HOJ I & some at HOJ II The data pertaining to ATF for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Total Volume Handled in Tonnes | HOJ I | 86,447 | 77,721 |
| | | HOJ II | 4,616 | 0 |
| | | **Total** | **91,063** | **77,721** |
| 2 | Number of Tankers | HOJ I | 38 | 29 |
| | | HOJ II | 1 | 0 |
| | | **Total** | **39** | **29** |
| 3 | Deadweight Tonnage | Average | 18,886 | 21,699 |
| | | Maximum | 47,076 | 47,878 |
| | | Minimum | 7,564 | 7,564 |
| 4 | Parcel Size In Tonnes | Average | 8,066 | 2,535 |
| | | Maximum | 28,012 | 8,455 |
| | | Minimum | 3,257 | 743 |
| 5 | Pumping Rate In TPH | HOJ I | 143 | 112 |
| | | HOJ II | 520 | x |

### 3.4.10 POL PRODUCT - LUBE

Lube is being exported by IOCL. This is handled at HOJ I. The data pertaining to Lube for the past two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | | 25,486 | 63,582 |
| 2 | Number of Tankers | | 7 | 14 |
| 3 | Deadweight Tonnage | Average | 7,269 | 6,842 |
| | | Maximum | 7,877 | 6,965 |
| | | Minimum | 6,955 | 6,431 |
| 4 | Parcel Size in Tonnes | Average | 3,850 | 4,552 |
| | | Maximum | 4,905 | 5,189 |
| | | Minimum | 1,128 | 3,376 |
| 5 | Pumping Rate In TPH | HOJ I | 285 | 189 |

### 3.4.11 POL PRODUCT – BITUMEN

Bitumen is being exported by IOCL. It is imported by Aegis and IMC for marketing purposes.. This is handled at HOJ I by IOCL and at Berths 6 & 7 by Aegis and IMC.. The data pertaining to Bitumen for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 90,213 | 65,002 |
| | | Berth 6 | 40,037 | 53,405 |
| | | Berth 7 | 45,768 | 4,115 |
| | | **Total** | **1,76,018** | **1,22,522** |
| 2 | Number of Tankers | HOJ I | 17 | 15 |
| | | Berth 6 | 11 | 14 |
| | | Berth 7 | 14 | 1 |
| | | **Total** | **42** | **30** |
| 3 | Deadweight Tonnage | Average | 5,227 | 5,362 |
| | | Maximum | 6,165 | 6,189 |
| | | Minimum | 3,337 | 4,060 |
| 4 | Parcel Size in Tonnes | Average | 4,580 | 4,239 |
| | | Maximum | 9,723 | 5,297 |
| | | Minimum | 1,513 | 3,195 |
| 5 | Pumping Rate In TPH | HOJ I | 336 | 243 |
| | | Berth 6 | 153 | 155 |
| | | Berth 7 | 159 | 256 |

### 3.4.12 CHEMICALS – PARAXYLENE

Paraxylene is being imported by Mitsubishi Chemical Corporation (PTA) India for their PTA plant. This is handled at HOJ I, Berths 2 & 3. The data pertaining to Paraxylene for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 1,39,122 | 87,841 |
| | | Berth 2 | 44,096 | 2,94,832 |
| | | Berth 3 | 4,96,591 | 1,92,946 |
| | | **Total** | **6,79,809** | **5,75,619** |
| 2 | Number of Tankers | HOJ I | 21 | 13 |
| | | Berth 2 | 6 | 43 |
| | | Berth 3 | 63 | 28 |
| | | **Total** | **90** | **84** |
| 3 | Deadweight Tonnage | Average | 14,684 | 14,216 |
| | | Maximum | 25,588 | 25,581 |
| | | Minimum | 9,220 | 7,877 |
| 4 | Parcel Size in Tonnes | Average | 8,079 | 7,134 |
| | | Maximum | 10,408 | 12,457 |
| | | Minimum | 4,758 | 2,865 |
| 5 | Pumping Rate In TPH | HOJ I | 500 | 510 |
| | | Berth 2 | 506 | 532 |
| | | Berth 3 | 495 | 443 |

### 3.4.13 CHEMICALS – PY GAS

PY Gas is being exported by HPL. This is handled at HOJ I& HOJ II . The data pertaining to PY Gas for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 70,681 | 41,946 |
| | | HOJ II | 36,654 | 15,468 |
| | | **Total** | **1,07,335** | **57,414** |
| 2 | Number of Tankers | HOJ I | 8 | 8 |
| | | HOJ II | 5 | 3 |
| | | **Total** | **13** | **11** |
| 3 | Deadweight Tonnage | Average | 26,148 | 14,180 |
| | | Maximum | 45,134 | 15,212 |
| | | Minimum | 6,184 | 13,149 |
| 4 | Parcel Size in Tonnes | Average | 10,063 | 2,846 |
| | | Maximum | 18,045 | 2,858 |
| | | Minimum | 4,839 | 2,834 |
| 5 | Pumping Rate in TPH | HOJ I | 547 | 218 |
| | | HOJ II | 725 | 309 |

### 3.4.14 CHEMICALS – BUTADIENE

Butadiene is being exported by HPL. This is handled at HOJ I. The data pertaining to Butadiene for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl. No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | | 54,237 | 64,086 |
| 2 | Number of Tankers | | 34 | 38 |
| 3 | Deadweight Tonnage | Average | 4,053 | 3,752 |
| | | Maximum | 10,282 | 6,954 |
| | | Minimum | 2,996 | 2,653 |
| 4 | Parcel Size in Tonnes | Average | 1,683 | 1,641 |
| | | Maximum | 5,914 | 2,916 |
| | | Minimum | 1,444 | 1,024 |
| 5 | Pumping Rate In TPH | HOJ I | 188 | 183 |

### 3.4.15 CHEMICALS – BENZENE

Benzene is being exported by HPL. This is handled at HOJ I & Berth 6. The data pertaining to Benzene for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | HOJ I | 88,873 | 90,467 |
| | | Berth 6 | 6,944 | 0 |
| | | **Total** | **95,817** | **90,467** |
| 2 | Number of Tankers | HOJ I | 23 | 29 |
| | | Berth 6 | 3 | 0 |
| | | **Total** | **26** | **29** |
| 3 | Deadweight Tonnage | Average | 10,867 | 11,688 |
| | | Maximum | 46,744 | 19,996 |
| | | Minimum | 3,500 | 6,524 |
| 4 | Parcel Size in Tonnes | Average | 3,685 | 3,055 |
| | | Maximum | 5,986 | 4,668 |
| | | Minimum | 2,184 | 2,847 |
| 5 | Pumping Rate in TPH | HOJ I | 245 | 245 |
| | | Berth 6 | 235 | x |

### 3.4.16 CHEMICALS – BUTENE - 1

Butene-1 is being imported by HPL. This is handled at HOJ I. The data pertaining to Butene-1 for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | | 8,053 | 6,022 |
| 2 | Number of Tankers | | 9 | 4 |
| 3 | Deadweight Tonnage | Average | 4,845 | 5,967 |
| | | Maximum | 6,685 | 10,442 |
| | | Minimum | 2,999 | 3,805 |
| 4 | Parcel Size in Tonnes | Average | 1,619 | 1,482 |
| | | Maximum | 1,986 | 1,524 |
| | | Minimum | 1,498 | 1,430 |
| 5 | Pumping Rate In TPH | HOJ I | 95 | 83 |

### 3.4.17 CHEMICALS – MONO ETHYLENE GLYCOL (MEG)

MEG is being imported by Dhunseri Petrochem & Tea Limited. This is handled at Berths 6 & 7. The data pertaining to MEG for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | Berth 6 | 68,843 | 58,971 |
| | | Berth 7 | 64,447 | 39,479 |
| | | **Total** | **1,33,290** | **98,450** |
| 2 | Number of Tankers | Berth 6 | 11 | 9 |
| | | Berth 7 | 10 | 6 |
| | | **Total** | **21** | **15** |
| 3 | Deadweight Tonnage | Average | 17,737 | 13,562 |
| | | Maximum | 46,744 | 23,322 |
| | | Minimum | 11,527 | 8,719 |
| 4 | Parcel Size in Tonnes | Average | 7,801 | 6,460 |
| | | Maximum | 13,349 | 7,271 |
| | | Minimum | 5,698 | 5,720 |
| 5 | Pumping Rate in TPH | Berth 6 | 262.20 | 286.04 |
| | | Berth 7 | 285.06 | 271.89 |

### 3.4.18 CHEMICALS – CARBON BLACK FEEDSTOCK (CBFS)

CBFS is being imported by IMC and Aegis Logistics Ltd. This is handled at Berths 5, 6 & 7. The data pertaining to CBFS for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | Berth 5 | 18,066 | 0 |
| | | Berth 6 | 87,154 | 1,50,429 |
| | | Berth 7 | 91,339 | 83,846 |
| | | **Total** | **1,96,559** | **2,34,275** |
| 2 | Number of Tankers | Berth 5 | 3 | 0 |
| | | Berth 6 | 5 | 9 |
| | | Berth 7 | 6 | 5 |
| | | **Total** | **14** | **14** |
| 3 | Deadweight Tonnage | Average | 43,505 | 49,277 |
| | | Maximum | 76,493 | 74,896 |
| | | Minimum | 6,235 | 6,276 |
| 4 | Parcel Size in Tonnes | Average | 14,040 | 17,147 |
| | | Maximum | 24,053 | 25,528 |
| | | Minimum | 5,902 | 5,871 |
| 5 | Pumping Rate in TPH | Berth 5 | 139 | NIL |
| | | Berth 6 | 696 | 664 |
| | | Berth 7 | 606 | 548 |

### 3.4.19 CHEMICALS – PHOSPHORIC ACID

Phosphoric Acid is being imported by Tata Chemicals for their fertiliser plant. This is handled at Berths 5, 6 & 7. The data pertaining to Phosphoric Acid for the two years i.e. 2013-14 & 2012-13 are furnished hereunder.

| Sl No | Description | | 2013-14 | 2012-13 |
|---|---|---|---|---|
| 1 | Volume Handled in Tonnes | Berth 5 | 0 | 33,883 |
| | | Berth 6 | 1,42,026 | 1,63,876 |
| | | Berth 7 | 1,78,941 | 93,079 |
| | | Total | 3,20,967 | 2,90,838 |
| 2 | Number of Tankers | Berth 5 | 0 | 3 |
| | | Berth 6 | 15 | 16 |
| | | Berth 7 | 17 | 8 |
| | | Total | 32 | 27 |
| 3 | Deadweight Tonnage | Average | 27,737 | 26,592 |
| | | Maximum | 49,487 | 38,450 |
| | | Minimum | 19,728 | 19,510 |
| 4 | Parcel Size in Tonnes | Average | 10,030 | 11,371 |
| | | Maximum | 15,612 | 14,881 |
| | | Minimum | 7,201 | 5,692 |
| 5 | Pumping Rate in TPH | Berth 5 | NIL | 395 |
| | | Berth 6 | 1,086 | 551 |
| | | Berth 7 | 594 | 541 |

## 3.5 PERFORMANCE OF BERTHS HANDLING LIQUID BULK

The performance of the berths handling liquid bulk are examined in the tables hereunder. This covers HOJ I; HOJ II; HOJ III; Berths 2,3,5,6 & 7.

### 3.5.1 HOJ I

The performance of HOJ I for the past 3 years is presented in the following table.

**PERFORMANCE OF HOJ I**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| 1 | Crude | **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | POL (Products) I & E | 13,31,189 | 149 | 187 | 15,05,565 | 159 | 188 | 14,62,429 | 160 | 182 |
| 3 | L.P.G. | 81,763 | 8 | 8 | 0 | 0 | 0 | 60,953 | 10 | 13 |
| | **CHEMICALS** | **431279** | **119** | **96** | **393289** | **108** | **100** | **467614** | **114** | **98** |
| 4 | Liquid Ammonia | 93,445 | 19 | 17 | 77,580 | 14 | 13 | 87,076 | 14 | 13 |
| 5 | Butadine - Export | 60,516 | 39 | 22 | 64,086 | 38 | 23 | 54,237 | 34 | 18 |
| 6 | Paraxylene | 1,71,185 | 29 | 24 | 87,841 | 8 | 12 | 1,39,122 | 21 | 19 |
| 7 | Benzene - Export | 80,929 | 22 | 22 | 87,602 | 29 | 26 | 88,873 | 23 | 24 |
| 8 | Bitumen I & E | 17,081 | 5 | 6 | 70,158 | 15 | 21 | 90,213 | 17 | 19 |
| 9 | Butene | 8,123 | 5 | 5 | 6,022 | 4 | 4 | 8,093 | 5 | 5 |
| 10 | Phosphoric Acid | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Acetic Acid | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | MEG | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | CBFS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | C.T.Pitch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | L.C.Soda | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **EDIB LE OILS** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **GRAND TOTAL** | **18,44,231** | **276** | **291** | **18,98,854** | **267** | **288** | **19,90,996** | **284** | **294** |
| | **BERTH OCCUPANCY** | | **291days - 80%** | | | **288 Days - 79%** | | | **294 Days - 81%** | |
| | **PREBERTHING DETENTION IN DAYS** | | | | | | **717** | | | **733** |

It can be seen that the berth has been handling almost 2 million tonnes per annum with an occupancy rate of 80%. It has to be noted that this occupancy rate has been worked out taking 365 days. However international practice is to consider 350 days only leaving the balance 15 days for national holidays, cyclonic conditions and maintenance activities. In such a case the occupancy rate increases to 84% which is very high. This is reflected in the pre-berthing detention experienced by the ship due to waiting. For a multi-berth group the preferable berth occupancy to restrict the waiting time is recommended as 65% only.

### 3.5.2 HOJ II

The performance of HOJ II for the past 3 years is presented in the following table.

**PERFORMANCE OF HOJ II**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| 1 | Crude | 33,000 | 1 | 0.86 | 0 | 0 | 0 | 1,40,443 | 6 | 5 |
| 2 | POL (Products) I & E | 16,74,904 | 117 | 134 | 11,63,571 | 94 | 120 | 11,02,334 | 83 | 103 |
| 3 | L.P.G. | 12,42,858 | 81 | 129 | 13,99,159 | 80 | 139 | 14,65,052 | 89 | 139 |
| 4 | CHEMICALS | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| 5 | EDIBLE OILS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **GRAND TOTAL** | **29,50,762** | **199** | **264** | **25,62,730** | **174** | **259** | **27,07,829** | **178** | **248** |
| **BERTH OCCUPANCY** | | | **264 Days - 72%** | | | **259 Days - 71 %** | | | **248 Days - 68 %** | |
| **PREB ERTHING DETENTION IN DAYS** | | | | | | | **672** | | | **484** |

This berth does not handle chemicals and edible oil. It can be seen that the berth has been handling on an average about 2.7 million tonnes per annum with an occupancy rate of 70%. Here again, this will increase to 73% if corrected for 350 operational days. This higher occupancy rate has again resulted in large pre-berthing detention of tankers.

### 3.5.3 HOJ III

The performance of HOJ III for the past 3 years is presented in the following table.'

**PERFORMANCE OF HOJ III**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| 1 | Crude | **21,26,576** | 68 | 68 | 5,43,951 | 17 | 16 | 6,52,492 | 24 | 23 |
| 2 | POL (Products) I & E | 10,84,140 | 49 | 48 | 9,17,405 | 45 | 48 | 4,87,374 | 33 | 37 |
| 3 | L.P.G. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | CHEMICALS | 0 | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| 5 | EDIBLE OILS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **GRAND TOTAL** | **32,10,716** | **117** | **116** | **14,61,356** | **62** | **64** | **11,39,866** | **57** | **60** |
| | **BERTH OCCUPANCY** | | **116 Days - 32 %** | | | **65 Days - 18 %** | | | **60 Days - 16 %** | |

This berth was constructed mainly for handling the crude oil for IOCL Haldia Refinery. With the shifting of crude oil handling to Paradip SBM terminal, the utilisation of this berth has come down with an occupancy rate of only 16 % during last year. This berth has surplus capacity which could be utilised.

### 3.5.4 BERTH 2

The performance of Berth 2 for the past 3 years is presented in the following table.'

**PERFORMANCE OF BERTH 2**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| 1 | Crude | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | POL (Products) I & E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | L.P.G. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **CHEMICALS** | **97,326** | **17** | **17** | **2,94,832** | **12** | **45** | **44,096** | **6** | **5** |
| 6 | Paraxylene | 97,326 | 17 | 17 | 2,94,832 | 12 | 45 | 44,096 | 6 | 5 |
| | **GRAND TOTAL** | **97,326** | **17** | **17** | **2,94,832** | **12** | **45** | **44,096** | **6** | **5** |
| **BERTH OCCUPANCY FOR LIQUID CARGO VESSELS** | | | **17 Days - 5 %** | | | **47 Days - 13 %** | | | **5 Days - 1.4 %** | |
| **BERTH OCCUPANCY OVERALL** | | | **256 Days - 70 %** | | | **170 Days - 47 %** | | | **296 Days - 81 %** | |
| **PREBERTHING DETENTION IN DAYS FOR LIQUID CARGO ONLY** | | | | | | | **28** | | | **11** |

The Dock basin Berth 2 is a dry bulk berth handling coal, coke, limestones, ore, fertilisers. For the past 4 years this has been handling Paraxylene also. Here again the berth occupancy rate for the last year is very high resulting in pre berthing detention.

### 3.5.5 BERTH 3

The performance of Berth 3 for the past 3 years is presented in the following table.

**PERFORMANCE OF BERTH 3**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| 1 | Crude | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | POL (Products) I & E | 1,74,011 | 12 | 16 | 4,29,878 | 32 | 43 | 4,78,369 | 31 | 43 |
| 3 | L.P.G. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **CHEMICALS** | **1,79,543** | **27** | **26** | **1,75,236** | **10** | **29** | **4,96,591** | **63** | **67** |
| 6 | Paraxylene | 1,79,543 | 27 | 26 | 1,75,236 | 10 | 29 | 4,96,591 | 63 | 67 |
| | **GRAND TOTAL** | **3,53,554** | 39 | **42** | **6,05,114** | **42** | **72** | **9,74,960** | 157 | **177** |
| **BERTH OCCUPANCY FOR LIQUID CARGO VESSELS** | | | **42 Days - 12%** | | | **72 Days - 20 %** | | | **110 Days - 30 %** | |
| **BERTH OCCUPANCY OVERALL** | | | **225 Days - 62 %** | | | **239 Days - 65 %** | | | **236 Days - 65 %** | |
| **PREBERTHING DETENTION IN DAYS FOR LIQUID CARGO ONLY** | | | | | | | **131** | | | **136** |

The Dock basin Berth 3, like berth 3 is also a dry bulk berth handling coal, coke, limestones, ore, fertilisers. For the past 4 years this has been handling considerable volumes of Paraxylene also.

