



EXECUTIVE SUMMARY

1. Introduction

The December 2004 Tsunami swept the lives of fishermen and washed off all fishing boats in Vellapallam fishing hamlets in Nagapattinam District, Tamil Nadu. The type and the extent of destruction still remain as a nightmare in every surviving fishermen mind. Today, Vellapallam is harbouring around 3686 active fishermen and 3490 women fish vendors with 9 mechanized boats, 488 FRPs and 86 catamarans but with no safety for the boats and life of the people to face any future natural disaster. The development of harbour facility with sufficient protection from waves, storm surges and Tsunami is extremely important for the surviving group of the fishermen.

Department of Fisheries, Government of Tamil Nadu has planned to develop fishing harbour facility at Vellapallam in order to fulfill the long term aspirations of the people of Vellapallam and its neighboring five coastal villages. Vellapallam is known historically as a fishing village actively engaged in fishing activities over several centuries and the other five villages in the nearby region which be benefited of the proposed facilities at Vellapallam are: Kameswaram, Vilunthamavadi, Vanavanmahadevi, Naluvethapathi and Pushpavanam.

Indomer Coastal Hydraulics (P) Ltd., Chennai, an ISO 9001:2015 and QCI-NABET accredited and CDC accredited organization has prepared the Detailed Project Report (DPR) and the respective EIA & EMP reports for the development of Vellapallam Fishing Harbour. Indomer, which is a QCI (NABET) accredited organization vide NABET/EIA/1720/SA 90 & 27.05.19., for Sector 33: Ports, harbours, jetties, marine terminals, breakwaters and dredging. The baseline data collection were collected during February 2016, October 2018 and November 2019.

2. Project Description

The proposed fishing harbour at Vellapallam planned to provide safe berthing facilities for the fishing vessels throughout the year, aimed to support the livelihood and to act as the safety barrier for the people in the inhabited areas of the Vellapallam. Once the fishing harbour is developed the number is expected to increase to 1000 FRPs and 100 MFVs. The length of the harbour between the two breakwaters will be 700 m, northern breakwater - 1080 m, southern breakwater - 1300 m, vertical wharf - 450 m, beach landing for FRP's and Catamarans - 450 m, depth inside harbour - 3 m w.r.t. CD. The details of various marine and onshore facilities provided are:

- 1. Breakwaters,*
- 2. Wharf for landing,*
- 3. berthing and outfitting,*
- 4. Beach landing for traditional crafts,*
- 5. Boat repair yard,*
- 6. Fuel supply and storage,*
- 7. Administrative building,*
- 8. Sloping yard,*
- 9. Auction hall,*
- 10. Ice point,*
- 11. Net mending shed,*



12. UG sump,
13. Pump and OHT for fresh water,
14. Communication tower,
15. Internal road pavements,
16. Drainage with screens,
17. Navigational aids,
18. Power and lighting,
19. Security system,
20. Compound wall,
21. Green and landscaping,
22. Gear cloak shed,
23. Restaurant/ Shop/ ATM,
24. Distribution System for Fresh water and Saline water,
25. Vehicle parking area,
26. Toilets with Septic Tanks,
27. Covered Settling Tank with vent,
28. Covered Sludge Drying Beds,
29. Compost Plant,
30. Composted Material Storage Shed,
31. Dried shell Storage shed,
32. Bins for inorganic waste disposal,
33. Generator and Transformer Yard and
34. Waste management facility.

The layout is planned accordingly keeping in view the future requirements. The dredge depth proposed is (-) 3.0 m CD. Suitable dredging methodology will be utilized to carry out the dredging and dredged spoil will be reclaimed in the shore. The detailed BoQ has been worked out for each and every item of both onshore and offshore facilities. The estimated cost of the project is Rs. 100.00 crores.

