Vizhinjam International Seaport Limited

(A Government of Kerala Undertaking)

VISL/2014-15/EE&EI-9/248

28th May 2018

Additional Principal Chief Conservator of Forests (C),
Ministry of Environment Forest and Climate Change,
Regional Office (SZ), Kendriya Sadan, 4th Floor, E&F Wings, 17thMain Road,
Koramangala II Block, Bangalore-560034 (Karnataka)
rosz.bng-mef@nic.in PH: 080-25532577, Fax: 080-25537184

Dear Sir,

Sub: Half yearly Compliance report of Environmental and CRZ clearance for Vizhinjam International Multipurpose Deepwater Seaport for the period of October 2017 to March 2018 – reg.

Ref: 1) F.No.11-122/2011-IA.III dated 3rd January 2014 of MoEF issuing Environmental Clearance
2) No.1285/A3/13/KCZMA/S&TD dated 24th August 2013

This has reference to the Environmental & CRZ Clearance (EC) issued on 3rd January 2014 (Ref 1) by the Ministry of Environment, Forest & Climate Change (MoEF&CC) to the proposed Vizhinjam International Multipurpose Deepwater Seaport at Vizhinjam in Thiruvananthapuram District of Kerala State based on the recommendation of KCZMA vide the reference cited (2).

The compliance report of the conditions stipulated in the cited reference for the half yearly period from October 2017 to March 2018 is enclosed herewith, in both hard and soft copy for record and reference.

Yours Sincerely
For Vizhinjam International Seaport Ltd

Managing Director& CEO

Encl: Compliance Report (hard & soft copy)

Copy to: (1)**The Director (Monitoring-IA II Division)**, Ministry of Environment, Forest & Climate Change, IndraParyavaranBhavan, JorBagh, New Delhi - 110003
(2)**The Zonal Officer**, Central Pollution Control Board (CPCB), Zonal Office, 1st& 2nd Floors, NisargaBhavan, A Block, Thimmiah Main Road, 7th D Cross Shivanagar, Opp. Pushpanjalai Theatre, Bengluru – 560 010.
(3)**The Member Secretary**, Kerala State Pollution Control Board, Thiruvananthapuram Regional Office, Plamoodu, Pattom P.O., Thiruvananthapuram – 695 004
(4)**The Member Secretary**, KCZMA, ShatraBhavan, Pattom P.O. Thiruvananthapuram – 695 004
(5) Shri. Rajesh Jha, MD& CEO AdaniVizhinjam Port Private Ltd. (AVPPL), 2nd Floor, Vipanchika Tower, Near Govt. Guest House, Thycaud P.O., Thiruvananthapuram- 14

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CIN: U45309KL2004SGC017685

VIZHINJAM INTERNATIONAL SEAPORT LIMITED

(A Government of Kerala Undertaking)

Vizhinjam International Deepwater Multipurpose Seaport

Half yearly Compliance report of conditions of Environmental and CRZ Clearance

Period: October 2017 to March 2018

June 2018

Development of Vizhinjam International Deepwater Multipurpose Seaport

Compliance Report

Environmental Clearance F. No. 11-122/2011-IA.III dated 3rd January 2014

Project Concessionaire

Adani Vizhinjam Port Private Ltd.

Project Authority

Government of Kerala

Implementing Agency on behalf of Government of Kerala

Vizhinjam International Seaport Limited

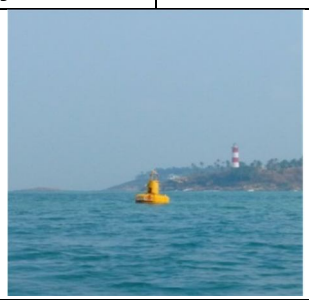
(A Government of Kerala Undertaking)