### 3.5.6 BERTH 5

The performance of Berth 5 for the past 3 years is presented in the following table.

**PERFORMANCE OF BERTH 5**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| | **CHEMICALS** | **0** | **0** | 0 | **33,883** | 3 | 4 | 18,066 | 3 | 8 |
| 1 | Phosphoric Acid | 0 | 0 | 0 | 33,883 | 3 | 4 | 0 | 0 | 0 |
| 2 | CBFS | 0 | 0 | 0 | 0 | 0 | 0 | 18,066 | 3 | 8 |
| | **EDIB LE OILS** | 5,41,062 | 69 | 165 | 5,87,017 | 78 | 178 | 5,95,275 | 87 | 189 |
| | **GRAND TOTAL** | **5,41,062** | 69 | **165** | **6,20,900** | **81** | **182** | 6,13,341 | 90 | **197** |
| **BERTH OCCUPANCY FOR LIQUID CARGO VES SELS** | | | **165 Days - 45 %** | | | **182 Days - 50 %** | | | **197 Days - 54 %** | |
| **BERTH OCCUPANCY OVERALL** | | | **301 Days - 82 %** | | | **348 Days - 95 %** | | | **350 Days - 96 %** | |
| **PREBERTHING DETENTION IN DAYS FOR LIQUID CARGO ONLY** | | | | | | | **133** | | | **146** |

The Dock basin Berth 5 mainly handles edible oil and some volumes of coal, coke and ore. In addition some volumes of phosphoric acid and CBFS are handled here. This berth is also having excessive occupancy rate and resulting in large pre berthing detention.

### 3.5.7 BERTHS 6 & 7 (FINGER JETTY)

The performance of Berths 6 & 7 for the past 3 years is presented in the following tables.

**PERFORMANCE OF BERTH 6**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| | **CHEMICALS** | **3,73,491** | 39 | 53 | **4,70,082** | 62 | 75 | **3,78,708** | 54 | 69 |
| 1 | Benzene - Export | 0 | 0 | 0 | 0 | 0 | 0 | 6,944 | 3 | 2 |
| 2 | Bitumen I & E | 8,080 | 2 | 4 | 53,405 | 14 | 20 | 40,037 | 11 | 16 |
| 3 | Butene | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Phosphoric Acid | 1,53,358 | 14 | 20 | 1,63,876 | 16 | 18 | 1,42,026 | 15 | 21 |
| 5 | Acetic Acid | 14,532 | 6 | 6 | 32,879 | 12 | 8 | 27,704 | 8 | 4 |
| 6 | MEG | 36,908 | 6 | 9 | 58,971 | 9 | 12 | 68,843 | 11 | 15 |
| 7 | CBFS | 1,55,111 | 10 | 10 | 1,50,423 | 9 | 14 | 87,154 | 5 | 10 |
| 8 | C.T.Pitch | 5,502 | 1 | 4 | 10,528 | 2 | 3 | 0 | 0 | 0 |
| 9 | M Alchocol | 0 | 0 | 0 | 0 | 0 | 0 | 6,000 | 1 | 1 |
| | **EDIBLE OILS** | 6,07,347 | 81 | 185 | 7,67,891 | 75 | 206 | 7,29,192 | 102 | 133 |
| | **GRAND TOTAL** | **9,80,838** | 120 | **238** | **12,37,973** | **137** | **281** | **11,07,900** | 156 | **202** |
| **BERTH OCCUPANCY FOR LIQUID CARGO VESSELS** | | | **238 Days - 65 %** | | | **281 Days - 77 %** | | | **202 Days - 55 %** | |
| **BERTH OCCUPANCY OVERALL** | | | **299 Days - 82 %** | | | **289 Days - 79 %** | | | **293 Days - 80 %** | |
| **PREBERTHING DETENTION IN DAYS FOR LIQUID CARGO ONLY** | | | | | | | **224** | | | **256** |

**PERFORMANCE OF BERTH 7**

| Sl. No. | Commodity | 2011-12 | | | 2012-13 | | | 2013-14 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days | Volume | No. of ships | Berth days |
| | **CHEMICALS** | **3,96,862** | 48 | 65 | **2,41,083** | 28 | 36 | **4,14,807** | 57 | 74 |
| 1 | Bitumen I & E | 24,443 | 6 | 9 | 4,115 | 1 | 1 | 45,768 | 14 | 22 |
| 2 | Butene | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | Phosphoric Acid | 1,84,342 | 17 | 27 | 93,079 | 8 | 13 | 1,78,941 | 17 | 23 |
| 4 | Acetic Acid | 17,859 | 7 | 4 | 17,565 | 7 | 3 | 28,251 | 9 | 6 |
| 5 | MEG | 38,310 | 8 | 9 | 39,479 | 6 | 9 | 64,447 | 10 | 13 |
| 6 | CBFS | 1,18,322 | 8 | 13 | 83,846 | 5 | 9 | 91,339 | 6 | 9 |
| 7 | C.T.Pitch | 13,586 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | L.C.Soda | 0 | 0 | 0 | 2,999 | 1 | 1 | 0 | 0 | 0 |
| 9 | M. Alchohol | 0 | 0 | 0 | 0 | 0 | 0 | 6,061 | 1 | 1 |
| | **EDIBLE OILS** | 42,989 | 6 | 15 | 1,28,078 | 18 | 35 | 2,24,253 | 32 | 64 |
| | **GRAND TOTAL** | **4,39,851** | 54 | **80** | **3,69,161** | **46** | **71** | **6,39,060** | 89 | **138** |
| **BERTH OCCUPANCY FOR LIQUID CARGO VESSELS** | | | **80 Days - 22 %** | | | **71 Days - 19 %** | | | **138 Days - 38 %** | |
| **BERTH OCCUPANCY OVERALL** | | | **260 Days - 71 %** | | | **282 Days - 77 %** | | | **267 Days - 73 %** | |
| **PREBERTHING DETENTION IN DAYS FOR LIQUID CARGO ONLY** | | | | | | | **43** | | | **118** |

The finger jetty accommodates berths 6 & 7 on either side. These berths handle dry bulk such as coal, coke, ore and gypsum. The liquid cargo includes mainly phosphoric acid, CBFS, bitumen, acetic acid, MEG and edible oil. In both these berths the berth occupancy level is high resulting in large pre berthing detention.

## SECTION 4

## TRAFFIC FORECAST

4.1 The liquid bulk traffic handled at Haldia Dock Complex during the past five years is furnished hereunder. For the purpose of this study, edible oil traffic is not being taken for consideration.

**LIQUID BULK TRAFFIC IN HDC**
*(in million metric tons)*

| | | 2016-17 | 2015 - 16 | 2014 - 15 | 2013-14 | 2012-13 | CAGR |
|---|---|---|---|---|---|---|---|
| | | | | | | | % |
| 1 | CRUDE OIL | 0.54 | 0.45 | 0.50 | 0.79 | 0.54 | 0 |
| 2 | POL PRODUCTS | 4.22 | 4.62 | 3.11 | 3.75 | 4.25 | - 0.18 |
| 3 | LPG | 2.02 | 2.01 | 1.91 | 1.53 | 1.40 | 9.6 |
| 4 | CHEMICALS | 2.15 | 2.03 | 1.94 | 1.83 | 1.59 | 7.8 |
| 5 | EDIBLE OIL | 2.20 | 2.41 | 1.96 | 1.55 | 1.54 | 9.3 |
| | TOTAL | 11.13 | 11.52 | 9.42 | 9.45 | **9.32** | 4.5 |

Based on the data collected from HDC as well as from some of the users during the interaction of the IPA study team, the possible traffic during the foreseeable future is presented hereunder.

### 4.2 CRUDE OIL

IOCL was earlier handling crude oil for their refineries at Haldia and Barauni from HDC. This was handled at HOJ II and HOJ III with IOCL through marine unloading arms installed on the jetties. With the shifting of crude oil traffic to Paradip SBM terminal, the traffic at HDC has become negligible. IOCL is handling, on an average, about 0.60 MTPA of crude oil through HDC. It is expected that this will continue. Additional crude oil requirements due to planned expansion of these two refineries will also be handled through Paradip and IOC have installed 3 SBMs there. Hence there is not likely to be any increased crude traffic at HDC by IOCL.

In recent times, BPCL, who are operating the Numaligarh refinery in Assam, have announced their plans to increase the refinery capacity from the present 3

MTPA to 9 MTPA. The crude oil for the present 3 MTPA capacity is met through on land oil fields in Assam. With the expansion, they have to import 6 MTPA of crude through marine facilities. According to media reports, BPCL have signed a MOU with Dhamra Port for handling this crude import. They have plans to connect Dhamra port to the Numaligarh refinery through a 1400 km long cross country pipeline. In this connection, HDC/KoPT have suggested their option to handle this crude traffic through a FSO at Sandheads for which a DFR has already been prepared. The consultants who prepared the DFR had interacted with the Numaligarh refinery team during their study. Such an option will have its own logistical advantage in reducing the length of cross country pipeline and associated costs. Moreover, while Dhamra Port will be able to handle only suezmax tankers, the FSO at Sandheads will be able to handle VLCCs. If this option is preferred by BPCL, HDC will be required to handle this 6 MTPA traffic of crude oil brought to HDC through shuttle tankers operating between HDC and FSO.

Accordingly the expected crude oil traffic is likely to be

| | |
|---|---|
| IOCL | 0.60 MTPA |
| BPCL | 6.00 MTPA |
| **Total** | **6.60 MTPA** |

## 4.3 LIQUEFIED PETROLEUM GAS (LPG)

Presently, IPPL (a joint venture of IOCL and Petronas) is importing about 1.5 MTPA of LPG through HDC. This is likely to continue in future also.

During the interaction with IPA team during January, 2015, BPCL indicated that they have plans to import LPG through HDC and for which they plan to construct 2 x 15,000 T refrigerated tanks. The traffic (Propane & Butane) will be initially 1.0 MTPA which may increase to 1.5 MTPA at a later date. It is to be noted that in response to HDC's EOI for using the surplus capacity of HOJ III, BPCL have been selected and the agreement between BPCL and HDC is in progress.

According to the information furnished by BPCL in their tender for survey work, (during February, 2015) the terminal will be located on a vacant plot behind HPCL marketing terminal about 9 kms from HOJ III. This plot is on either side of HPCL link road. The 30 acre plot on the southern side will accommodate the tankage and the bottling plant while the 25 acre plot on the northern side will be used for parking road tankers. The railway track is passing about 1 km at the southern side of the proposed site and at the western side, National Highway is passing at a distance of about 800 m. HPCL boundary is located at a distance of

about 700 m. It is proposed to link this terminal with HOJ III through twin insulated pipelines.

In addition to IPPL & BPCL, Aegis Logistics also plan to import LPG at HDC. As per the information shared during the interaction with IPA team, they plan to import about 1.0 MTPA of LPG for which they will be constructing 2 x 15,000 T refrigerated tanks. The LPG terminal will be located behind Shaw Wallace plot which is about 12 km from the port facilities. The terminal will be connected to the jetties though twin insulated pipelines. This terminal is likely to be commissioned within the next two years. The present status is that the required land has been acquired and its filling is in progress.

When these two facilities are commissioned and additional 2 MTPA of LPG are imported, it is expected that the present volume of 1.91 million tonnes of IPPL will get reduced and stabilise at 1.5 MTPA.

Based on these, the likely future traffic in LPG will be

| | **2014-15** | **2019-20** | **2024-25** |
|---|---|---|---|
| IPPL | 1.91 MTPA | 1.50 MTPA | 1.50 MTPA |
| BPCL | 0.00 MTPA | 1.00 MTPA | 1.50 MTPA |
| Aegis Logistics | 0.00 MTPA | 1.00 MTPA | 1.00 MTPA |
| **Total** | **1.91 MTPA** | **3.50 MTPA** | **4.50 MTPA** |

## 4.4 POL PRODUCTS

POL products handled at HDC include HSD; MS; SKO; FO; Naphtha; ATF; Lube and Bitumen. Of these, IOCL exports its surplus products from its Haldia Refinery which include all these items. IOCL also imports HSD; MS; SKO for marketing purposes to balance the shortfall. HPCL and BPCL imports HSD; MS; SKO; FO for purely marketing purposes. In addition to all these, HPL imports Naphtha as raw material for its petrochemical plant. It is understood that IMC is also handling MS for HPL and HSD for Essar Oil. Reliance have facilities for handling HSD and MS for marketing purposes. The operations, which were suspended for some years, are expected to be resumed shortly.

According to the information furnished during IPA team interaction as well as data collected from the port, the following is the traffic pattern of the oil majors.

| | | |
|---|---|---|
| IOCL | MS : | Loading 178.000 KL & Unloading 18,000 KL |
| | HSD: | Loading 326,000 KL & Unloading 18,000 KL |
| | SKO: | Loading 13,500 KL & Unloading 356,500 KL |

| | | | |
|---|---|---|---|
| | Naphtha: | Loading | 76,000 KL |
| | ATF: | Loading | 75,000 KL |
| | FO: | Loading | 152,000 KL |
| | Lube: | Loading | 32,000 KL |
| | Bitumen | Loading | 60,000 KL |
| BPCL | MS: | | 78,500 Tonnes |
| | HSD: | | 240,000 Tonnes |
| | SKO: | | 5,000 Tonnes |
| | FO: | | 92,000 Tonnes |
| HPCL | MS: | | 40,000 Tonnes |
| | HSD: | | 50,000 Tonnes |
| | SKO: | | 30,000 Tonnes |
| | FO: | | 75,000 Tonnes |
| HPL | Naphtha | | 1,440,000 Tonnes |
| | MS | | 150,000 Tonnes |

If the Naphtha traffic of HPL is taken out and considering that Reliance are yet to resume their operations, the POL product traffic has been more or less stagnant at about 3.3 MTPA for the past two years.

It is to be noted that HPL was having problems and running at less than installed capacity during the past few years. It is understood that TCG is likely to take over the plant completely and run it at optimum capacity. Hence it is hoped that the import of Naphtha by HPL will increase substantially soon.

In conclusion it is presumed that the POL product traffic which is at about 3.3 MTPA will not change dramatically in future. It is understood from Reliance that they plan to resume their marketing operations from July 2015. They are reviving their retail outlets and this is likely to take about 4 months. During the initial periods their volumes are likely to be in the range of 0.3 to 0.5 MTPA. They are hopeful of getting back to their earlier status when they were handling almost 17% of the eastern demands. At that time they expect to handle 4 parcels each of 25,000 KL every month. This is equivalent to almost 1.00 MTPA.

Taking all these into consideration, the future POL traffic is likely to be as follows:

| | |
|---|---|
| 2014 – 15 | 3.11 MTPA |
| 2019 – 20 | 4.00 MTPA |
| 2024 – 25 | 5.00 MTPA |

### *4.5 CHEMICALS*

As regards Chemicals traffic, the major users of port facilities are Mitsubishi Chemical Corporation (PTA) Ltd.; Haldia Petrochemicals Ltd., Tata Chemicals, Dhunseri Petrochem & Tea Limited, IMC and Aegis Logistics. The traffic of various chemicals through these agencies are indicated hereunder:

| | | |
|---|---|---|
| HPL : | PY Gas | 280,000 Tonnes |
| | Benzene | 300,000 Tonnes |
| | Butadiene | 200,000 Tonnes |
| | Butene -1 | 30,000 Tonnes |
| | Styrene Monomer | 12,000 Tonnes |
| MCC | Paraxylene | 1,000,000 Tonnes |
| | Acetic Acid | 60,000 Tonnes |
| Tata Chemical | Phosphoric Acid | 350,000 Tonnes |
| | Ammonia | 120,000 Tonnes |
| Dhunseri | MEG | 150,000 Tonnes |
| IMC & Aegis | CBFS | 2,50,000 Tonnes |

In addition, some small quantities of Pitch and L. Caustic soda are also handled sometimes.

Taking all these into consideration, the future Chemicals traffic is likely to be as follows:

| | |
|---|---|
| 2014 – 15 | 1.49 MTPA |
| 2019 – 20 | 2.00 MTPA |
| 2024 – 25 | 2.75 MTPA |

### 4.6 LIQUIFIED NATURAL GAS (LNG)

IWAI is setting up Multimodal Terminal at Haldia for handling cargo to and from barges. The barges will transport the cargo between Haldia through the National Waterways to Bihar, UP etc. as well as to the north east, Bangladesh (by protocol route). These barges as per the initiatives taken by the Govt. of India will use LNG as fuel for the barges. This will create a substantial demand for LNG at Haldia. The LNG may also be used by the transport sector as well as the industries located in the hinterland of Haldia. The LNG demand at Haldia may go upto 1 million ton subject to providing the required handling facilities at HDC.

## 4.7 SUMMARY

Summing up, the expected future traffic in liquid bulk (excluding edible oils) will be as given hereunder:

| | **2014-15** | **2019-20** | **2024-25** |
|---|---|---|---|
| Crude Oil | 0.50 MTPA | 6.60 MTPA | 6.60 MTPA |
| LPG | 1.91 MTPA | 3.50 MTPA | 4.50 MTPA |
| POL Products | 3.11 MTPA | 4.00 MTPA | 5.00 MTPA |
| Chemicals | 1.49 MTPA | 2.00 MTPA | 2.75 MTPA |
| LNG | -- | 0.5 MTPA | 1.00 MTPA |
| **Total** | **7.01 MTPA** | **16.60 MTPA** | **19.85 MTPA** |

# SECTION 5
# FACILITY PLANNING

## 5.1 FUTURE TRAFFIC

The expected future traffic in liquid bulk (excluding edible oils) as established the earlier section is as follows:

| | 2014-15 | 2019-20 | 2024-25 |
|---|---|---|---|
| Crude Oil | 0.50 MTPA | 6.60 MTPA | 6.60 MTPA |
| LPG | 1.91 MTPA | 3.50 MTPA | 4.50 MTPA |
| POL Products | 3.11 MTPA | 4.00 MTPA | 5.00 MTPA |
| Chemicals | 1.49 MTPA | 2.00 MTPA | 2.75 MTPA |
| **LNG** | -- | 0.5 MTPA | 1.00 MTPA |
| **Total** | **7.01 MTPA** | **16.60 MTPA** | **19.85 MTPA** |

If we consider the projected crude oil traffic, it is assumed that HDC should be prepared to handle 6 MTPA of crude oil for the BPCL Numaligarh refinery consequent to its proposed expansion. Based on the FSO scheme considered by the port, shuttle tankers with 25,000 Te parcel are to be handled at the jetties. This requires an exclusive jetty to handle these shuttle tankers. This traffic is at the moment only speculative since BPCL is looking at other options also such as Dhamra port. Hence it is recommended that this exclusive berth could be taken up as an when this proposal gets a concrete shape.