**DEVELOPMENT OF FISHING HARBOUR AT VELLAPALLAM,
NAGAPATTINAM DISTRICT, TAMIL NADU
REVISED COST ESTIMATES
ABSTRACT**

| Sl. No | Qty (Nos) | Description | Amount (in Lakhs) |
|-------------------------|-----------|---|-------------------|
| Shore Facilities | | | |
| 1 | 1 | Auction Hall - A | 189.50 |
| 2 | 1 | Auction Hall - B | 132.50 |
| 3 | 1 | Net Mending Shed | 74.00 |
| 4 | 1 | Administration Building & Health Centre | 38.50 |
| 5 | 1 | Communication Tower | 48.00 |
| 6 | 1 | Security Kiosk | 16.00 |
| 7 | 1 | Public Toilet (2) | 50.00 |
| 8 | 1 | OHT | 14.50 |
| 9 | 1 | Fishermen Rest shed | 35.00 |
| 10 | 1 | Boat Repair workshop | 30.00 |



| Sl. No | Qty (Nos) | Description | Amount (in Lakhs) |
|--------------------------|-----------|---|-------------------|
| 11 | 1 | Road | 387.00 |
| 12 | 1 | Compound wall & Arch | 83.00 |
| 13 | 1 | External Electrification | 53.25 |
| 14 | 1 | Generator Room | 13.00 |
| 15 | 1 | Fresh Water Sump | 7.00 |
| 16 | 1 | Transformer Yard | 25.00 |
| 17 | 1 | Waste disposal unit & Decompose yard | 25.00 |
| 18 | 1 | Vehicle Parking | 25.00 |
| | | | 1246.25 |
| Marine facilities | | | |
| 1 | 1 | Break water | |
| | | i) South Breakwater (1400m) | 3032.00 |
| | | ii) North Breakwater (1100m) | 2295.00 |
| 2 | 1 | Diaphragm wall | 635.00 |
| 3 | 1 | Sloping Yard | 180.00 |
| 4 | 1 | Dredging, reclamation and Levelling | 728.00 |
| | | | 6870.00 |
| | | Total | 8116.25 |
| 1 | | Shore Protection measure | 50.00 |
| 2 | | Greeneries Development | 5.00 |
| 3 | | Documentation charges | 10.00 |
| 4 | | Advertisement charges | 10.00 |
| 5 | | Rain water harvesting | 5.00 |
| 6 | | Environmental study, Geotechnical and EMP | 25.00 |
| 7 | | Basic firefighting facilities | 10.00 |
| 8 | | Provision for unexpected subsoil variation | 40.25 |
| 9 | | GST (12%) | 973.95 |
| 10 | | Labour Welfare fund (1%) | 81.16 |
| 11 | | Ps Charges and Contingencies | 202.91 |
| 12 | | Break water Sinkage and Settlement etc., due to poor soil | 370.00 |
| 13 | | Link road b/w Manikapangu village to FH (LS) | 100.00 |
| | | Total | 1883.27 |
| | | Grand Total | 9999.52 |
| | | Say | 10000.00 |

Engineering design: Architectural and engineering design of various onshore structures such as auction hall, port administration building, restaurant, rest-shed for fishermen, public toilets, utilities and services, roads and pavements, greeneries etc. were done based on the geotechnical investigations for the design of foundations. The offshore structural design include design of breakwaters, wharf, sloping ramp, dredging etc.



3. Description of the Environment

The baseline data collection for EIA study was collected during fair weather period (February 2016), NE monsoon (October 2018) and SW monsoon (August 2019). Baseline status for 10 km around the study area on ambient air, noise levels, surface and ground water, soil, seawater, seabed sediment, ecology and biodiversity and socio economics were monitored by NABET accredited EIA consultant Indomer Coastal Hydraulics (P) Ltd. The collected data were analysed by Indomer Inhouse Laboratory which is accredited by NABL.

Ambient air quality: Monitoring of particulate matter and gaseous pollutant was carried out at 4 locations as specified in NAAQS, 2009. The sampling was carried out using high and low volume air samplers. Air quality monitoring results shows that, pollutants are within NAAQ Standard.

Ground water quality: Water samples were collected at 4 locations to assess the ground water quality in the project region. The collected samples were analysed and compared with IS 10500:2012. Ground water quality results shows that most of the water quality parameters are within the norms of IS 10500:2012. Turbidity is slightly higher than the norms at some stations. The ground water quality shows the trace of impact due to Gaja Cyclone. The water quality will get reverse/improve once monsoon rainfall/heavy runoff occurs.