June 2018

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
11.	**Specific Conditions**	
(i)	"Consent for Establishment" shall be obtained from Kerala State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.	Complied "Consent for Establishment" has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018. Copy submitted to MoEF&CC with the compliance report submitted for the period October15-March'16 dated 27.05.2016 (Ref No: VISL/2014-15/EE&EI-9/229).
(ii)	Project Proponent shall carry out intensive monitoring with regulatory reporting six monthly on shoreline changes to the Regional Office, MoEF.	Complied Shoreline monitoring for a stretch of 40 Km (20 Km on both sides of the project site) is being done and reports are regularly submitted to MoEF&CC as part of Six monthly compliance report. Report for the period October 2017 to March 2018 is enclosed as **Annexure 1** in CD. The 1st Mathematical Report prepared by L&T Infrastructure Engineering Pvt. Ltd. (LnTIEL) based on Shoreline Monitoring data for the period Feb'15-Feb'17 has been submitted with previous compliance report (Apr'17-Sep'17) in Nov'17. The 1st mathematical modelling report has affirmed that the shoreline change is in line to the prediction done as part of the EIA report. We are continuing with the same practice, and, the shoreline data from March 2017 to February 2018 is submitted to LnTIEL for mathematical modelling to assess the impact on shoreline under the guidance of National Institute of Ocean Technology (NIOT). Mathematical modelling report so prepared will be submitted within due course to all the statutory authorities. Long term shoreline change monitoring employing satellite images has been initiated through NIOT, the report of which will be submitted with next compliance report.
(iii)	The capital dredged material (7.6 Mm^3) shall be utilized for reclamation of berths.	Being Complied The dredged material till 31st March 2018 amounting to 2.26$Milm^3$ has been utilized for reclamation of 30 Ha area. As of November 2017, 35 Ha. reclamation was done. Some

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		portion of reclaimed area has been washed away due to cyclone Ohki, which passed Kerala coast on 30th November 2017. There has been nil dredging and reclamation thereafter. The dredged material has been used for reclamation only.
(iv)	Additional fish landing centre shall be developed as part of the proposed Vizhinjam port for upliftment of fisheries sector.	Being Complied The work for construction of the fish landing centre and the fishery breakwater has been initiated as part of the funded work component of the concession agreement with AVPPL. The EPC contactor for development of aforesaid activity has been finalized and work orders has been issued. A budgetary provision of 16 crores for Fish Landing Centre and 131.12 crore for fishery breakwater has been kept. 565 meter length of breakwater was completed which forms part of the new fishing harbor but during cyclone Ohki approx. 200 meter of breakwater was partially washed off. At present fishing boats are docked in the proposed area affecting the progress of fishery berth. The GoK has initiated discussions with fishermen representatives for removal of the boats to facilitate construction work.
(v)	The project shall be executed in such a manner that there is minimum disturbance to fishing activity.	Being Complied Following is being practiced to ensure minimum disturbance to fishing activity • Works are planned in such a way that the movement of fishing boats is not hindered due to project construction. • Signboards have been placed for demarcation of construction area • For mutual understanding of the developmental activities with the local fishing community an exclusive CSR team has been assigned, details are given in **Annexure 2**. • Using the technological advancement/digital media a dedicated whatsapp group has been formed by CSR team for fisherman/fishing community members to facilitate the flow of various project related information/updates as

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)

Sl. No.	Conditions	Compliance Status as on 31-03-2018
		necessary/useful • Turbidity buoys at 3 locations identified by NIOT have been deployed and continuous monitoring is carried out to assess the real time turbidity. One turbidity buoy (Buoy – 3) was damaged during cyclone Okhi which passes Kerala Coast on 30th November 2017 and is not operational since December 2017 and its redeployment is under process. The turbidity details are given in Table 13 of **Annexure 1** (OSaS/P21716/ AVPPL /PSR-(20, 22 to 25)/118 and in Table – 15, PSR-congenial to the designated use. • Marine Water Quality is being monitored regularly and reports are submitted as part of compliance report. No abnormal results were observed during the monitoring period. (**Refer Annexure 11).**  **Buoy -1**  **Buoy -2**  **Buoy -3**
(vi)	Steps would be taken to safeguard the interests of the fisheries sector as detailed in the Resettlement Action Plan (RAP), Corporate	Being Complied As per the EIA report 7.1 crores was set apart as compensation as livelihood affected fisherman. However the amount was enhanced by GoK for the benefit of the