Hence for planning purposes in this section, this crude oil volume is excluded. The capacity of the existing facilities to handle this projected traffic will be examined and the need for additional facilities will be established.

## 5.2 BERTH PRODUCTIVITY

The section on "Present Performance" has analysed in detail the performance of the tankers carrying various products as well as the berths handling these products. The various details such as ship size, parcel size, rate of discharge etc. have been indicated. However, as a broad indicator for the productivity of berths for each category of products, the following table is used.

PRODUCTIVITY OF BERTHS

| Sl. | Commodity | 2013- | | | 2012- | | | 2011- | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Volume | Berth | Tonnes per | Volume | Berth | Tonnes per | Volume | Berth | Tonnes per |
| 1 | Crude | 0.7 | 28 | **28,26** | 0.5 | 16 | **33,75** | 2.1 | 69 | **31,32** |
| 2 | POL (Products) I & | 3.5 | 36 | **9,67** | 4.0 | 39 | **10,07** | 4.2 | 38 | **11,06** |
| 3 | L.P.G. | 1.5 | 15 | **10.06** | 1.4 | 13 | **10,07** | 1.3 | 13 | **10.00** |
| 4 | CHEMICALS | 1.8 | 31 | **5,75** | 1.5 | 28 | **5,50** | 1.4 | 25 | **5,75** |

This table uses the berth days from the Annexure 9 of the Administrative Reports. For planning purposes, this will serve the purpose. It could be seen that the productivity in terms of tonnes handled per berth day has remained more or less at the same level over the years. Based on this, the following productivity norms are considered for the requirement of berths for handling the projected traffic.

Crude oil : 31,000 Tonnes per berth day

POL products : 10,000 Tonnes per berth day

LPG: 10,000 Tonnes per berth day

Chemicals: 5,700 Tonnes per berth day

## 5.3 REQUREMENT OF BERTHS

Based on the berth productivity as above, the performance of the existing berths are examined and the need for additional berths is established hereunder. Presently, there are only three exclusive oil jetties. The Dock basin berths 2,3,5,6 & 7 which handle chemicals and some POL products provide combined berth days equivalent to ¾ of an exclusive berth. Hence for this analysis, it is assumed that there are 3.75 berths available.

| Sl.No. | Products | 2014 -15 | | | 2019 -20 | | | 2024 -25 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Traffic Volume | Productivity in TPD | Required Berth days | Traffic Volume | Productivity in TPD | Required Berth days | Traffic Volume | Productivity in TPD | Required Berth days |
| 1 | Crude Oil | 5,00,000 | 31,000 | 16 | 6,00,000 | 31,000 | 19 | 6,00,000 | 31,000 | 19 |
| 2 | POL Products | 31,10,000 | 10,000 | 311 | 40,00,000 | 10,000 | 400 | 50,00,000 | 10,000 | 500 |
| 3 | LPG | 19,10,000 | 10,000 | 191 | 35,00,000 | 10,000 | 350 | 45,00,000 | 10,000 | 450 |
| 4 | Chemicals | 19,40,000 | 5,700 | 340 | 20,00,000 | 5,700 | 351 | 24,00,000 | 5,700 | 421 |
| | Total | | | 858 | | | 1,120 | | | 1,390 |
| | Berth occupancy of each berth assuming 3.75 berths | | | 229 | | | 299 | | | 371 |
| | Occupancy of each berth as perentage | | | 63% | | | 82% | | | 102% |
| | Number of berths required each with 70% occupancy. | | | 3.36 | | | 4.38 | | | 5.44 |

It could be seen that if the present situation continues, by 2019-20, all the berths handling liquid bulk will be operating at 82% occupancy which is very high. This will result in high pre-berthing detention. By 2024-25, the situation will worsen leading to an occupancy rate of 102%.

If 70% berth occupancy as prescribed by TAMP is adopted, it could be seen that by 2019-20 another berth is required and this may have to augmented by yet another one by 2024-25.

Hence it is concluded that one additional berth is to be constructed immediately.

## 5.4 LOCATION FOR NEW BERTH & ALLOCATION OF CARGO

The port has already initiated action for developing Haldia Dock II at Shalukkhali to take advantage of marginal increase in draft. Haldia Dock II North berths have already been awarded under PPP mode. There is provision of two more berths at Shalukkhali and it is recommended that the new oil jetty be located there.

The increase in the projected traffic in POL products, LPG and Chemicals are due to the following:

- Reliance resuming their marketing activities in MS and HSD
- BPCL proposing to handle 1.5 MTPA of LPG
- Aegis Logistic proposing to handle 1.0 MTPA of LPG
- MCC hoping to maximise its production

Reliance have installed topside facilties and pipelines from HOJ III for their requirement. Hence, when they resume their activities from July, 2015, the

products will be handled at HOJ III. They have indicated that they would gradually reach their earlier peak traffic of 1.0 MTPA.

BPCL have been selected by HDC for operating HOJ III to utilise its spare capacity. BPCL propose to handle their LPG from this berth. They plan to start with 1.0 MTPA which will be gradully enhanced to 1.50 MTPA.

HPL are presently handling their Naptha imports through HOJ III. With their renewed operations, the Naptha volumes are set to increase.

When all these materialise, HOJ III, whose capacity is under utilised, will get saturated.

With these developments, the existing berths will not be able to handle the additional LPG traffic of Aegis. As of date, Aegis have indicated that their terminal will be connected to all the three jetties HOJ I; HOJ II and HOJ III and have sought HDC permission for laying the pipelines. Their scheduled commissioning date is mid 2017. In such a case, as explained earlier, the oil berths will be extremely overloaded and consequently all the tankers will be subjected to unacceptable levels of pre-berthing detention.

Considering all these, it is recommended that the new jetty at Shalukkhali can handle the LPG traffic of Aegis Logistics and the Para-xylene traffic of MCC. These two agencies stand to benefit as the distance from this jetty to their respective terminals will be nearer than from the existing jetties. In the case of MCC, the distance will come down to 5 km as against the present 13 km. In the case of Aegis, whose LPG terminal is supposed to be near Shaw Wallace unit, the distance may be almost equal or even less.

The relative locations of the new jetty and the terminals of MCC and Aegis LPG terminal are shown in the following figures.


## 5.5 REVISION OF TRAFFIC PROFILE:

IPA submitted the feasibility report for setting up a POL jetty at Haldia Dock II, Shalukkhali in July, 2015 on the basis of a projected traffic of 2 MTPA comprising

1 MTPA of LPG (through Aegis Logistics) and 1 MTPA of Paraxylene (through MCC PTA). HDC communicated that management had decided to take the confirmation of both M/s Aegis Logistics and M/s MCC PTA that each would provide 1MTPA of products. It appeared that while M/s MCC PTA were willing to the MGT of about 1 MTPA, M/s Aegis Logistics were not in a position to give such a commitment. In view of these developments, HDC requested IPA to revised the Feasibility report considering the handling of chemicals and other liquids at the proposed jetty. Accordingly, the traffic has been reviewed at it was assessed that the following traffic could be handled at the proposed berths considering the present cargo of MCC handled at oil jetties would be diverted to proposed facility in view of the distance advance and additional cargo of chemical which is showing growth potential as per the indication of the users.

| | **2014-15** | **2019-20** | **2024-25** |
|---|---|---|---|
| Chemicals & other liquids. | 1.49 MTPA | 2.00 MTPA | 2.75 MTPA |
| Less : Present handing | 0.79 MTPA | 0.79 MTPA | 0.79 MTPA |
| **Anticipated cargo at the proposed berth** | **0.70 MPTA** | **1.21 MTPA** | **1.96 MPTA** |

## 5.6 OPTIMUM CAPACITY OF THE BERTH

It has been observed earlier in this section that the average handling rate for chemicals is 5,700 tonnes per day.

Following TAMP Guidelines; the optimal capacity of the terminal is calculated using the following formula:

**Optimal capacity**

$$= 0.7 \frac{S1}{100} X P1 + \frac{S2}{100} X P2 + \frac{S3}{100} X P3 + \ldots X 365$$

S1 - Percentage share of capacity of Cargo type 1
P1 - Handling rate of the vessel carrying Cargo type 1
S2 - Percentage share of capacity of Cargo type 2
P2 - Handling rate of the vessel carrying Cargo type 2
S3 - Percentage of share of capacity of Cargo type 3
P3 - Handling rate of the vessel carrying Cargo type 3

Considering the rate of handling of 5,700 for chemical and other liquids, the optimum capacity of the new berth

365 x 0.7 x (100% x 5700) ≈ **1.47 MTPA**

## 5.7 PERFORMANCE OF NEW BERTH

If these handling rates are incorporated in TAMP Guidelines i.e. 7200 tonnes per day, the optimum capacity of this berth gets enhanced to 1.84 MTPA.

The detailed calculations are given under.

**Optimal capacity**

$$= 0.7 \frac{S1}{100} X P1 + \frac{S2}{100} X P2 + \frac{S3}{100} X P3 + \ldots X 365$$

S1 - Percentage share of capacity of Cargo type 1
P1 - Handling rate of the vessel carrying Cargo type 1
S2 - Percentage share of capacity of Cargo type 2
P2 - Handling rate of the vessel carrying Cargo type 2
S3 - Percentage of share of capacity of Cargo type 3
P3 - Handling rate of the vessel carrying Cargo type 3

According to this formula, the optimum capacity of the new berth

365 x 0.7 x (100% x 7200) ≈ **1.84 MTPA**

The Tariff Authority for Major Ports while approving the tariff has considered following cargo profile and cargo handling rates:-

| Sl. No. | Type of cargo | Handling rates per Tonnes per Hour |
|---|---|---|
| 1 | Paraxzylene | 440 |
| 2 | Edible Oil & Chemicals | 300 |
| 3 | POL Products (Class-A, B & C) | 600 |
| 4 | LPG and LNG | 250 |

Based on above, the revised optimum capacity of the proposed liquid cargo Jetty is calculated as under:

= 365 x 0.7 x (25% x 440+ 25% x 600 + 25% x 300 + 25% x 250) x24 ≈ **2.43 MTPA**

**Hence the ultimate traffic by 2024-25 is restricted to revised capacity of the proposed facility i.e. 2.43 MTPA.**

**SECTION 6**

**PLANNING PARAMETERS**

## 6.1 SITING OF THE BERTH

HDC has proposed new berthing facilities at the deep water pocket north of Haldia Docks and south of Diamond Harbour in the Rangafalla channel. This is called Haldia Dock II at Shalukkhali.

The river, however, moves along a curved path at this site. The 9m contour is at about 1.2 km away from the HTL on the western bank. The Kolkata navigational channel, which is 300 m wide, passes close to the eastern bank of the river. The detailed soundings in the area around Haldia Dock II are presented in the figure 6.1 given hereunder.

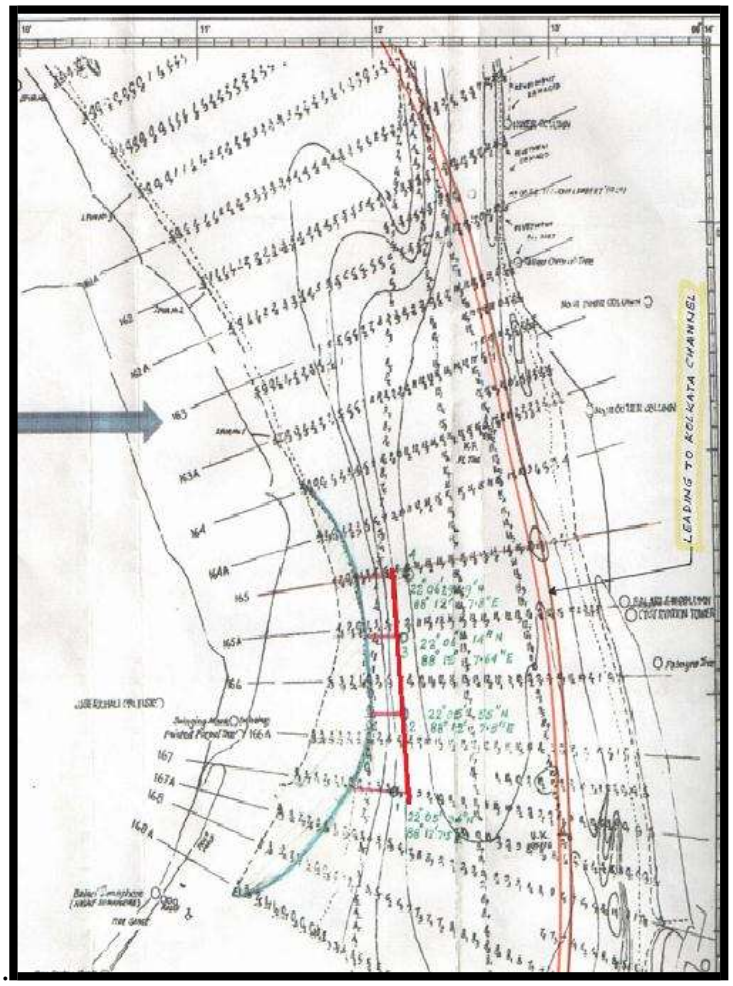



**FIGURE 6.1: LOCATION OF HALDIA DOCK II**

The approach to Haldia Dock II is marked in figure 6.2 given hereunder. The vessels follow the Kolkata channel through Rangafalla channel leading to Diamond Harbour.

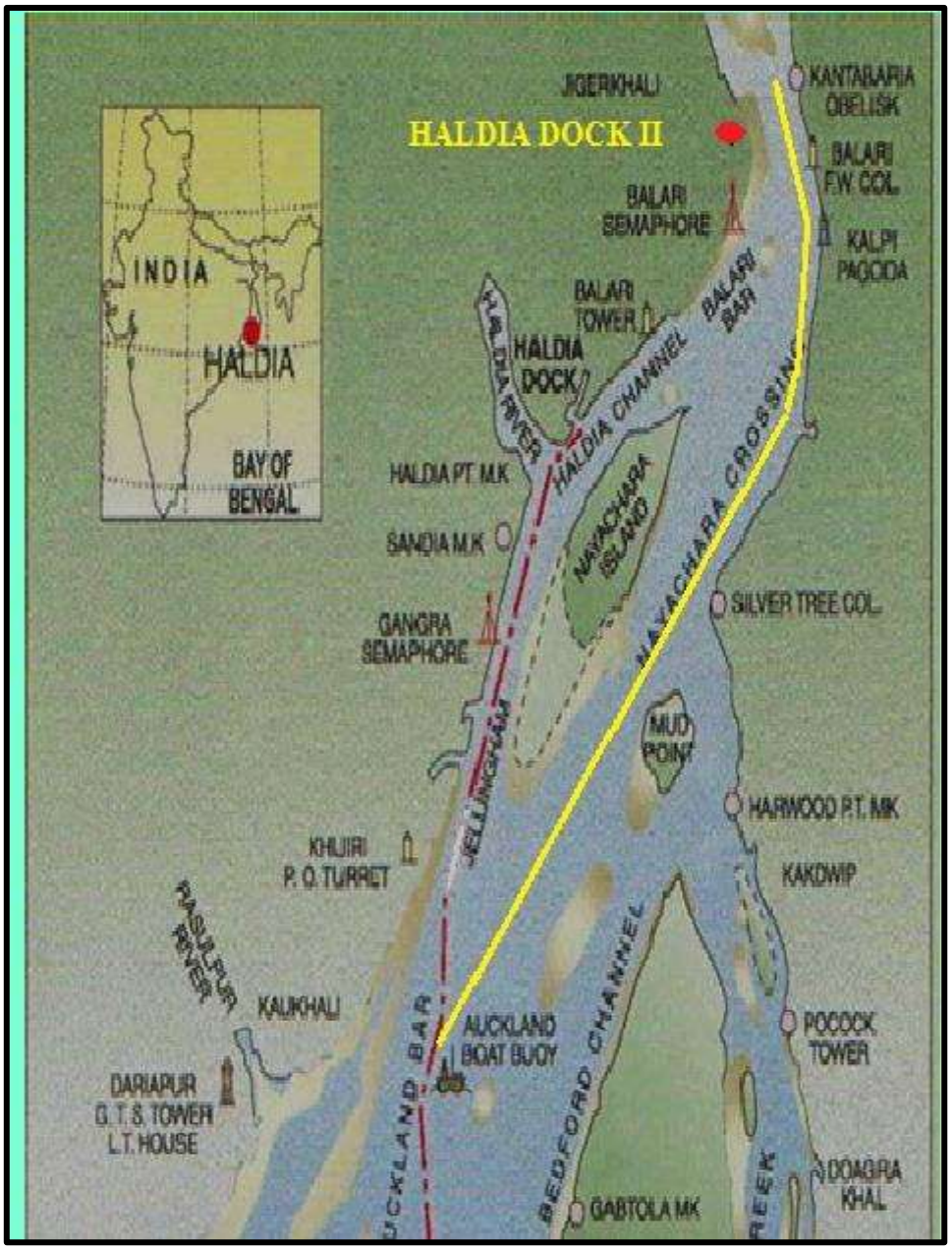



**FIGURE 6.2 : NAVIGATIONAL APPROACH TO HALDIA DOCK II**

According to the Marine Department of HDC, vessels for Haldia Dock II would come through the same shipping channel for Kolkata Dock System via Rangafalla. The channel is suitable to handle both KDS and Haldia Dock II vessels in the same tide. There would be no difficulty for outward bound or inward bound ships to and fro Haldia Dock II along with Kolkata Dock System vessels using the same channel.

For siting the berths along the river, mathematical model studies were carried out at Central Water Power and Research Station (CWPRS), Pune. According to CWPRS, the selected location of the jetties lies close to the Jigerkhali flat on the right bank of the Hughli river and is on the concave side of the bend in the river, opposite to Kulpi. Out of the five jetty locations studied in the model, the 4th jetty location was found to be unsuitable. Hence, it has been rejected. The other four jetties are possible. Based on the results of the mathematical model studies, the location of the jetties are given in the following Table.

| Name of Jetty | Centeline of Jetty Face | | Alignment of jetty face |
|---|---|---|---|
| | Latitude | Longitude | |
| Jetty No. 1 | $22^0$ 06' 33" N | $88^0$ 12' 09" E | 347.33 N |
| Jetty No. 2 | $22^0$ 06' 24" N | $88^0$ 12' 12" E | 348.94 N |
| Jetty No. 3 | $22^0$ 06' 15" N | $88^0$ 12' 12" E | 350.93 N |
| Jetty No. 4 | $22^0$ 05' 58" N | $88^0$ 12' 15" E | 318.67 N |

The location of the four jetties marked in the satellite picture with the respective length of approach from the high grounds are presented in the Figure 5.4.