Surface water quality: Surface water samples were collected at 4 location to assess the surface water quality. The collected samples were analysed and compared with CPCB standard. The surface water quality results suggests that the surface water bodies within study area are satisfying various designated uses, as per CPCB criteria. Most of the surface water quality parameters are falls under class A. Surface water can be used for drinking purpose after some preliminary treatment. Surface water can be used for drinking purpose after some preliminary treatment. The surface water quality shows the trace of impact due to Gaja Cyclone. On the otherhand, the surface water quality is good.

Soil quality: Soil samples were collected at 4 location to know the soil quality in the project region. The soil texture in the project region is predominantly comprised of clay and sand. The soil quality results show that the soil in the project area is free from any contamination. The soil is varying from acidic to basic and are low in nutrients status.

Noise measurements: Noise level monitoring was carried over at 4 location for the assessment of the existing noise level status. The measured noise levels were within the Ambient Noise Standard prescribed under Noise Pollution (Regulation and control) Rules, 2000.

Socio-economic environment: Socio economic study was conducted by covering 10 km radius around the project region. The survey indicates that there are no major industries within the project region. The villagers around the project region is mainly depend on Fishing, aquaculture farms, salt pans as their source of income. The study area is underdeveloped in terms of infrastructure facilities, higher educational facilities.

Marine environment: The baseline data on marine environment on physical, chemical and biological parameters have been collected. Physical parameters: Winds, Storm, Waves, Tides, Currents, Salinity and Temperature, Littoral Drift and Bathymetry. Seawater quality



parameters: Temperature, Salinity, pH, Total suspended solids, Dissolved oxygen, Biochemical oxygen demand, Turbidity, Ammonia - N, Nitrite - N, Nitrate - N, Total Nitrogen, Inorganic phosphate, Total phosphorus, Lead, Cadmium, Chromium, Mercury, Phenolic compounds, and Petroleum Hydrocarbons. Sediment quality parameters: Sediment structure, Total Organic Carbon, Total Nitrogen, Total Phosphorous, Calcium carbonate, Cadmium, Lead, Chromium, Mercury, Phenolic Compounds and Petroleum Hydrocarbons.

4. Anticipated Environment Impacts

Project activities are planned both on terrestrial and marine environment. The onshore will be constructed in land area devoid of human settlement the anticipated impacts on terrestrial environment during construction phase and operational phase appears to be minimum. The construction of breakwater, wharf may cause impacts on the marine environment.

4.1. Terrestrial Environment:

The impact on terrestrial environment are due to operation of construction equipment, transport of construction material etc. No ground water will tapped during construction and operational phase of the project. As there in no manufacturing activity within the port, no process related wastewater generation is envisaged. The sewage from the proposed project shall be sent to STP within the harbour. The treated water will be used for green belt development. Proper sanitation facilities like toilets and bathrooms will be provided for workers. On completion of civil work, materials like wooden scrap, steel scrap cement, gravel etc., unused paint, diesel oil and other debris will be collected and disposed as per norms to prevent any adverse impact on the land environment and to maintain the aesthetics.

Mitigation measures:

- Water sprinkling will be practiced at unpaved roads and dust-prone areas.*
- Engines and exhaust systems of all vehicles and machinery and equipment will be regularly maintained to keep the emission under statutory limits.*
- Vehicles with valid PUC only will be allowed to operate.*
- Wastage of water during construction phase will be prevented by promoting awareness.*
- Site drainage plan to prevent any water logging during the construction and operational phases will be executed. Site run off during the rainy season will be channelled through storm water drains. The runoff will be directed to the rainwater collection tank.*
- Proper lubrication, muffling and modernization of equipment will be done to reduce noise.*
- Periodic ambient noise level monitoring will be carried out.*
- Fuels, paints and lubricants will be stored at designated covered site with containment and concrete floor to prevent ground contamination and restrict spill.*
- Solid waste from labour camp and barges will be collected and properly disposed.*
- The ground will be levelled, compacted and strengthened with green belt as proposed.*



- *Usage of non-recyclable plastics will be discourage inside the port.*

4.2. Marine Environment

Construction of breakwater and wharf, Piling, dredging and disposal of dredged material can have impact on seawater and seabed sediment quality, shoreline, flora and fauna. Numerical modeling using MIKE 21 has concluded that no significant change in the flow field outside the breakwaters before and after the construction and also no significant change in the bed level.