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	Social Responsibility (CSR) and in the Integrated Fishing Community Management (IFCMP), namely a component of Rs.7.1 crores as part of the compensation package for the fisheries sector, as livelihood restoration measures for mussel collectors, shore seine fishermen and others. Rs.41.30 crores as part of CSR activities in the fisheries sector under (i) water supply scheme (7.3crores) (ii) new fishing landing centre (16crores) (iii) adoption of existing fishing harbor (5crores) (iv) sea food park (4crores) (iii) skill development centre (4crores) (iv) environmental sanitation (3crores) and (v) solid waste management (2crores).	affected fishermen. Till date an amount of Rs. 32.04 crores have been disbursed to a total number of 2391 Livelihood Affected Persons (LAP's) whose verification has been completed in all respects. This includes 2116 numbers of boat owners as well to whom kerosene is supplied free of cost during the port construction period. Verification of the documents of balance LAP's is in progress. The status of the CSR activities envisaged in the fisheries sector is as follows. **Water supply**: Scheme has been commissioned in April, 2013 by VISL by spending an amount of Rs. 7.3 crores. For O&M of the same an amount of 3.97 crores has been spent till date. **Fish Landing centre**: Construction of the fish landing centre (Rs.16 crores) and the fishery breakwater (Rs.131.12 crores) has been initiated as a part of funded work of the phase 1 project. 565 meter length of breakwater has been completed which forms part of the new fishing harbor. At present fishing boats are docked in the proposed area affecting the progress of fishery berth. The GoK has initiated discussions with fishermen representatives for removal of the boats to facilitate construction work. **Existing fishing harbor**: Tenders for modernization of the existing fishing harbor was invited by HED and work awarded. However the works could not be initiated due to sectoral protests among different fishermen groups. **Seafood park**: Procurement of land for seafood park (Rs.26 crores) by VISL has been completed. Actions for selection of consultant for preparation of DPR initiated with the assistance of Kerala State Industrial Development Corporation (KSIDC) so as to commission the same along with the completion of the new fishing harbor. Relating to the activities carried out for skill development, environmental sanitation and solid waste management refer **Annexure 2** for the period of October 2017 to March –2018.

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
(vii)	Rail connectivity shall be parallel to the harbour road on elevated structures at +4/5.00 m level without affecting the entry to the existing harbor.	Will be complied The Konkan Railway Corporation has been engaged as a consultants for turnkey execution of the project, the option of tunnel is being looked into to minimize the disturbance.
(viii)	Compensation packages in accordance with the Central/State Government norms shall be given to all the authorized-cum-affected (having valid clearances as applicable) resort owners.	Based on G.O,(Rt) No.2021/2017/RD dated 27-04-2017, government ordered to pay compensation for land and not for the structures since they were in violation of CRZ notification. Later based on G.O,(Rt) No.17/2017/F&PD dated 08-08-2017 the GoK ordered to pay compensation for structures constructed in violation of CRZ notification also. However based on the advice of the Advocate General Kerala the payment for structures constructed in violation of CRZ notification has been withheld since the EC condition specifies that the compensation shall be given to authorized-cum-affected (having valid clearances as applicable) resort owners.
(ix)	The port shall ensure that all ships under operation follow the MARPOL convention regarding discharge or spillage of any toxic, hazardous or polluting material like ballast water, oily water or sludge, sewage, garbage etc. The emission of NOx & SOx shall remain within permissible limits.	Will be complied Currently project is under construction. This shall be complied during operational phase.
(x)	CSR activities shall cover villages within 10 km radius of the project.	Complied All CSR activities on livelihood development health, sanitation, education etc. are being implemented after receiving formal demand from social controlled institutions; Government controlled institution and recognized platforms. As indicated in EIA report during initial phase of development CSR activities will be taken for Vizhinjam & nearby village in 2Km radii, considering the same during Phase I implementation of the project, CSR activities are presently carried out in 5 wards namely; Mulloor, Kottapuram,

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		Vizhinjam, Harbour and Venganoor. An amount of 8.74 Crore has been utilized for CSR activities mainly in the field of Education, community health, sustainable livelihood, and Urban Infrastructure Development during the compliance periods. Details on CSR activities carried out by AVPPL during compliance period (October 2017 to March 2018) are enclosed as **Annexure 2.**
(xi)	Oil Contingency Management Plan shall be put in place.	Will be complied AVPPL has started the preliminary work for identification of suitable vendor to develop Facility Level Oil Spill Contingency Plan. Oil Contingency Management Plan will be prepared prior to completion of the project and shall be implemented prior to operation.
(xii)	All the recommendations /conditions stipulated by Kerala Coastal Zone Management Authority (KCZMA) shall be complied with.	Complied We are complying with all the recommendations/conditions of Kerala Coastal Zone Management Authority (KCZMA). Copy of Six monthly compliance reports is also being sent to KCZMA. Compliance report to the recommendation/conditions of KCZMA is enclosed as **Annexure 3**
(xiii)	The responses/ commitments made during public hearing shall be complied with in letter and spirit.	Complied We are complying with the responses/commitments made during public hearing (as applicable). Status of the same is being submitted regularly with Six monthly compliance reports to all the authorities concerned. The compliance status of the commitments made during Public Hearing & actions on the same is enclosed as **Annexure 4**
(xiv)	All the recommendation of the EMP shall be complied with in 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 MoEF along with half yearly compliance	Being Complied Project is in construction stage. Out of the 5 identified EMP areas, work has started in Port Site (Building construction in back up yard), in limited way in PAF (Project Annex Facility) and Warehouse Area (Only boundary wall) only. Recommendations of the Construction stage EMP for these areas are being implemented. Status of construction stage EMP in matrix format is enclosed as