Of these four jetties, HDC has awarded the two jetties No. 1 & 2 to a consortium under Haldia Dock II (north) project. Even though the other two jetties were also concurrently tendered out, there were no takers. In view of this situation, it is now recommended that the southernmost jetty No. 4 may be converted as a liquid bulk jetty. This jetty is farther away from the other three jetties and this may make it a bit isolated for handling hazardous liquid cargo.

## 6.2 CARGO PROFILE

The Tariff Authority for Major Ports while approving the tariff has estimated the capacity and cargo profile of the proposed liquid cargo jetty at Shalukkhali as follows:-

| **Sl. No.** | **Type of cargo** | **Estimated quantity in million metric ton per annum** |
|---|---|---|
| 1 | Parazylene | 0.61 |
| 2 | Edible Oil & Chemicals | 0.61 |
| 3 | POL Products (Class-A, B & C) | 0.61 |
| 4 | LPG and LNG | 0.60 |
| | **Total** | **2.43** |

The actual handling of the above commodities may however, vary both upward and downward depending upon the market situation prevailing at the relevant point of time.

As per the demand analysis, the chemicals would comprise PY Gas, Benzene, Butadiene, Butene-1, Styrene Monomer, Acetic Acid, Phosphoric Acid, Ammonia, MEG and CBFS

## 6.3 DESIGN SHIP SIZE

For selecting the design ship size for the new jetty which is expected to handle chemical and other liquid cargo, it is proposed to examine the size range of respective tankers calling at HDC for the past few years.

**Chemicals**

| Sl. No. | PARTICULARS | | 2013 - 14 | 2012 - 13 | 2010 - 11 |
|---|---|---|---|---|---|
| 1 | DEADWEIGHT TONNAGE | Maximum | 25,588 | 25,581 | 25,130 |
| | | Average | 14,592 | 13,924 | 12,227 |
| | | Minimum | 9,220 | 7,877 | 5,808 |
| 2 | LENGTH OVERALL IN M | Maximum | 178 | 178 | 170 |
| | | Average | 134 | 132 | 124 |
| | | Minimum | 118 | 108 | 100 |
| 3 | PARCEL SIZE IN TONNES | Maximum | 10,408 | 12,457 | 10,506 |
| | | Average | 8,079 | 7,134 | 5,130 |
| | | Minimum | 4,758 | 2,865 | 2,860 |

On review of the range of tankers calling at HDC as above, it is proposed to select the design size of the tanker as Chemical Tanker of size **30,000 DWT x 180 m LOA** as the maximum size. As the minimum size it is proposed to select a chemical tanker of 5500 DWT x 100 m LOA. These tankers will call at the jetty with the available draft in the river Hooghly.

## 6.4 JETTY CONFIGURATION

Considering the sizes of the largest and smallest tankers proposed, the configuration of HOJ I is proposed to be adopted for this new berth also.


**FIGURE 5.4 LOCATION OF JETTIES ALONG WITH APPROACH**

# SECTION 7

# SITE INFORMATION

## ENVIRONMENTAL DATA

### *Rainfall Data*

7.1 This region is mainly exposed to southwest monsoon from June to September and an average monthly rainfall of over 250mm is experienced (July and August are the wettest months having monthly rainfall as high as 400mm). During northwest monsoon from November to February, monthly average rainfall of less than 50mm is experienced. The average annual rainfall is around 1500mm and the average number of rainy days in a year with rainfall of 25mm or more is about 20.

### *Temperature*

7.2 At Haldia, there is a seasonal variation in the temperature. April and May are hotter month, whereas December and January are colder months. The highest temperature so far recorded is $44.9^0$ C during the month of May in 1975 and the lowest temperature is $6.9^0$ C recorded during the month of December 1975. Design range of effective temperature is ± $25^0$ C

### *Visibility*

7.3 It is learnt that visibility at Haldia is better compared to that at Kolkata, as the area is free from industrial smoke. At times due to heavy rainfall poor visibility is reported during the southwest monsoon. On an average, fog is reported on 5-7 days in each month from November to February during mornings.

### *Wind*

7.4 For the purpose of design of the berth, wind loads have been considered with the following wind velocities.

Basic wind speed = 50m/sec

Wind speed in operating condition = 24m/sec

***Earthquake***

7.5 Seismic loads are estimated according to modified clause for the interim measures for seismic provisions clause 222 of IRC:6-2000. Horizontal seismic forces to be resisted shall be computed as follows:

Feq = A n x (Dead Load ± Appropriate Live Load)
A n = {(Z / 2) x (Sa / g)} / (R / I)
Horizontal Seismic Co-efficient = 0.18
Z = Zone Factor = 0.24 (Table 5)
Sa / g = Average response acceleration coefficient = 2.50
R = Response Reduction Factor = 2.50
I = Importance Factor = 1.50

***Tidal Data***

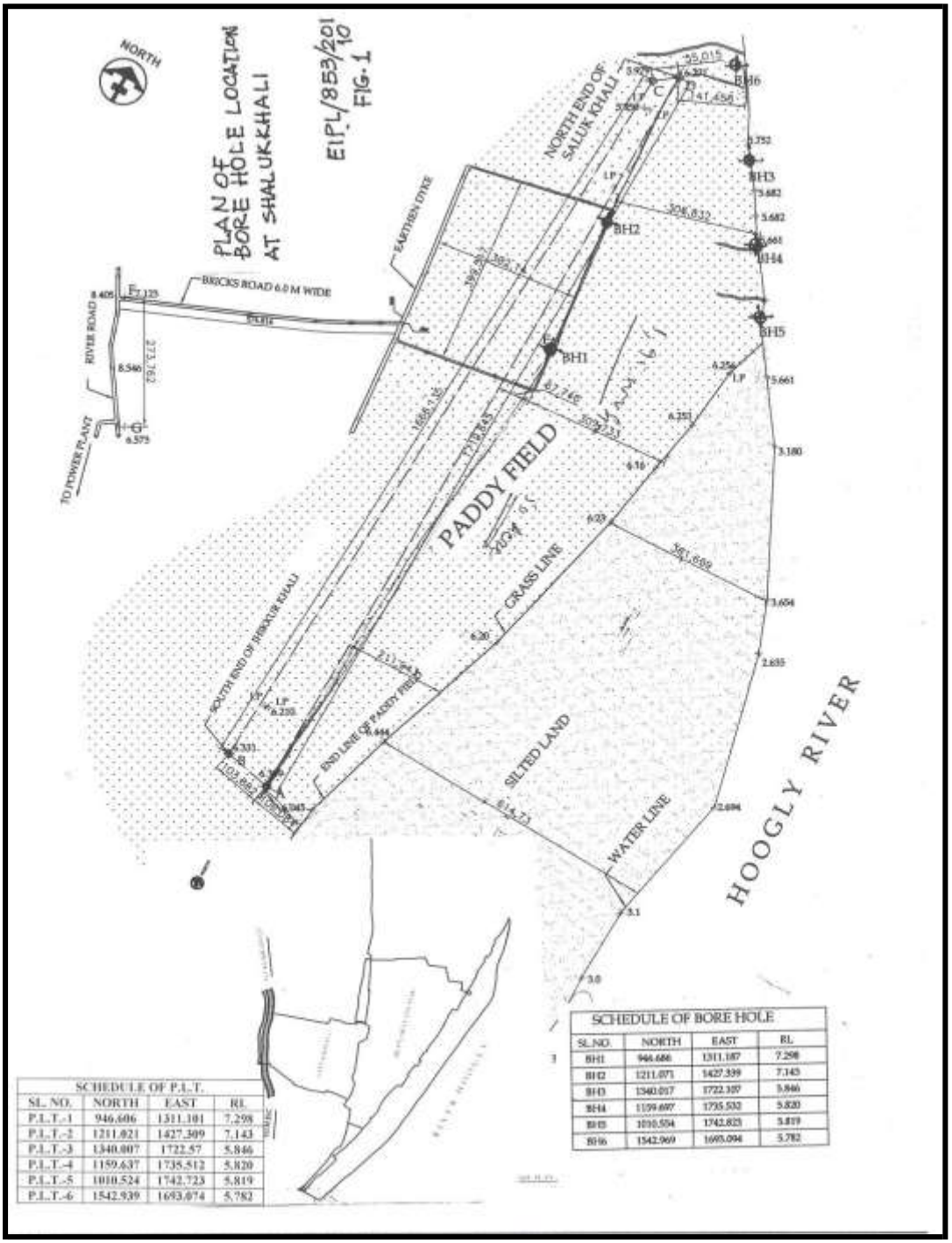
7.6 The tide levels of river Hugli at Haldia are as follows:

| | |
|---|---|
| Highest High Water (HHW) | **:** (+) 7.26 m CD |
| Mean High Water Spring (MHWS) | **:** (+) 5.70 m CD |
| Mean High Water (MHW) | **:** (+) 5.01 m CD |
| Mean High Water Neaps (MHWN) | **:** (+) 4.26 m CD |
| Local Mean Water Level (LMWL) | **:** (+) 3.23 m CD |
| Mean Low Water Neaps (MLWN) | **:** (+) 2.10 m CD |
| Mean Low Water (MLW) | **:** (+) 1.34 m CD |
| Mean Low Water Springs (MLWS) | **:** (+) 0.80 m CD |
| Lowest Low Water (LLW) | **:** (-) 0.07 m CD |

**GEO-TECHNICAL INFORMATION**

**Onshore**

7.7 Onshore geotechnical investigations and plate load tests were carried out at six locations as shown in the following figure.




**Soil Profile**

7.8 The sub-surface soil profile at Saluk Khali/ Rupnarayan Chak Area is entirely alluvial deposit, arising out of the river borne bed load material. The deposits in stratification of fine to medium sand with silt and mica have been formed by the receding river Ganges in recent times.

**Stratum-I**

7.9 This stratum is 6.0 M. to 4.2 M. Thick and consists of Greyish Brown Clayey Silt with Fine Sand and Mica. It has been classified as MI.

The range of SPT values in this Stratum is from 4 to 6.

The angle of internal friction, $Ø_{CD}$, from Consolidated Drained Triaxial Test, is Average $15^0$ with $C_{CD} = 0$.

The $d_{50}$ value from Grain Size Analysis is **0.011 MM.**

**Stratum-II**

7.10 This stratum extends upto average 20M depth i.e. its average thickness is 15 M. It consists of medium dense fine to medium size grey sand, classified as SM.

The range of SPT Values in this Stratum is from 8 to 34.

The angle of internal friction, $Ø_{CD}$, from Consolidated Drained Triaxial Test, $Ø_{CD}$, is average $23^0$ with $C_{CD} = 0$.

The $d_{50}$ value from Grain Size Analysis is **0.11 MM.**

**Stratum-III**

7.11 This stratum extends upto average 41.0 M depth i.e. its average thickness is 21.0 M. It consists of dense to very dense, fine to medium size greyish sand with silt and Mica. It has been classified as SM.

The range of SPT Values within this Stratum is from 31 to 59

The angle of internal friction $Ø_{CD}$, from Consolidated Drained Triaxial Test, is Average $31^0$ with $C_{CD} = 0$.

The $d_{50}$ Value from Grain Size Analysis is **0.13 MM.**

**Stratum-IV**

7.12 This stratum extends upto the termination depth of 50 M. in all the six bore holes, i.e. its average thickness is 9.0 M. It consists of very dense, medium size greyish sand with silt and Mica. It has been classified as SM.

The Range of SPT Values within this Stratum is from 52 to 79

The angle of internal friction, $Ø_{CD}$, from Consolidated Drained Triaxial Test, is Average $36^0$ with $C_{CD} = 0$,

The $d_{50}$ Value from Grain Size Analysis is **0.19 MM.**

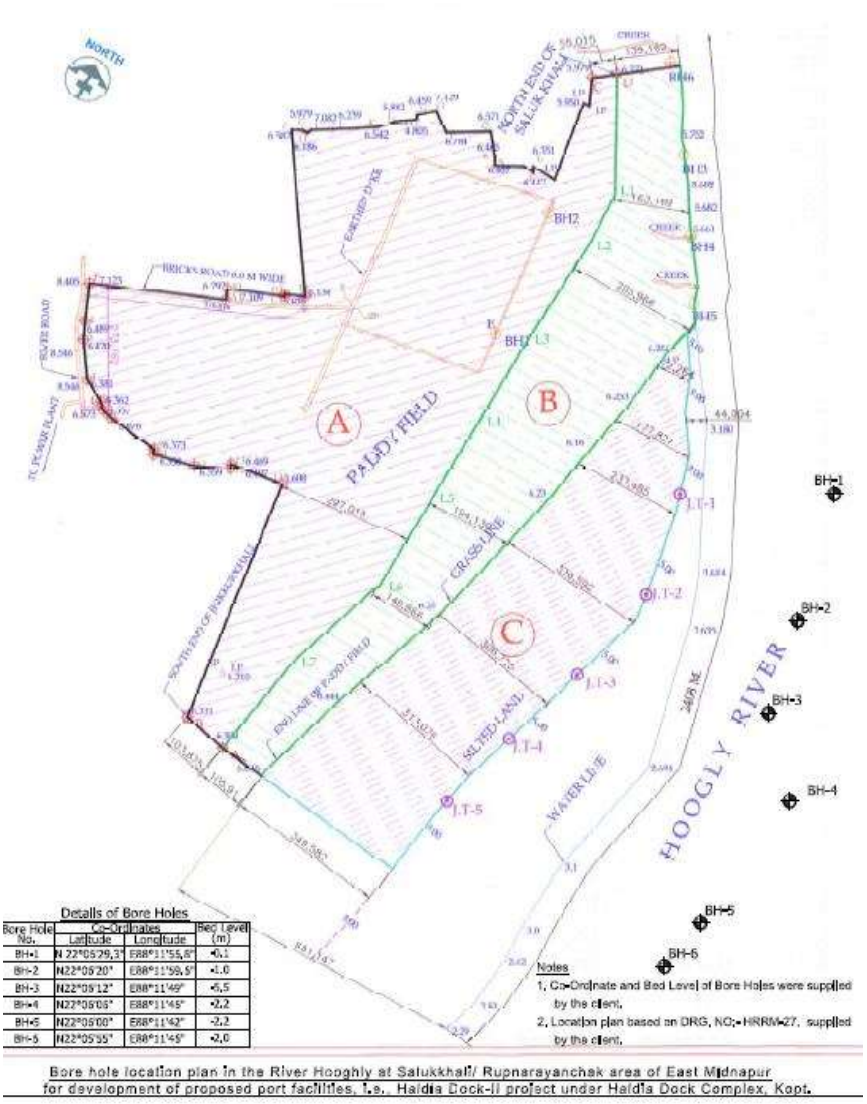
**Coefficient of Vertical Sub–Grade Reaction**

7.13 The coefficient of the vertical sub-grade reaction, KV, as obtained from the average of the Plate Load Test results, is;

**Kv = 1.674 Kg. / cm3**

**Marine**

7.14 The sub-soil formation in the river area has been investigated by sinking six bore holes upto a maximum depth of 60.15m below the existing bed level. The field investigation data and the results of laboratory test conducted on samples collected from the bore holes indicate the presence of different layers. The location of the boreholes are shown in the following figure.

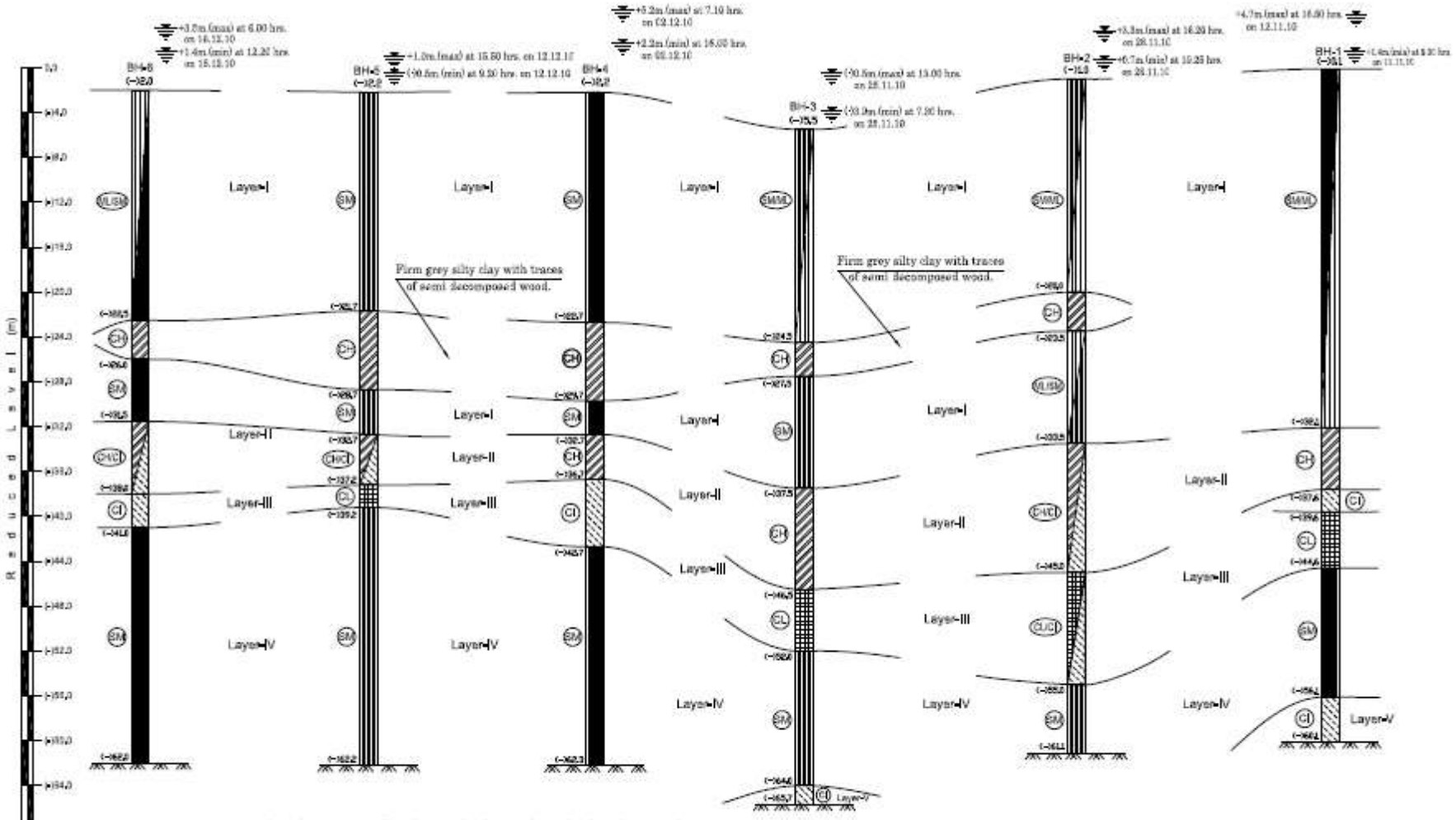


Bore hole location plan in the River Hooghly at Salukkhali/ Rupnarayanchak area of East Midnapur for development of proposed port facilities, i.e., Haldia Dock-II project under Haldia Dock Complex, Kopt.