Construction of breakwater, Piling and dredging have potential to disperse the bed sediment in the water column and increase the suspended sediments. The characteristic of the seabed sediment suggests that the texture is clayey. The piling and dredging would impact though locally, the sub tidal benthic communities. Thus, the benthos at pile footprint would be lost permanently while at dredged sites their recolonization would eventually occur.

Mitigation Measures:

- *Efficient piling and dredging equipment will be deployed and the dredging will be confined to the planned area only.*
- *Construction schedule should be strictly followed.*
- *Waste materials should not be disposed into seawater.*
- *Regular mock drills and training will be provided to the concerned port personnel for combating oil spills.*

5. Post Project Monitoring

The responsibility for ensuring the effective implementation of environment monitoring programme will lie with head of environmental cell for the fishing harbour along with support of environment professional. During the construction stage, inspection will be conducted by environment team who will be responsible for ensuring effective implementation of the Environmental Management Plan.

Post project monitoring on terrestrial environment and marine environment will be carried out in the same locations where the baseline data were collected so that changes if any in the baseline data after operational phase of the project could be studied. If there is any aberrations is noted comparing the baseline data, then proper mitigation measure has to be implemented.

6. Additional Studies

Risk Assessment and Disaster Management Plan

To manage and control the risk and also to mitigate the impacts of the proposed activities and effective functioning of the fishing harbour, it is suggested that an Operation and Maintenance manual shall be prepared and strictly followed. It should include a Comprehensive Maintenance Management System (CMMS) Guidelines, Emergency



Procedures, Incident Management Plan and Environmental Response Plan. In case of any emergency incident management plan shall be followed to reduce impact due to risk.

Disaster Management Plan including natural disasters has also been prepared and included in the report. Necessary safety procedures will be followed to minimize the impact of risks involved.

As the project is located on the coast, the area is vulnerable to natural disasters. Although, these are rare events, proper and effective coordination with local, national agencies and Govt., bodies will be the key to manage such events. Necessary facilities for emergency management will be provided to the workers. Emergency facilities include Lifesaving jackets, ropes, demarcation of Assembly Points, Evacuation Routes and Medical Facilities. An Emergency Disaster Management Cell will be formed to deal with emergency situations.

Modelling studies

The modelling studies covers in brief the results of model studies to ascertain the parameters such as wave tranquility inside the harbour basin for different wave climate, littoral drift.

7. Project benefits

The development of fishing harbour will benefit the local fishing community in terms of safe landing of the fishing crafts and facilitate their operations including net mending and marketing of fish. Employment will be generated and livelihood of fisherfolk will improve.

8. Environment Management Plan

EMC is in place to ensure the implementation of Environment Management Plan. Periodic review and audits will be conducted for checking the effectiveness of implementation of mitigation measures listed in the EIA report. Environment Management Cell will be responsible for the Post project monitoring results & evaluation and annual review of EMP. Both terrestrial and marine environment management plan are suggested to mitigate the impacts of the project during construction and operational phase of project. The EMC will report environmental performance and monitoring reports regularly to statutory authorities. The separate environmental budget of about ₹ 80 Lakhs will be allocated for the proposed project. Greenbelt will be developed within the harbour premises and also suggested to take mangrove afforestation at appropriate location in consultation with Forest Department.

9. Conclusion

Baseline environment study has been conducted to establish the prevailing status of the study area within 10 km from the project site. The significant environment parameters for the terrestrial and marine environment are compared with the available National Standards. The impact assessment shows that there are no significant negative impacts due to proposed project activities on surrounding environment. The implementation of suggested mitigation measures and environment management plan will ensure to keep the anticipated impacts to minimum so that the project will be completed without any significant change in baseline environment status.