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	report to MoEF-RO.	**Annexure 5.**
(xv)	The project proponent shall bring out a special tourism promotion package for the area in consultation with the State Government and implement the same along with the project.	Being Complied An integrated Area Development Plan is being prepared through the CEPT university, in consultation with Town Planning, Tourism, Industry and other line departments. The final report is expected in May 2018.
(xvi)	The project proponent shall place on its website its response to the Public Hearing, and representations as presented to the EAC in the 128th meeting held on 23rd November 2013, for information of the general public.	Complied All the relevant details pertaining to EIA, ToR, EAC meetings, Public Hearing, etc. related to the project have been placed on VISL website http://www.vizhinjamport.in/eia-30-5-13.php
(xvii)	There shall be no withdrawal of groundwater in Coastal Regulation Zone Area, for this project. In case any groundwater is proposed to be withdrawn from outside the CRZ area, specific prior permission from the concerned State/Central Groundwater Board shall be obtained in this regard.	Noted There will not be any withdrawal of groundwater in CRZ Area. In case of requirement of groundwater withdrawal outside CRZ area, specific prior permission will be obtained from State/Central Groundwater Board. The water supply scheme had already been commissioned with the source as Vellayani Lake. 3.00 MLD of raw water will be available for treatment with a net availability of 2.49 MLD of potable water. Out of this 1.49 MLD of water shall be distributed to the locality as part of social welfare measures of VISL. The balance 1.0 MLD is for the port use. Water requirement during construction is being met from the above source.
(xviii)	The Hazardous waste generated shall be properly collected and handled as per the provision of Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008.	Complied Presently M/s AFCONS and M/s B&R are the contractors working at site, under the EPC Contractor M/s HEPIPL, both the contractors have obtained separate consent from KSPCB for handling Hazardous Waste. During this compliance period (October 2017 to March 2018) 0.10 KL of used oil is generated and after discussions with KSPCB officials during their visits it has been stored as per Hazardous Waste Rules at site, and will be disposed to authorized (CPCB/SPCB) waste

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		oil handlers. A total of 5.0 KL of used oil was disposed during the compliance period (October 2017 to March 2018) to authorized (CPCB/SPCB) oil handlers.
(xix)	No hazardous chemicals shall be stored in the Coastal Regulation Zone area.	Complied No hazardous chemical is being stored in the Coastal Regulation Zone area.
(xx)	The waste water generated from the activity shall be collected, treated and reused properly.	Complied Only batching plant wash/reject is generated from the construction activity presently. For the same a settling tank is constructed and used for collection, and recycling of all wash water generated. Settled sludge is used for filling of low lying area 
(xxi)	Sewage Treatment facility should be provided in accordance with the CRZ Notification.	Will be complied The detailed port facility layout planning is under progress. Provision for installing sewage treatment facility of adequate capacity in phased manner has been kept and will be implemented in line to CRZ Notification along with the commissioning of the project in consultation with Kerala State Pollution Control Board (KSPCB).
(xxii)	No solid waste will be disposed of in the Coastal Regulation Zone area. The solid waste shall be properly collected, segregated and disposed as per the provision of Solid Waste (Management and Handling) Rules, 2000.	Being Complied No solid waste is being disposed of in the Coastal Regulation Zone area. Solid waste is being properly collected, segregated and disposed as per the Solid Waste Management Rules, 2016 As mentioned in EIA, contractors working at the site have been made responsible for management of Solid Waste during construction stage. They have obtained Consent of Kerala State Pollution Control Board and complying with the provisions pertaining to management of Solid Waste in line to Solid Waste Management Rules 2016.