The details of layers viz. layer no., description of layer and the thickness of each layer as encountered in the bore holes are furnished below.

| Layer No. | Description | Layer thickness (m) | | | | | |
|---|---|---|---|---|---|---|---|
| | | BH-1 | BH-2 | BH-3 | BH-4 | BH-5 | BH-6 |
| I | Loose / medium dense grey / yellowish grey silty fine sand / sandy silt with traces of mica | 32.00 | *32.50 | *32.00 | *30.50 | *30.50 | *29.50 |
| II | Stiff / very stiff grey silty clay with yellow / brown spots | 5.50 | 11.50 | 9.00 | 4.00 | 4.50 | 6.50 |
| III | Stiff / very stiff / hard bluish grey / grey silty clay with varying percentage of sand | 7.00 | 10.00 | 5.50 | 6.00 | 2.00 | 3.00 |
| IV | Medium dense / dense / very dense grey / yellowish grey / greyish yellow silty fine sand with traces of mica | 11.50 | 6.10 | 12.00 | 19.55 | 23.00 | 21.00 |
| V | Very stiff / hard bluish grey silty clay with yellow / brown spots | 4.00 | – | 1.65 | – | – | – |
| * 3.5m, 3.0m, 7.0m, 7.0m and 3.5m thick bands of firm grey silty clay with traces of semi-decomposed wood are found to be present within this layer in BH-2, BH-3, BH-4, BH-5 and BH-6 respectively as shown in the sub-soil profile. | | | | | | | |

The generalised soil profile is shown in the follwing figure.




Layer - I : Loose / medium dense grey / yellowish grey silty fine sand / sandy silt with traces of mica.
Layer - II : Stiff / very stiff grey silty clay with yellow / brown spots.
Layer - III : Stiff / very stiff / hard bluish grey / grey silty clay with varying percentage of sand.
Layer - IV : Medium dense / dense / very dense grey / yellowish grey / greyish yellow silty fine sand with traces of mica.
Layer - V : Very stiff / hard bluish grey silty clay with yellow / brown spots.

Generalised Soil Profile in the River Hooghly at Salukkhali / Rupnarayanchak area of East Midnapur for development of proposed port facilities, i.e., Haldia Dock-II project under Haldia Dock Complex, Kopt.

# SECTION 8

# PROJECT DESCRIPTION

## 8.1 GENERAL

The project involves the pre-project activities such as field investigations and surveys, planning and detailing design of terminal facilities, construction of jetty with accessories, installation of top side facilities such as marine unloading arms, flexible hoses, jetty-head pipe manifold with headers, jetty infrastructure such as fire fighting system, and pollution control. The approach road to the jetty from the nearest state roadway is also part of the project. The connecting pipelines from the jetty-head to the tankage at the terminal of the users are expected to be laid and maintained by the respective user agencies. Hence these have been excluded from the project scope.

## 8.2 BERTHING JETTY

Unlike dry bulk and break-bulk cargo which need a continuous wharf for ship/shore transfer, liquid bulk cargo need only a limited space where connections are made from the tanker manifold to the manifold on the jetty through flexible hoses or marine loading arms. Hence, a liquid bulk berth could be with isolated structures for berthing and mooring of tankers and a service platform where the handling facilities and utilities are provided. This would optimise the cost of construction of the berth.

The berth comprising isolated dolphins with open-piled sub-structure will involve the least cost. In this case the bearing capacity of the soil does not pose any problem, since the piles are taken below the designed dredge level to be founded at a suitable bearing stratum. As regards the type of piles, it is proposed that bored cast-in-situ concrete piles will be used.

Considering the size range of tankers to be handled, it is proposed to provide four breasting dolphins and four mooring dolphins for berthing and mooring of the tankers. A service platform to accommodate marine unloading arms and other utilities will be provided centrally between the two inner breasting dolphins,. The breasting dolphins and the service platform as also the mooring dolphins will all be interconnected by

walkways. An approach trestle, accommodating the pipelines, power and control cables and a carriageway, will connect the service platform to the shore.

### 8.2.1 *Service Platform*

The service platform supports three unloading arms, for handling chemicals, pipeline manifold with headers, two fire monitor towers and an operations control cabin all of which are located on concrete plinths on the platform deck. The platform is connected to the approach trestle and pipe rack at the rear of the deck. An earthing strap is provided at front of the platform to which tankers are connected prior to the commencement of unloading. The platform has sufficient space for keeping the flexible hoses and adequate space to accommodate two more unloading arms and additional pipelines in future. It also provides for vehicle parking and turning and an amenities building.

The service platform is 30 m long and 20 m wide. The front edge of the platform is to be set back from the berthing line to ensure that, during normal berthing operations, it is protected by the inner breasting dolphins from possible ship impacts. The deck elevation is kept at + 8.70 m (CD) in line with the existing berths of HDC. The dredged water depth at the berth will be (-) 9.00 m CD to enable berthing of vessels with a maximum draft of 9.0 m.

The structure of the service platform is proposed to be in the form of open piled jetty. The piles are concrete bored cast-in-situ tentatively sized at 1200mm diameter. Considering the nature of sub-soil at Shalukkhali the pile tip may be taken upto (-) 45.0 m to (-) 50 m. However, the diameter of the piles, their spacing and founding depth, will all be defined more exactly during detailed engineering.

### *8.2.2 Breasting Dolphins*

There will be four breasting dolphins provided two on either side of the service platform, to absorb the berthing energy of the vessel. These are positioned so as to allow handling of all ranges of vessels. The spacing between the breasting dolphins is generally kept as 0.25 to 0.4 times the length of the design vessel(s).

In the present case, keeping in view the LOA of vessels to be handled at the jetty varying from 100 m to 230 m, the centre to centre of the inner breasting dolphins is

kept as 40 m and that of the outer breasting dolphins as 80 m. Size of the breasting dolphins will be mainly governed by the structural arrangement required to withstand the berthing force. The deck elevation is kept at + 8.70 m (CD)

In this case also, the piles are concrete bored cast-in-situ tentatively sized at 1200mm diameter and taken upto (-) 45.0 m to (-) 50 m. However, the diameter of the piles, their spacing and founding depth, will all be defined more exactly during detailed engineering.

For taking the impact of the tanker at the time of berthing, each of the breasting dolphins will be provided with suitable fenders to absorb the berthing energy of the design tankers.

The four dolphins are each equipped with a double 100 tonne quick release hooks for ships' mooring lines that are mounted on 500mm high concrete plinths, and are connected to the unloading platform by walkways. They are provided with handrails along the rear face and safety ladders.

### 8.2.3 *Mooring Dolphins*

Mooring dolphins are required to hold the berthed vessel in position. The distance between the outer mooring dolphins is usually taken as the maximum ship's length plus the distance taken by the head and stern line under a maximum angle of 15° relative to a line perpendicular to the berthing line. The inner mooring dolphins are located to optimise breast lines perpendicular to the longitudinal vessel axis and/or to accommodate the range of vessel sizes to be handled.

Four mooring dolphins are proposed for mooring of the vessels. The inner dolphins will be spaced at 80 m from centre line on either side while the outer mooring dolphins will be spaced at 150 m from centre line on either side. The inte distance between the inner and outer mooring dolphins will be 70 m. While the tentative size of the mooring dolphins is indicated as 15 m x 15 m, the final size as well as the number, diameter and the founding levels of the piles will be governed by the structural arrangement required to withstand the mooring force during detailed engineering. The deck elevation is kept at + 8.70 m (CD)

The mooring dolphins are equipped with triple 100 tonne capacity quick release hooks, mounted on 500mm high concrete plinths, for ships' mooring lines. The dolphins are connected to each other and to the outer mooring dolphins by walkways. They are provided with handrails along the rear face and safety ladders.

### 8.2.4 *Interconnecting Walkways*

To provide access to the different berth structures for handling, fixing and releasing mooring ropes, it is proposed to provide 1.5 m wide walkways.

### 8.2.5 *Approach Trestle*

An approach trestle, accommodating the pipelines, power and control cables and a carriageway, will connect the service platform to the shore. Keeping in view the present and future requirements of the pipelines, it is proposed to provide a pipe rack of 5.8 m width. Allowing for 7 m wide access road and 1.2 m footpath, the total width of the approach works out to 14 m.

The fire-fighing pump house along with a control centre is located at a platform adjoining the approach trestle at a distance of 100 m from the jetty head.

### 8.2.6 Jetty Accessories

For access from the water, each of the dolphins and the service platform will be provided with ladders, safety chains and mooring rings.

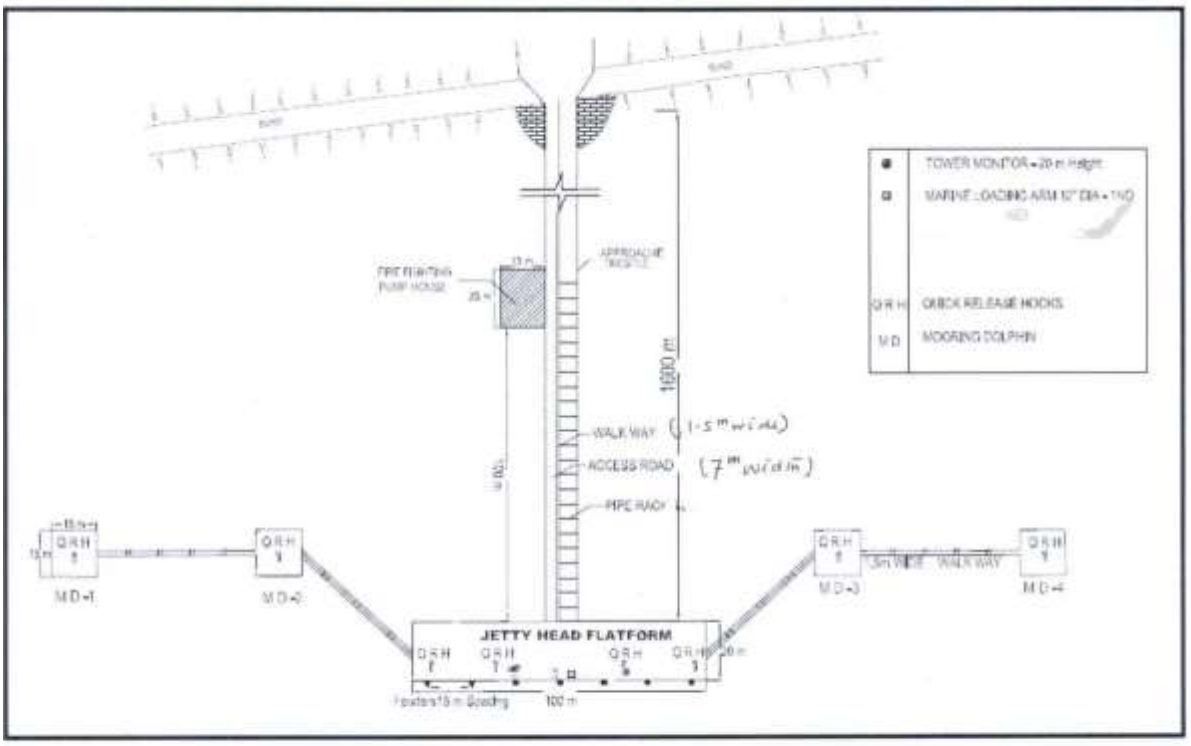
Timber rubbing strips will be provided at the face of the jetty and the mooring dolphins to protect the mooring ropes from rubbing with the concrete.

Handrails will be provided along the approach, walkways and mooring dolphins (at places where it does not foul with the mooring ropes)

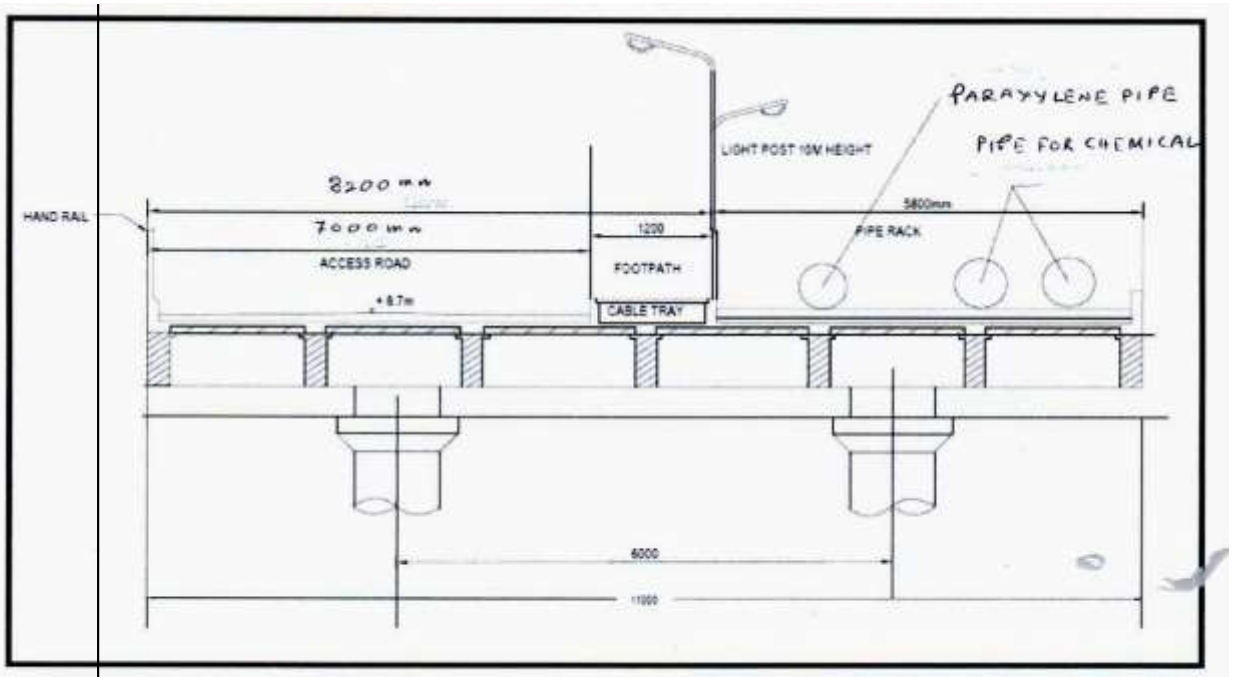
### *8.2.7 Final jetty layout*

While preparing the layout drawing, it may be noted that the gaps between the inner and outer breasting dolphins are small and it would be better to integrate all together

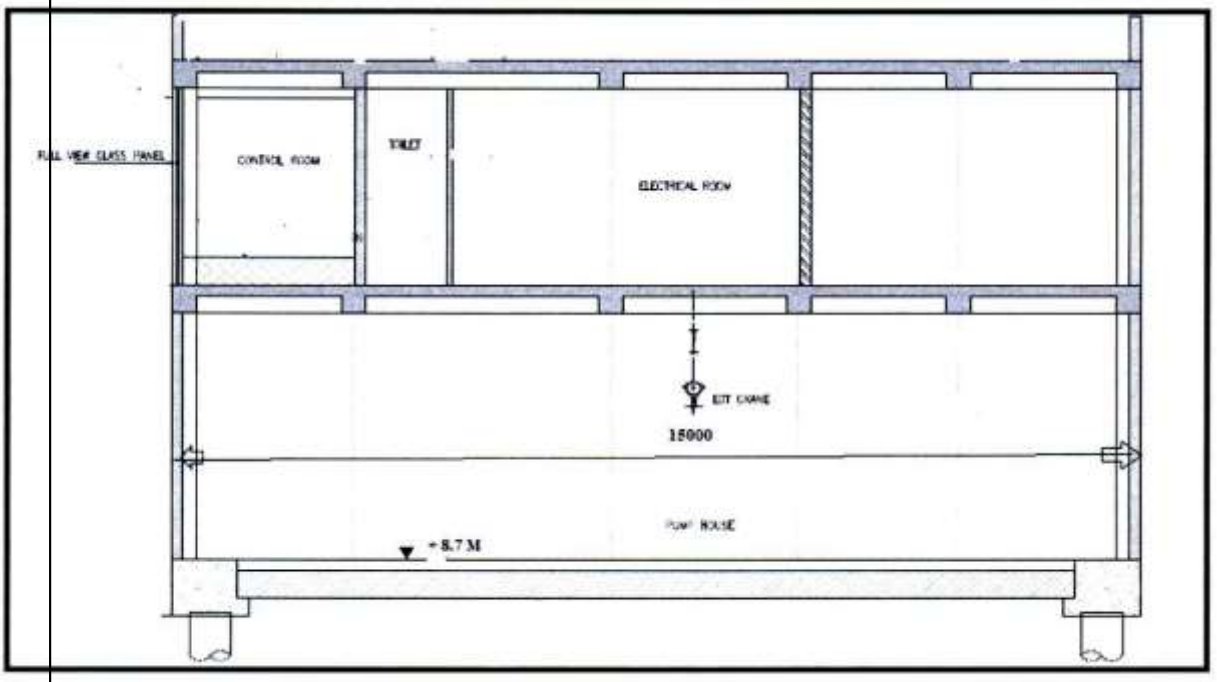
as in the case of HOJ 1. The berthing dolphins and service platform are integrated into one single deck of 100 x 20 m with fenders placed at every 15 m interval. This will facilitate the berthing of ships of all sizes. The final jetty layout is presented hereunder. A bigger drawing is attached as Annexure 8.1




**OVERALL JETTY LAYOUT**




**TYPICAL CROSS SECTION OF APPROACH TRESTLE**




**TYPICAL CROSS SECTION OF PUMPHOUSE WITH CONTROL CENTRE**

## 8.3 SHIP-SHORE TRANSFER AND EVACUATION OF PRODUCTS

At the proposed liquid cargo jetty it is proposed that ship-shore evacuation of different commodities viz. LPG, LNG, Petroleum Products will be undertaken with the help of Marine Unloading Arms. The edible oils and chemicals are proposed to be handled by flexible hoses. The jetty will be design to accommodate at least 8 nos. Marine Unloading Arms as follows:-

| | | |
|---|---|---|
| LPG | - | 2 Nos. |
| LNG | - | 2 Nos. |
| Petroleum Products | - | 4 Nos. (2 for white products and 2 for black products) |

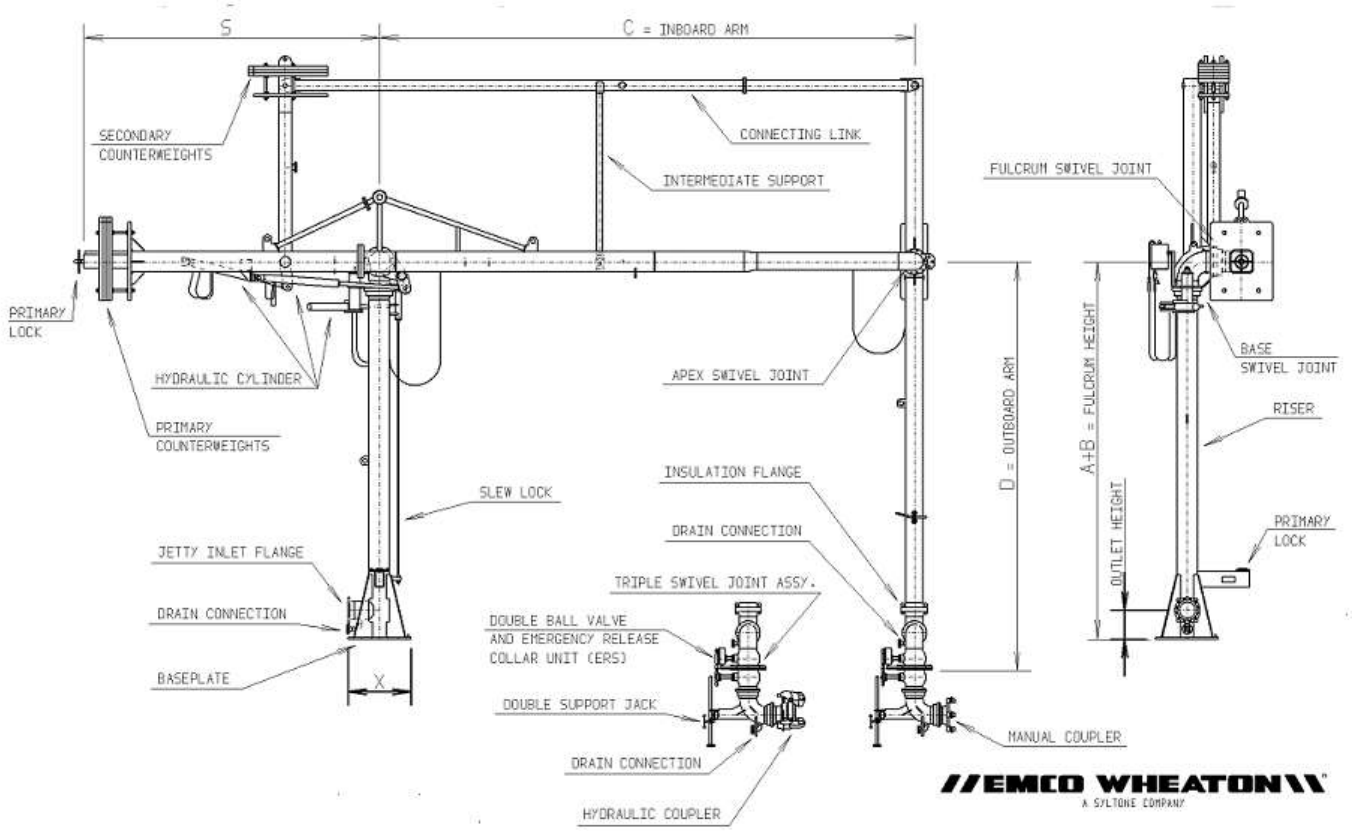
### 8.3.1 Marine Unloading Arms

A marine loading arm is a direct hookups that is particularly useful for larger vessels and transfers at higher loading rates and pressures. A marine loading arm (MLA), also known as a mechanical loading arm is a device consisting of articulated steel pipes that connect an oil tanker or chemical tanker to the shore pipe line through the jetty manifold.

Controlled manually or hydraulically or electro hydraulically, a loading arm employs swivel joints that follow the movement of a moored vessel. Many loading arm systems feature quick-connect fittings or gasket or O-ring arrangements to make a secure seal to the ship's manifold flange. A loading arm must be drained or closed off before the connection is broken off. This is usually done by stripping with pumps or lines blown with high pressure air. Often it is affected by suck back from ships side and draining by gravity from shore side.

Loading arms are also designed for a wide range of vessel sizes from small river barges to the largest supertankers and they are normally tailor made to specific installations on considerations such as vessel size, cargo flow rate and cargo temperature.

Environmental constraints, such as the range of tide, wind conditions, and earthquake tolerance can also affect choice of loading arm. A loading arm installation may include add-ons such as hydraulic or manual quick connect couplers, position monitoring systems, emergency release systems, and piggyback vapor return lines etc.




**A TYPICAL MARINE UNLOADING ARM**

It is proposed to install one marine unloading arm of 12″ diameter.

### 8.3.2 Pipelines and Manifold

The different users of the proposed liquid cargo jetty will provide manifolds on the service platform along with pipelines for facilitating loading / unloading of different products and transporting the same between the ships and the storage areas. Separate set of pipelines will be laid for handling LPG, LNG, Petroleum Products, edible oil, chemicals, Parazylene etc. of sizes varying between 8” to 24”. Besides, there will be other service lines for water, nitrogen, compressed air, vapour return line etc. A tentative list of possible pipelines that may be laid in the proposed jetty are given below:-

| Sl. No. | Product Group | Size of Pipeline | Remarks |
|---|---|---|---|
| 1 | LNG | 24 / 20 inches – 2 nos.<br>12/10 inches – 1 no. for vapour return line to LNG tanker. | Total 3 Nos |
| 2 | LPG | 18 / 16 inches – 1 No.(Propane)<br>18 / 16 inches – 1 No. (Butane) | Total – 2 Nos. |
| 3 | Petroleum Products | 24 inches – 1 No.<br>20 / 18 inches – 2 Nos<br>16 inches – 1 No<br>12 inches – 2 Nos | Total – 6 Nos |
| 4 | Parazylene | 18 / 16 inches – 1 No. | Total–1 No |
| 5 | Chemicals and Petrochemicals | 12 inches – 2 Nos<br>10 inches – 2 Nos<br>8 inches – 2 Nos | Total–6 Nos |
| 6 | Edible Oil | 14 inches – 2 nos<br>12 inches – 2 Nos | Total -4 Nos |
| 7 | Other Liquids | 12 inches – 2 Nos | Total 2 nos. |
| 8 | Service Pipeline | 4/6/8 inches – 6 Nos<br>(For water, nitrogen, instrument air, compressed air, boil-off gases, vapour return line, slop etc.) | Total 6 Nos. |

## 8.4 FIRE FIGHTING FACILITIES

### 8.4.1 General

The layout of fire fighting facilities for the proposed jetty is done in accordance with standard engineering practices

The system design will be based on the guidelines given in the following documents:

- OCIMF Document "Guide on Marine Terminal Fire Protection & Emergency Evacuation"
- OISD standard 156- Fire Protection Facilities for Port Oil Terminals.

. It will have adequate access for firefighting, escape routes in case of fire and also provisions for segregation of facilities in the event of emergency.

The following fire fighting facilities are proposed to take care of the size of tankers as also the nature of products to be handled viz., chemicals and other liquid cargoes

- Fire Water System

- Foam System

- Fire / smoke / Gas Detection and Alarm System
- Fire Alarm/ Communication System

- DCP Protection System for electrical room

- First Aid Fire Fighting Equipment

In addition there will be fire station fully manned round the clock in the safe vicinity of the jetty. This station will be equipped with a control room for remote operation of firefighting systems and the fire station will be have Portable & Mobile Fire Fighting Equipment for combating any hazards in the pipe lines.

### 8.4.2 Design Criteria for fire fighting

i) It is assumed that in case of fire on ship tanker, ship will be towed to open sea and that fire fighting for tanker will be treated as first aid till towing is done.

ii) Tower mounted water cum foam monitors shall be provided for protection to loading /unloading arms/first aid to tankers.

iii) All facilities shall be covered with Hydrant System.

iv) Water curtains will be provided for segregation of loading / unloading arms/piping manifold and ship tanker in the event of fire on either of these facilities.

v) Manual/ automatic below deck fixed water spray system or pile fire-proofing to protect berth structure and installations will be provided.

### 8.4.3 Fire Water System

For the purpose of firefighting, water turrets, spray and mist/ fog may be used effectively against oil fires and for making a screen between the fire fighter and the fire. Water is used for fire extinguishing, fire control, cooling of equipment etc.

Provision will be made to prevent inadvertent operation of a water suppression system. When water is used, an adequate drainage system will be provided.

The main components of the system are:

- Design Flow Rate
- Fire water pumps.
- Distribution piping network.

The Fire water flow rate for the jetty will be

- aggregate of Water flow for Tower mounted water/ foam monitors for protection of loading / unloading arms./ piping manifold and ship tanker.
- Water flow for area segregation by providing water curtains between ship tanker and loading / unloading arms and Hydrant service.

For the size of LPG tanker, the fire water system is proposed designed to have 2 x 720 M3/hr ( 2 Tower monitors x 6000 lpm + 2 Jumbo Nozzles x 6000 lpm)

The fire water pressure system shall be designed for a minimum residual pressure of 7 $Kg/cm^2$ at the hydraulically remotest point of application in the terminal. As large quantity of water is required it is sea water that is used in a Port Tanker berth.

Vertical turbine type fire water pumps are proposed to meet the design fire water flow rate and head. These will have flooded suction and capable of discharging 150% of its rated discharge at a minimum of 65% of the rated head.

It is proposed to have one electrically driven pump with a stand by diesel engine driven pump set for tower monitors and hydrant system separately.

The Fire water pump house will be located in a covered shed at least 100 M away from the jetty. Also Jockey Pumps of adequate capacity to maintain minimum pressure 7 kg / cm2 in fire water distribution network will be provided.

There will be two firefighting water lines one leading to the two tower monitors and the line will have a capacity of 12000 LPM to supply each monitor to have a discharge rate of 6000 lpm. Similarly there will be a second line to supply water the jumbo nozzles for providing a water curtain on the jetty head platform covering the marine loading arms and tower monitors so that there will be a curtain of water to isolate the shore installation from the ship. This second line with a similar capacity also will have fire hydrants mounted on it.

### 8.4.4 Fire Hydrant System:

Hydrants will be located bearing in mind the fire hazards at different sections of the premises to be protected and to give most effective service. At least one hydrant post will be provided for every 30 metre length on the Jetty for high hazard area.

Hydrants protecting utilities and miscellaneous buildings in high hazard areas may be spaced at 45 metre intervals. Hydrants will be located at a minimum distance of 15 metre from the periphery of tanker or equipment under protection. Double headed hydrants with two separate landing valves on 4" stand post will be used. All hydrant outlets shall be situated 1.4 metre above ground level.

### 8.4.5 Water Cum Foam Monitors

For protection of ship tank and loading arms long range/high head foam/water monitor will be used. This can be effectively achieved by mounting monitor on a steel tower of suitable height. It is proposed to have two Tower Monitors for the proposed jetty and shall be auto operated from control room which should be located minimum 100 metre from the manifold.

The height of the monitor shall be such that it will cover the deck of the largest tanker in the lightest condition at spring tides at the jetty. Tower monitors will be located minimum 15 Mt away from the hazardous area it is to protect.

### 8.4.6 Ground Monitors

It is also proposed to have two Ground Monitors located to direct water on the object as well as to provide water shield to firemen approaching a fire. These monitors also will not he installed less than 15 M from hazardous equipment.

### 8.4.7 Foam System

It is also proposed to have a foam system as the jetty will be handling hydrocarbons and chemicals. The foam system should be designed to create foam blanket on the burning surface in a reasonably short period. Foam shall be applied to the burning hazard continuously at a rate high enough to overcome the destructive effects of radiant heat.

### 8.4.8 Fire Detection, Alarm & Communication System

As timely detection of fire at an early stage, is most important it is proposed to have an alarm system consisting of manual call points (break glass), automatic gas/ smoke/ heat detectors, release & inhibit switches for fire suppressment clean agent. Conventional or micro-processor based data gathering fire alarm and central fire alarm panel, mimic panels & associated equipment will be provided. Flammable gas detectors will be provided to give warning of the presence of flammable gases or vapours in air, well before they reach explosive concentrations.

Control room for remote operation:

The entire fighting system will be operated from a control room located at a height of not less than 20 m and in the close vicinity but not less than 100 m away from the jetty. Apart from commanding a complete and unhindered view of the ship and jetty area, all firefighting operations through the tower monitors and operation of jumbo curtain will be controlled from the control room.

## 8.5 ELECTRICAL POWER SUPPLY & DISTRIBUTION SYSTEM

### 8.5.1 Power Requirement

The estimated maximum demand when the drives of one electrically motor driven tower monitor pump, one electric motor driven hydrant pump and jockey pump and the entire illumination is operational use will be about 700 KVA.

### 8.5.2 Electrical System

It is therefore proposed to have a 1 MVA incomer with circuit breakers and distributor with bus bar for 6.6 KV HV power and a 100 KVA 6.6 KV/440 V HV/LV

Transformer a distribution panel for all LT power requirements of the installations on the jetty.

The receiving and distribution system will comprise the following:

a. A receiving substation where power from "West Bengal State Electricity distribution Company Ltd" (WBDCL) will be received at 6.6 KV from the nearest substation through an incomer with circuit breaker..

b. The power received at 6.6 KV will be distributed at the same voltage to all the HT drives which will be basically meant for fire protection facilities.

c. A 6.6 KV/ 440 V/220 V- HV LV transformer to step down and supply LT power to various utilities in the jetty for illumination, electrically operated valves, quick release mooring hooks with capstans, tower and ground monitor drives, foam pumps and for drive of main hydraulic pumps of Marine unloading arms..

The firefighting pump room where electrically driven pumps are provided (with diesel engine driven as standby) will be located about 110 m or more away from the jetty head.

All the drives, fitting, cables etc., will be flame proof and fire retardant as required. A capacitor bank will be provided to main the power factor.

A stand-by diesel gen set of about 30 KVA is proposed for emergency lighting and for operation of marine loading arms in case of power failure.

All electrical fittings/ equipment shall be provided in line with Hazardous Area Classification as laid down for electrical area classification and selection of electrical equipment IS-5571, IS-5572 (Part- 1) and OISD-Standard 113 – "Classification of areas for electrical Installations at Hydrocarbon Processing and handling facilities.

## SECTION 9

# CAPITAL COST ESTIMATE & IMPLEMENTATION SCHEDULE

9.1 The total capital cost of the project is estimated at Rs. 172.52 Crores. The detailed estimate is attached as ***Annexure 9.1.*** The summary break up of the estimate is given as under:

| Sl. No. | Item of Work | Estimated Capital Cost (Rs. Crores) |
|---|---|---|
| 1 | Civil Works | 127.00 |
| 2 | Mechanical Works | 21.00 |
| 3 | Electrical Works | 3.50 |
| | **Total (1+2+3)** | 151.50 |
| 4 | Add:<br>a. Detailed Engineering & Project Supervision @ 2%<br>b. Contingencies @ 3% | <br>3.03<br>4.54 |
| 5 | Works Contract Tax @ 4% on 100% of Civil costs + 4% on 15% of Mech. & Electrical costs | 5.23 |
| 6 | Miscellaneous Cost @ 5% of project cost as per TAMP | 8.22 |
| | **Grand Total** | **172.52** |

**IMPLEMENTATION SCHEDULE**

9.2 The project implementation period including detailed engineering from the date of grant of concession is estimated at 36 months.

**PHASING OF EXPENDITURE**

9.3 The phasing of expenditure proposed is as under:

1st Year = Rs. 30.00 crores
2nd Year = Rs. 92.52 crores
3rd Year = Rs. 47.00 crores
**Total = Rs. 172.52 crores**

**ANNEXURE 9.1**

## LIQUID BULK JETTY AT SHALUKKHALI CAPITAL COST ESTIMATE

| | | | |
|---|---|---|---|
| **CIVIL WORKS** | | | |
| 1. | Pre project activities, surveys and soil investigation | Rs. | 2.0 crores |
| 2. | Jetty structure with fenders, quick release hooks, walkways, ladder and other accessories | Rs. | 40.0 crores |
| 3. | Approach trestle 1.6 km long with roadway and pipeline rack on one side& 20mx15m pumproom and control room platform | Rs | 82.0 crores |
| 4. | Approach road to waterfront 2 km long | Rs | 3.0 crores |
| | ***Sub Total*** | ***Rs.*** | ***127.0 crores*** |
| **MECHANICAL WORKS** | | | |
| 5. | Firefighting pumphouse with control room | Rs. | 2.0 crores |
| 6. | Marine Unloading arm of 12” | Rs | 4.0 crores |
| 7. | Flexible hoses and pipe manifolds | Rs. | 0.5 crores |
| 8. | Firefighting system with pumps, towers, monitors, Hydrants, pipelines etc. | Rs | 13.0 crores |
| 9.. | Oil containment system | Rs. | 1.5 crores |
| | ***Sub Total*** | ***Rs.*** | ***21.0 crores*** |
| **ELECTRICAL WORKS** | | | |
| 10. | Electrical facilities including sub-station, lighting etc. with flame-proof equipment in the jetty and approach Area near by jetty and Stand-by Gen Set | Rs. | 3.0 crores |
| 11. | Communications | Rs. | 0.5 crores |
| | ***Sub Total*** | ***Rs.*** | ***3.5 crores*** |

## SECTION 10

## ANNUAL OPERATION AND MAINTENANCE COST

10.1 The annual operation and maintenance cost of the proposal is estimated at Rs. 13.89 Crores based on TAMP Guidelines for fixation of up-front tariff. The broad break-up of estimate is given in the table below.

| Sl. No. | Particulars | Amount (Rs. In lakhs) |
|---|---|---|
| **1.** | **Repairs & Maintenance Cost** | **192.46** |
| | • Civil Works (1% of capital cost – Rs. 14071.90 lakhs) | 140.72 |
| | • Mech. Works (2% of capital cost – Rs.2587.20 lakhs) | 51.74 |
| **2.** | **Power for illumination** | **43.94** |
| | • Illumination (Op. Land area 2 hectares + 20% of Waterfront of 3.66 hectares) x 2.4 lakh units per hectare x Rs.6.67 per unit | 43.73 |
| | • Marine Loading Arm- (1No. x 25 units /Tanker x 128 Tankers x Rs.6.67 per unit | 0.21 |
| **3.** | **Depreciation** | **796.09** |
| | • Marine Loading Arms, Fire fighting System & Flexible Hoses (13.34% of equip. cost – Rs.2059.20 lakhs) | 274.70 |
| | • Elec., Communication and Oil Containment System (10.00% of equip. cost – Rs. 528.00 lakhs) | 52.80 |
| | • Deprecation on civil structures (3.33% of capital cost – Rs. 14071.90 lakhs) | 468.59 |
| **4.** | **Other Expenses** ( towards salaries and overheads @ 1% of Gross value of assets of Cargo handling Activity – Rs. 12444.81 akhs) | **124.45** |
| **5.** | **Insurance** @ 1% of Gross value of assets – Rs.17251.71 lakhs) | **172.52** |
| **6.** | **Lease rentals** • ( 4 hectares x Rs1304.22/100 sqm/month x 100 x 12 + 3.66 hectares of waterfront x Rs.652.11 per 100 sqm/month x 100 x12 | **59.94** |
| | **Total Operating Cost** | **1389.40 Say crores** |

**10.2** The key assumption for estimation of annual Operation and Maintenance expenditure are as follows.

### 10.2.1 Optimal Capacity Terminal:

The Optimal Capacity of the proposed Liquid Bulk Terminal is determined at 18.40 lakh tonnes considering Paraxylene and other liquid cargo handling rate based on the norms prescribed in Upfront Tariff Guidelines 2008. Subsequently, TAMP while approving the tariff has estimated the capacity of the proposed liquid cargo jetty at Shalukkhali as 2.43 MTPA.

### 10.2.2 Repairs & Maintenance cost :

As per norms specified in guidelines, the Repairs & Maintenance cost is estimated at Rs.192.46 lakhs per annum at the rates of 1% of civil assets and 2% of all mechanical and electrical equipment.

### 10.2.3 Power cost for Marine Unloading Arms:

As per technical specifications, the power consumption for connecting and disconnecting Marine Loading Arms will be 25 units to each tanker berthed. It was estimated that 128 tankers 144 per annum will utilize Marine unloading arms and accordingly power cost is estimated for operation of MLAs at Rs.0.21 lakhs per annum. (Unit Rate at Rs.6.67 is taken as per WBSEDCL applicable for HT consumers for industrial purpose)

### 10.2.4 Power cost for Illumination:

As per norms specified in TAMP guidelines, the power consumption for illumination is taken at 2.4 lakh units per annum per hectare. It is considered that 2 hectares of land for operational area and approach roads etc and 20% of waterfront area of 3.66 hectares will be allotted to the project and accordingly the power cost is estimated at Rs.43.73 lakhs per annum.(Unit Rate at Rs.6.67 is taken as per WBSEDCL applicable for HT consumers for industrial purpose)

### 10.2.5 Depreciation:

As per guidelines, Depreciation is estimated at 13.34% of the capital cost of the Mechanical equipments viz. Marine loading arms, flexible hoses & Fire Fighting system and 10.00% of Oil containment system & Electrical and Communication systems and 3.33% on Civil Assets on Straight line method.

### 10.2.6 Other expenses:

As per norms specified in guidelines, other expenses are estimated at Rs. 124.45 lakhs per annum at the rates of 1% of original capital cost of the assets which include the following:

(a) Salaries and wages of operating and maintenance staff including welfare and other expenses towards them.

(b) Management and general overheads and other miscellaneous cost.

### 10.2.7. Insurance:

As per guidelines, Insurance cost is estimated at Rs.172.52 lakhs @ 1% of the total capital cost.

### 10.2.8 License Fee:

License Fee payable for the land area and waterfront area of the project is estimated at Rs.59.94 lakhs as per applicable lease rental rates of HDC @ Rs.1304.22 per 100 sqm per month and Rs. 652.11 per 100 sqm per month respectively.

## SECTION 11

## ANNUAL FINANCIAL REVENUE EARNINGS

**11.1** The revenue earnings from the project to the Port is basically the Berth hire charges, Handling charges from cargoes. In the event of taking up the Project on DBFOT basis viz either through PPP Mode or through a joint venture with an oil company under Public sector or Private sector, the project term normally be limited to 30 years and the financial feasibility has to be examined accordingly. The tariff shall, however, be determined under Revised Reference Tariff guidelines 2013 or under Upfront Tariff guidelines 2008 in case no reference tariff is available for the given cargo profile in the port concerned or in any other Major Port. The said guidelines will also apply to Port's own Project. As such, the financial analysis has been carried out considering the entire project is taken up under DBFOT basis and accordingly, the revenue from handling charges and berth hire charges during the entire tenure of concession period of 30 years will accrue to Private Operator and Port will be entitled to offered revenue share by the operator.

**11.2** The estimated annual revenue based on provisional tariff assessed as per the upfront tariff guidelines 2008 is given below

(Rs. In Lakhs)

| S.No. | Particulars | 2019-20 | 2021-22 | 2024-25 |
|---|---|---|---|---|
| **1.** | **Estimated Throughput** (Lakh tonnes) | **12.10** | **15.20** | **18.40** |
| | • Handled by Marine Unloading arms | 6.05 | 7.60 | 9.20 |
| | • Handled by Flexible Hoses | 6.05 | 7.60 | 9.20 |
| | | | | |
| **2.** | **Liquid Handling Rate** ( Rs. per Ton) | | | |
| | • Handled by Marine Unloading arms | 176.73 | 176.73 | 176.73 |
| | • Handled by Flexible Hoses | 162.95 | 162.95 | 162.95 |
| | | | | |
| **3.** | **Revenue on Liquid Handling** (Rs. In lakhs) | **2055.07** | **2581.57** | **3125.06** |
| | • Handled by Marine Unloading arms | 1069.22 | 1343.15 | 1625.92 |
| | • Handled by Flexible Hoses | 985.85 | 1238.42 | 1499.14 |
| | | | | |
| **4.** | **Estimated GRT** ( Lakh GRT hours ) | **403.33** | **506.67** | **613.2** |
| | | | | |
| **5.** | **Berth hire (Rs./ GRT hour)** | **1.672** | **1.672** | **1.672** |
| | | | | |
| **6.** | **Revenue on Berth hire** (Rs. In lakhs) | **674.37** | **847.15** | **1025.27** |
| | | | | |
| | **Total Estimated Income** | **2729.44** | **3428.72** | **4150.33** |

**11.3** The broad assumptions for the estimating the revenue are as follows.

- The anticipated Handling charges and berth hire chargest are worked out based on the preliminary calculations of annual revenue requirement and capacity as per the TAMP Guidelines for determination of upfront tariff (2008.)

- Wharfage charges are not considered as the revenue to be accrued to the port since composite handling charges for discharging from ship through Pipeline is proposed.

**11.4** The port will also earn revenue from Port Dues and Pilotage as per the General scale of rates, which has not been considered for the cash flows.

**11.5** As already brought out elsewhere in this report, the Paraxylene proposed to be handled at this subject liquid jetty is hither to being handled at HOJ – I and Berth No.3 and thus envisages shifting of cargo from HDC- I to HDC – II and there would be no additional revenue to Port authority to the extent of cargo handling charges on present volume of Paraxylene of around 0.6 to 0.7 MTPA. It is also mentioned that the berth days released at HOJ I and Berth No.3 could be productively used for handling of Coal, the volume of which is on increasing trend. Thus the differential decline in revenue due to cargo handling charges of Paraylene Vs Coal which is estimated at Rs108.23 lakhs per annum is considered while calculation of IRR and sensitivity analysis. The detailed working of the net effective revenue is worked are as under

(Rs. In Lakhs)

| S.No. | Particulars | 2024-25 |
|---|---|---|
| 1. | **Estimated Throughput** (Lakh tonnes) | **18.40** |
| | | |
| 2. | **Estimated Income from the project** | **4149.40** |
| 3. | **Less:** Loss of Wharfage income at the present berth due shift of Paraxylene cargo to proposed berth (Rs. 91.80 per ton x 4.43 LTPA*) | **406.67** |
| 4. | **Add:** Additional Revenue on handling of coal in the savings in the berth days at Berth no.3 due to shift of cargo ( 78 berth days ** x 8200 T x Rs. 46.66 per ton) | **298.44** |
| 5. | **Net Benefits** | **4041.17** |

* Based on actual cargo handled at Berth No.3 during 2014-15

** 4,43,000 tonnes /5700 TPD = 78.72 day or say 78 berthdays

11.6 The volumes proposed for the subject project which are otherwise have to be handled at HOJ I, HOJ II and other berths of HDC-I, the berth occupancy of which is far exceeded the norms, will result in out flow of Nation's Foreign Exchange (FE) resources in the form of ship demurrage charges. With the decongestion to vessels visiting HDC, the incurrence of ship demurrages could be avoided. Since it is not feasible to estimate such ship demurrage payments in the absence of data, the same could not be considered to evaluate EIRR of the Project.

## SECTION 12

## FINANCIAL VIABILITY AND SENSITIVITY ANALYSIS

12.1 The Financial viability of the project on PPP operator's perspective, considering the 30 years concession period from the date of award of the project works out to 14.94%,

12.2 Sensitivity analysis has also been carried out to gauge the impact of increase in cost and reduction of revenue earnings on the viability of the proposal. The results of the analysis are presented below. The detailed Cash flow statement is given at ***Appendix-12.01.***

| **Sl. No.** | **Pre-Tax Project IRR at Constant prices** | **IRR (%)** |
|---|---|---|
| 1 | Base case | 14.94 |
| 2 | Capital Cost up by 10% | 13.54 |
| 3 | Annual O&M Cost up by 10% | 14.63 |
| 4 | Revenue down by 10% | 13.08 |
| 5 | Combined effect of Sl. no. 2, 3 & 4 | 11.47 |

12.3 The above analysis is only on PPP Operator's perspective only. he The port's viability ie., net impact on earnings due to earnings of revenue sharing from PPP operator vis-à-vis likely loss of revenue to the port due to shift of cargo from the present berths to proposed berths has not been depicted. However, an attempt has been made to gauge the net impact on earnings with a different percentage of revenue sharing.

| **Sl. No.** | **Revenue Share** | **5%** | **10%** | **15%** | **20%** | **25%** | **30%** | **35%** |
|---|---|---|---|---|---|---|---|---|
| 1 | IRR to the PPP Operator (%) | 13.60 | 12.82 | 12.02 | 11.19 | 10.34 | 9.45 | 8.52 |
| 2 | Revenue share to the Port (Rs. in lakhs) | 207.53 | 415.06 | 622.59 | 830.12 | 1037.65 | 1245.18 | 1452.71 |
| 3 | Likely loss due to shift of cargo | 108.23 | 108.23 | 108.23 | 108.23 | 108.23 | 108.23 | 108.23 |
| **4** | **Net Benefits** (Rs. in lakhs) | **99.30** | **306.83** | **514.36** | **721.89** | **929.42** | **1136.95** | **1344.48** |

From the above, it is evident that the operator has to share the revenue preferably more than 10% to 15% to the port, which seems to viable to the PPP operator, as the IRR is more than 12%..

12.5 The viability of the project will be further prospective, in the event PPP operator achieves the productivity norms and eligible for 15% productivity increase in tariff over the notified tariff.

**12.6** Cash flow statement for the above analysis is given at ***Appendix-12.01,***

***From the above, it could be seen that, the project is viable, if the port undertakes through the PPP mode.***

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*Annexure- 12.01*

## *SETTING UP OF LIQUID JETTY AT HALDIA DOCK –II, SHALUKKHALI, HALDIA CASH FLOW STATEMENT FOR CALCULATION OF FIRR*

**(Rs. In lakhs)**

| YEAR | CAPITAL COST | ANNUAL O&M COST * | TOTAL COST | REVENUE EARNINGS | NET BENEFITS | SENSITIVITY ANALYSIS | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CAPITAL COST (+) 10% | ANNUAL O&M COST (+)10% | REVENUE (-)10% | COMBINED EFFECT OF ALL |
| 2016-17 | 3,000.00 | - | 3,000.00 | - | (3,000.00) | (3,300.00) | (3,000.00) | (3,000.00) | (3,300.00) |
| 2017-18 | 9,552.00 | 59.94 | 9,611.94 | - | (9,611.94) | 10,567.14) | (9,617.94) | (9,611.94) | (10,573.14) |
| 2018-19 | 4,700.00 | 59.94 | 4,759.94 | - | (4,759.94) | (5,229.94) | (4,765.94) | (4,759.94) | (5,235.94) |
| 2019-20 | | 593.24 | 593.24 | 2,729.46 | 2,136.22 | 2,136.22 | 2,076.90 | 1,863.28 | 1,803.95 |
| 2020-21 | | 593.24 | 593.24 | 2,729.46 | 2,136.22 | 2,136.22 | 2,076.90 | 1,863.28 | 1,803.95 |
| 2021-22 | | 593.24 | 593.24 | 2,729.46 | 2,136.22 | 2,136.22 | 2,076.90 | 1,863.28 | 1,803.95 |
| 2022-23 | | 593.28 | 593.28 | 3,428.75 | 2,835.47 | 2,835.47 | 2,776.14 | 2,492.59 | 2,433.27 |
| 2023-24 | | 593.28 | 593.28 | 3,428.75 | 2,835.47 | 2,835.47 | 2,776.14 | 2,492.59 | 2,433.27 |
| 2024-25 | | 593.28 | 593.28 | 3,428.75 | 2,835.47 | 2,835.47 | 2,776.14 | 2,492.59 | 2,433.27 |
| 2025-26 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2026-27 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2027-28 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2028-29 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2029-30 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2030-31 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2031-32 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2032-33 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2033-34 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2034-35 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2035-36 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2036-37 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2037-38 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2038-39 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2039-40 | 2,587.20 | 593.32 | 3,180.52 | 4,150.59 | 970.07 | 711.35 | 910.74 | 555.01 | 236.96 |
| 2040-41 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2041-42 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2042-43 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2043-44 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2044-45 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2045-46 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2045-46 | | 593.32 | 593.32 | 4,150.59 | 3,557.27 | 3,557.27 | 3,497.94 | 3,142.21 | 3,082.88 |
| 2046-47 | | 593.32 | 593.32 | 2,075.30 | 1,481.98 | 1,481.98 | 1,422.65 | 1,274.45 | 1,215.12 |
| **Total** | **19839.20** | **17325.75** | **37164.95** | **111862.93** | **74697.98** | **72714.06** | **72965.40** | **63511.69** | **59795.19** |
| | | | **NPV @ 12%** | | **3,048.62** | **1,667.70** | **2,700.82** | **1,015.04** | **(713.68)** |
| | | | | **IRR** | **14.36%** | **13.20%** | **14.10%** | **12.81%** | **11.47%** |

*** Annual O&M Excluding Depreciation. # Project revenue has considered as Revenue earnings**

**SECTION 13**

**EVALUATION OF OPTIONS AND RECOMMENDATION**

## 13.1 PROJECT EXECUTION OPTION AND SCHEDULE

In the earlier sections the need for the project, the location, project components, capital as well as O & M costs and financial viability all have been established.

It has been concluded that the project is viable if the port undertakes through the PPP mode.

In such a case, it will take 36 months for the project to be commissioned. Assuming that the Port is able to get necessary approvals to go ahead by end December, 2015, the project could get completed by March, 2019. A detailed project schedule has been prepared and is presented as ***Annexure 13.1***.

The present project has been conceived mainly to cater to the requirements MCC PTA's Paraxylene traffic and other chemical users. Here two important aspects are to be considered.

- MCC PTA has already pipeline connections at HOJ 1, Dock Basin berths 2 & 3. Major portion of their Paraxylene volumes are presently handled at Dock Basin berth 2 in view of the congestion at HOJ 1.
- For handling other cargo, Port has to provide necessary clearances / permissions to upcoming/ existing chemical importers users lay pipelines connecting to their storage facilities. Moreover, necessary evacuation facilities viz rail and road linkages also to be provided by the port to fructify the project and attract the cargo to the proposed facilities.

In view of these, it is proposed to examine in detail the requirements of these users, as to the implication of their traffic being handled at the existing facilities without the new jetty.

## 13.2 PARAXYLENE OF MCC PTA

MCC were initially interested in Shalukkhali in view of two distinct advantages to them, viz. Shalukkhali is almost half the distance of the existing berthing facilities to their plant and the draft there was almost deeper by 1 m than at Haldia. With these two aspects, they

expected to increase their parcel size as well as improve their discharge rate and tanker turnaround time.

However, as of July 2015, the drafts at Haldia as well as Shalukkhali are the same. This may dampen their spirits to some extent. On a discussion with the Chief Hydrographer, Marine Department, Kolkata Port Trust, it is learnt that the variation in the drafts at Rangafalla Channel is a natural phenomenon. It appears to be a fluctuating situation. While during 2009, the draft was almost 1 m more than at Haldia, it started reducing and during 2014 it was marginally lesser than at Haldia. However, during 2015 it has started picking up and over the years it is likely to reach the earlier level of higher depths than Haldia.

Even if the draft remains the same as at Haldia, MCC stand to gain at Shalukkhali as the distance to their terminal is almost half from the existing berths of HOJ 1 & Dock basin berths 2 and 3. This will definitely improve the rate of discharge and the turnaround time. The added advantage is that their tankers can avoid the preberthing time which they are suffering from.

The dock entrance has constraints as the number of ship movements during each high tide is limited. During 2013-14, 90 Paraxylene tankers were handled with 72 of them being handled at Dock basin berths 2 & 3. The total pre-berthing detention was 134 days with detention for each tanker varying from 0.3 days to 7 days. According to MCC, the demurrage for such tankers vary from US$ 16,000 to US$ 24,000 per day. Their average annual outgo on this account is about US$ 0.2 million.

In view of these, MCC will definitely be willing to shift to Shalukkhali.

## 13.3 POSSIBILITY OF ADDITIONAL PRODUCTS

During the interaction with users, M/s Ruchi dealing with edible oil have indicated that they will be able to bring initially 60,000 tonnes of edible oil to Shalukkhali by creating a separate tankage facilities. Later this could be augmented by another 50,000 tonnes. But an essential requirement was rail connectivity. They said that they would be able to share

the railway siding with coal by making special arrangements and may not need any exclusive facility.

Here again, they are aware the advantage of avoiding pre-berthing detention which they are suffering from at the Dock basin berths. These pre- berthing detentions vary from 10 to 12 days. The demurrage rates for their tankers are US$ 11,000 to US$ 18,000 per day. Considering that there is great potential for edible oil traffic and also the fact that there is a spare capacity at the proposed jetty upto 0.3 million tonnes per annum, this traffic could be captured in due course once the facility is commissioned.

## 13.4 IMPACT OF SHIFTING PARAXYLENE TO SHALUKKHALI JETTY

It has been proposed to shift the entire volume of Paraxylene to Shalukkhali. The planned volume is 1.0 MTPA while the present volumes are in the range of 0.6 to 0.7 MTPA.

Since it is only a shifting of the existing product, there is no additional revenue to the port from this.

However, this shifting will release berth days at these berths which could be used for handling other cargo. Paraxylene is presently handled mainly at HOJ 1 and Berth 3 with limited volumes being handled at Berth 2. This shifting will release about 22 berth days at HOJ 1 which amounts to about 6% of berth occupancy. Since HOJ 1 is already overloaded with berth occupancy in the range of 80%, this release will slightly ease the congestion. At Berth 3, Paraxylene shifting will release about 78 berth days. Since the occupancy of this berth is within permissible limits of 65 %, the released berth days could be productively used to handle dry bulk like coking and non-coking coal. The average productivity of such coal through conventional methods is on an average 8,200 tonnes per day. Accordingly, it would be possible to handle 639,600 tonnes. Since the traffic in coking and non-coking coal is on the increase, this will generate additional revenue to the port.

However, it has to be noted that the wharfage on Paraxylene is Rs.91.80 per tonne whereas the wharfage on coking and non-coking coal is only Rs.46.66 per tonne. This loss due to differential revenue has been taken into consideration in the financial analysis.

## 13.5 RECOMMENDATION

Based on the foregoing, the following conclusions are made:

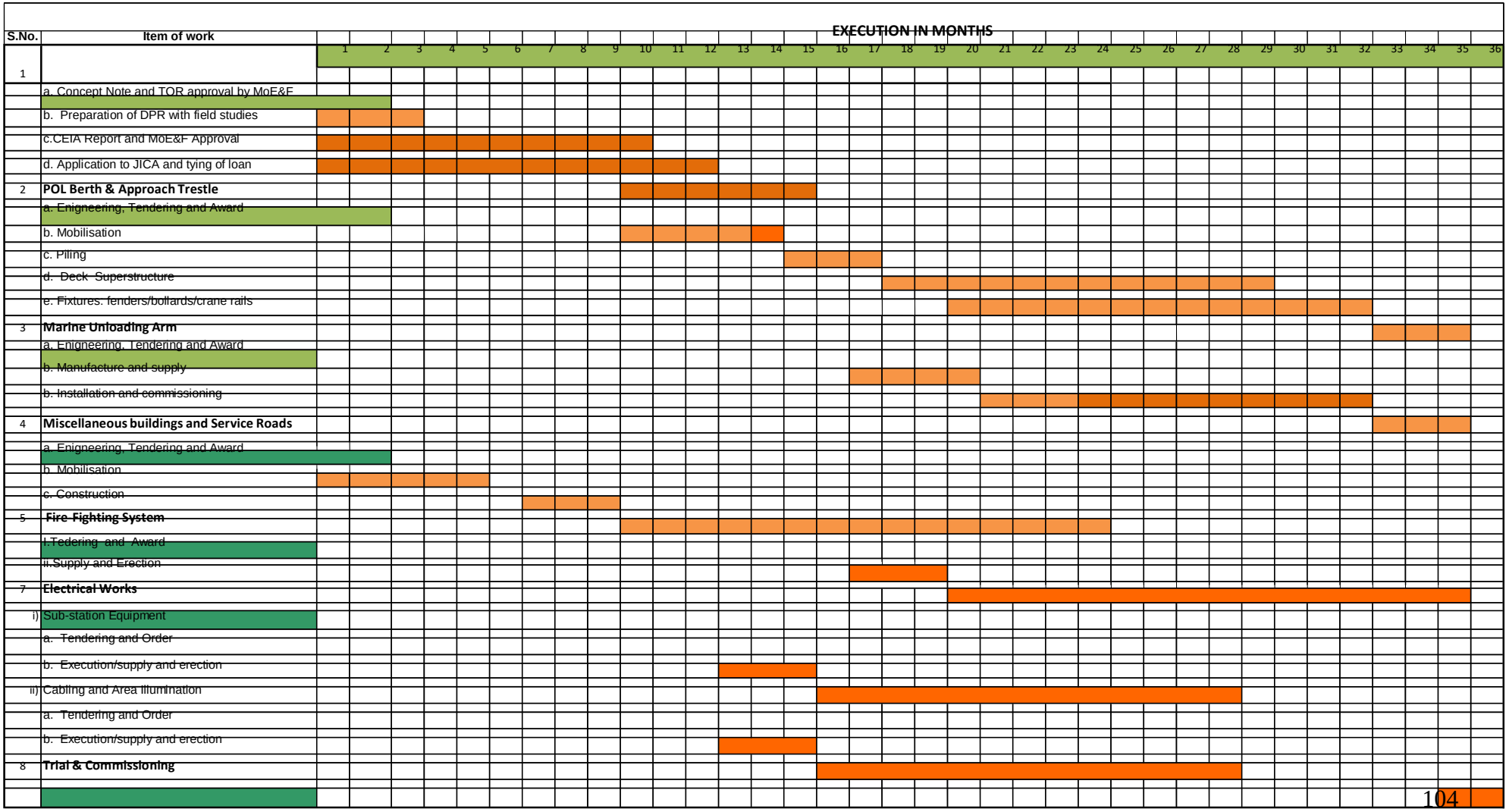
- There is a need and a potential for the new liquid bulk jetty at Shalukkhali. This will benefit the port in attracting additional liquid cargo traffic including LPG and LNG.
- There is compelling advantages for the users in using this jetty.
- The Port also stands to gain by reducing the congestion at the existing oil jetties.

It is finally recommended that the Port immediately take action for constructing the new liquid bulk jetty at Shalukkhali through PPP mode.

**********

*ANNEXURE-13.1*

## *TYPICAL IMPLEMENTATION SCHEDULE FOR SETTING UP OF LIQUID JETTY AT HALDIA DOCK-II, SHALUKKHALI, HADIA*



पंजीकरण सं.....दि.....
Regn. No. D/7664 Dt. 13-8-15
कोलकाता पत्तन न्यास
KOLKATA PORT TRUST
मुख्य अभियंता विभाग
Chief Engineer's Dept

**F.No.11-140/2010-IA.III**
Government of India
Ministry of Environment, Forest & Climate Change
(IA.III Section)

Indira Paryavaran Bhawan,
Jor Bagh Road,
New Delhi - 3

Dated: 30th July, 2015

**To**

**The Chief Engineer,**
Kolkata Port Trust,
Haldia Dock Complex,
15 Strand Road,
**Kolkata – 1**

Dy CE & Manager (Environment)

**Sub: 'Development of Port facilities at Haldia Dock-II' at Mouza Shalukkhali & Rupnarayanchak, District East Medinipore (West Bengal) by Kolkata Port Trust - Environmental and CRZ Clearance - Reg.**

Sir,

This has reference to your letter no. Civ./Env./EIA-12 dated 10.03.2014 and subsequent letter dated 06.04.2015, submitting the above mentioned proposal to this Ministry for grant of Environment Clearance (EC) in term of the provisions of the Environment Impact Assessment Notification (EIA), 2006 under the Environment (Protection), Act, 1986.

2. The proposal for **'Development of Port facilities at Haldia Dock-II' at Mouza Shalukkhali & Rupnarayanchak, P.S. Sutahata, District East Medinipore (West Bengal) by Kolkata Port Trust,** was considered by the Expert Appraisal Committee (EAC) in the Ministry for Infrastructure Development, Coastal Regulation Zone, Building/ Construction and Miscellaneous projects, in its meetings held on 21st - 22nd April, 2014 and 19th – 21st May, 2015 respectively.

3. The details of the project, as per the documents submitted by the project proponents (PP), and also as informed during the above said EAC meetings, are reported to be as under:-

(i) TOR was granted for the project vide letter no. 11-140/2010-IA-III dated 27.09.2013 after lifting the moratorium vide notification dated 17.09.2013.
(ii) **Proposal:** The proposal is for development of Port facilities comprising of four jetties of 23.4 MMTPA (two mechanised and two multipurpose jetties) with associate infrastructure like hard standed stack yard, pipelines, cargo handling equipment, mechanized wagon loaders, conveyor systems, railway sidings, fire fighting facilities, internal roads, etc.
(iii) **Location:** The project site is in Mouza - Shalukkhali & Rupnarayanchak, P.S.- Sutahata, District - East Medinipore in West Bengal. The site is located between 22°06'02.82"N latitude & 88°11'30.35"E longitude and 22°06'54.30"N latitude & 88°11'35.50"E longitude. The Project will be setup in vacant Government land of around 160 acres. Draught of about 9 m. is available. The area has been declared as critically polluted area.
(iv) Location of jetties along with approaches are:

| Name of Jetty | Centerline of Jetty Face | | Alignment of Jetty Face |
|---|---|---|---|
| | Latitude | Longitude | |
| Jetty No.1 | 22 06'33"N | 88 12'09"E | 347.33 N |
| Jetty No.2 | 22 06'24"N | 88 12'12"E | 348.94 N |
| Jetty No.3 | 22 06'15"N | 88 12'12"E | 350.93 N |
| Jetty No.4 | 22 06'58"N | 88 12'15"E | 318.67 N |

(v) No dredging is envisaged at the proposed Haldia Dock-II site.

(vi) There is no fishing activity in the project site.

(vii) About 540$m^3$/day of purified water will be needed in the proposed Dock.

(viii) The drinking water to the facility will be supplied by Haldia Development Authority through a pipeline.

(ix) The treated water will be received from Haldia Development Authority (HDA) water supply system. As per an initial estimate, water to the tune of 540 $m^3$/day will be required for the proposed project. Such water will be used primarily for domestic purposes.

(x) Domestic wastewater from proposed dock II is expected to be generated mainly from office areas and from dock areas and the same will be treated as per relevant standard and the treated waste water will be used for gardening/ dust suppression. Excess treated wastewater, if any, conforming to the relevant standard will be disposed in the surface water. Oily bilge water and ballast water generated from ships will be treated in the existing Ballast water Treatment Plant at Haldia Dock Complex.

(xi) Reusable solid wastes will be sold periodically and non-reusable wastes will be used for land filling purposes in the dock premises or will be disposed off site in consultation with the concerned Civic body.

(xii) The estimated power requirement, taking all the usage of power for conveyors, equipment and illumination including future requirements, will be 12000 KVA, which will be met from WBSEDCL supply for all the proposed 4 nos of berth. 2 DG set of 500 KVA capacity will be installed for emergency power backup for the buildings, yards and security area.

(xiii) Hazardous wastes will be stored separately in a secured enclosure and would be transported to the Treatment, Storage & Disposal facility (TSDC) at Haldia. Oily waste & metal scrap water will be handed over to registered re-refiners /recyclers having approval of MoEFCC.

(xiv) Fugitive dust shall be the main air pollutant, for which dust suppression system will be installed at relevant points.

(xv) Green belt: 33% of proposed dock area has been earmarked for green belt development. Green belt will be developed @ 1500 nos. of trees per hectare.

(xvi) About 8.5 km track length of Railway line to be constructed for connection between port yard and nearest railway station at Basulya-Sutahata. The total track length including exchange yard is about 14.295 km.

(xvii) **SCZMA Approval:** The West Bengal Coastal Zone Management Authority (WB CZMA) has recommended the proposal vide their letter no. 538/EN/T-II-4/005/2014 dated 26.02.2015 and corrigendum dated 18.03.2015.

(xviii) Mathematical Modal Studies for development of berthing facilities at Shalukhali in Hugli Estuary were conducted using the pertinent modules of MIKE-21 software installed through WAPCOS for KoPT studies at CWPRS. The conclusions of the studies are:

(xix) The bathymetry in the reach of the proposed location of four Jetties with about 400 m to 500 m approach trestle near Shalukhali falls in a stable reach of the Hugli estuary and has potential for maintaining enhanced drafts in the berthing area with marginal maintenance dredging.

(xx) The proposed jetties will have relatively stable approach conditions for navigation through Rangafalla channel from Sagar anchorage.
(xxi) The hydrodynamic conditions at Jetty nos. 1,2,4 and 4 are suitable for providing favorable alignments for the berthing face of the Jetty heads with mooring forces falling within permissible limits.
(xxii) The morphological model simulations indicate that there would be marginal changes in the bathymetry around the development site.
(xxiii) **Investment/Cost:** Cost of the project is Rs. 1707.5 Crores.
(xxiv) **Public Hearing** for the project was conducted on 05.02.2015. The summary of the issues raised during the public hearing along with response of PP were presented before the EAC. The following major issues were raised:

a. Look in to the employment issue of local people
b. Compensation for occupying the Government land for long period
c. Bad conditions of the Roads
d. Status of dust pollution in adjoining area.
e. Drinking water to be made available in the area

(xxv) **Employment potential:** In response the PP submitted that the project will generate direct and indirect employment for local people.
(xxvi) Regarding compensation, KPT has already paid the amount to the Government as per the prevailing law. To control dust pollution, it is proposed to dispatch 90% of the total cargo through rail route. A four lane road has been proposed for connectivity of the Dock. The water distribution network proposed by HDA will benefit the local people.

4. The project was re-considered by the EAC in its meeting held on 19th – 21st May, 2015 for grant of Environmental and CRZ Clearance. As per recommendations of the EAC, the Ministry of Environment, Forest & Climate Change hereby accords Environmental and CRZ Clearance for the above-mentioned project **'Development of Port facilities at Haldia Dock-II' at Mouza Shalukkhali & Rupnarayanchak, P.S. Sutahata, District East Medinipore (West Bengal) by Kolkata Port Trust**, under the provisions of the Environment Impact Assessment Notification, 2006 and CRZ Notification, 2011 and amendments thereto and Circulars issued thereon and subject to the compliance of the following specific conditions, in addition to the general conditions mentioned below:-

**A. <u>SPECIFIC CONDITIONS</u>:**

(i) 'Consent to Establish' shall be obtained from State Pollution Control Board under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.

(ii) The coal from the ships shall be conveyed through closed conveyor to the coal stock yard. The conveyor shall be seamless without joints/transfer points.

(iii) Stacking of Cargo will be made on concrete surface along with drainage arrangement for the collection of leachate. The same shall be treated before disposal. The disposal shall meet the norms specified by the SPCB.

(iv) The coal shall be stored only in designated stock yard with dust control measures viz. wind screen of height at least 2m above the of coal stock, made of fabric/HDPE or any better closed alternative, water sprinkler assignment, green belt of at least three layers of suitable trees and shrubs.

(v) The water sprinkling shall be done regularly to mitigate dust emissions.

(vi) Domestic waste water from the proposed dock-II shall be treated and reused for gardening and dust suppression. There shall be no discharge in to the Sea/ river.

(vii) Oily bilge water and ballast water generated from ships shall be treated in the existing Ballast water Treatment Plant at Haldia Dock Complex.

(viii) Hazardous wastes shall be stored separately in a secured enclosure and be disposed through the TSDF of West Bengal Waste Management Ltd at Haldia.

(ix) The port shall ensure that the ship under operation follows the MARPOL convention regarding discharge or spillage of any toxic, hazardous or polluting material like ballast water, oily water or sludge, sewage, garbage etc.

(x) All the recommendation of the EMP shall be complied with letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to Ro, MoEF along with half yearly compliance report.

(xi) All the recommendations and conditions stipulated by the West Bengal Coastal Zone Management Authority (WB CZMA) vide letter no. 538/EN/T-II-4/005/2014 dated 26.02.2015 and corrigendum dated 18.03.2015, shall be complied with.

(xii) Oil Spill Contingency Management Plan shall be put in place.

(xiii) As committed, Project Proponent shall earmark and develop 33% of proposed dock area for Green belt development and such green belt shall be developed @1500 Nos. of tree per Ha.

(xiv) There shall be no disposal of wastes in to the coastal areas.

(xv) On site Emergency Management plan shall be put in place.

(xvi) A separate Environment Monitoring Cell shall be set up especially for this plant and details shall be submitted to the Ministry prior to the commencement of operation.

(xvii) There shall be no ground water drawal within CRZ area.

(xviii) Sewage shall be treated and the Treatment Facility shall be provided in accordance with the Coastal Regulation Zone Notification, 2011. The disposal of treated water shall confirm the regulation of State Pollution Control Board.

(xix) Solid Waste Management shall be as per Municipal Solid (Management and Handling) Rules, 2000.

(xx) The project shall be executed in such a manner that there shall not be any disturbance to the fishing activity.

(xxi) It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project.

(xxii) No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.

(xxiii) The project proponent shall set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.

(xxiv) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.

(xxv) The responses/commitments made to the issues raised during public hearing shall be complied with in letter and spirit. A hard copy of the action taken shall be submitted to the Ministry.

(xxvi) The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report so also during their presentation to the EAC.

(xxvii) Corporate Social Responsibility:

a. The Company shall have a well laid down Environment Policy approved by the Board of Directors.
b. The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/ deviation/violation of the environmental or forest norms/ conditions.
c. The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.
d. To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.

**B. GENERAL CONDITIONS:**

(i) Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.

(ii) Full support shall be extended to the officers of this Ministry/ Regional Office at Bhubaneswar by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.

(iii) A six-Monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bhubaneswar regarding the implementation of the stipulated conditions.

(iv) Ministry of Environment, Forest & Climate Change or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with.

(v) The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry.

(vi) In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment, Forest & Climate Change.

(vii) The project proponents shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work.

(viii) A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion/ representation has been made received while processing the proposal.

(ix) A copy of the environmental clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.

5. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 1994, including the amendments and rules made thereafter.

6. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

7. The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental and CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment, Forest & Climate Change at http://www.envfor.nic.in. The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhubaneswar.

8. This clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

9. Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

10. Status of compliance to the various stipulated environmental conditions and environmental safeguards will be uploaded by the project proponent in its website.

11. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

12. The proponent shall upload the status of compliance of the stipulated Clearance conditions, including results of monitored data on their website and shall

update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

13. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

14. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of Clearance conditions and shall also be sent to the respective Regional Office of MoEFCC by e-mail.

30/7/2015

**(S.K Srivastava)**
**Scientist E**

Copy to:

1. The Secretary, Department of Environment, Government of West Bengal, Kolkata
2. The Member Secretary/Chief Environment Officer, West Bengal State Coastal Zone Management Authority, Poura Bhavan, Block – FD-415A, 4th Floor, Sector – III, Salt Lake City, Kolkata – 6
3. The Chairman, CPCB, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 32
4. The Member Secretary, West Bengal Pollution Control Board, Bldg No:10-A, Block L-A, Sector III, Salt Lake City, Kolkata – 98
5. Additional Principal Chief Conservator of Forests (C), Ministry of Environment, Forests and Climate Change, Regional Office (EZ), A/3, Chandersekharpur, Bhubaneswar – 23
6. Guard File.
7. Monitoring Cell, MoEFCC.

30/7/2015

**(S.K Srivastava)**
**Scientist E**