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		   Solid Waste Management at Labour Camp
(xxiii)	Installation and operation of DG set if any shall comply with the guidelines of CPCB. Oil spills if any shall be properly collected and disposed as per the Rules. Project proponent shall install necessary oil spill mitigation measures.	Complied 24 DG sets are present at site. 17 DGs are operational and 7 DGs are standby. These are compliant to CPCB guidelines. A brief summary of DG sets present at site along with Pollution Control mechanism provided is attached as **Annexure 6.**
(xxiv)	No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	Being Complied Construction of the project is as per the approvals obtained.
(xxv)	The approach channel shall be properly demarcated with lighted buoys for safe navigation and adequate traffic control guidelines shall be framed.	Will be complied The project is in construction phase. The same shall be complied during operational phase
(xxvi)	The project proponent shall take up development of green belt in the project area, wherever possible. Adequate budget shall be provided in the Environment	Will be complied **Green Belt**: Although Natural green belt exist, the Greenbelt of adequate width with suitable species in consultation with forest department as identified in EIA will be developed in all possible areas including

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	Management Plan for such development.	Cargo storage areas and along the boundary of expansion project area. Currently reclamation of port back up yard is under progress. Greenbelt development plan has been considered in the Master Plan and adequate Budgetary provision has been kept for this purpose. **Compensatory Afforestation**: 12 Ha of land is identified by social forest department to carry out compensatory afforestation activities (at an aerial distance of 24 km from project site). In lieu of 1127 tress cut till now we require 7 Ha area for afforestation however keeping future felling of trees we are in the process of doing afforestation on 12 Ha land in Sainik School Trivandrum. Principal Chief Conservator of Forest has submitted the scheme for afforestation to Government of Kerala for approval (Attached as **Annexure 7**), and necessary funds for the same will be deposited to forest department. It is expected that afforestation activities will commence with the onset of monsoon.
(xxvii)	The fund earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.	Being Complied An amount of 40 Crores has been kept solely for EMP implementation and is not diverted for any other purpose. The breakup of EMP fund activity wise is enclosed as **Annexure 8.** An amount of 2.46 Cr has been utilized towards implementation EMP measures during compliance period (October 17 to March 18).
(xxviii)	The project proponent shall set up an organizational mechanism/institutional structure for Environment, Health & Safety & CSR under the supervision of a General Manager as outlined in the EIA Report for effective implementation of the stipulated EHS safeguards & CSR activities.	Complied During construction phase an officer of VISL has been designated as Head (EHS & CSR) for effective implementation of the stipulated EHS safeguards & CSR activities. AVPPL, the concessionaire executing the project has also appointed competent and qualified professional for effective implementation of EHS safeguards & CSR activities. In addition to the above, independent environment, health and safety consultants have been appointed as per concession agreement signed with AVPPL. It is also ensured that

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EMP measures Organizational Structure for Environment, Health, and Safety & CSR for construction phase is enclosed as **Annexure 9.**
(xxix)	Staff Colony should be located beyond CRZ area.	Will be complied Port facility planning is done in such a way that staff Colony will be located beyond CRZ area
12.	**General Conditions**	
(i)	Construction of the proposed structures shall be undertaken meticulously conforming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification, 2011 & its amendments. All the construction designs/drawings relating to the proposed construction activities must have approvals of the concerned Statutory Departments / Agencies.	Complied All the construction activities are being carried out as per existing Central/local rules. Necessary permissions under CRZ Notification 2011 & its amendments have been obtained. Further, necessary approvals from concerned Statutory Departments / Agencies have been obtained for the construction designs/drawings relating to the proposed construction as mentioned hereunder. • Consent to Establish from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015. • All permits required for construction of buildings as per building by laws will be obtained. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 7.12.2015 **(**Submitted along with the compliance report for the period ending June 2016**)** As per the exemption granted by Government of Kerala (GoK), we are not required to obtain any further permission to construct port related building within the port premises.
(ii)	Adequate provision for infrastructure facilities including water supply, fuel and sanitation must be ensured for construction workers during the construction phase of the project to avoid any damage to the environment.	Complied On an average 560 nos. of construction worker were engaged in the said activity on a daily basis, during the compliance period and were housed in a labor camp near to the project site as well as nearby resorts and were provided with all the necessary infrastructure facilities including water, electricity, fuel, sanitation etc.

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		A brief write-up highlighting the facilities/amenities given to construction workers engaged in construction activity along with photographs is attached as **Annexure 10.**
(iii)	Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.	Complied Digging activities were undertaken during the compliance period in limited way for road corridor construction. For the same AVPPL has engaged Kerala State Remote Sensing and Environment Centre (KSREC) to carry out study on the possible impact on groundwater system in the catchment area of 2 KM road corridor. Mitigation measures such as water sprinkling on roads, all vehicles have PUC certificate. Marine Surface & Ground water quality is monitored on a monthly basis in line to Environment Monitoring Plan prescribed in EIA and analysis reports are enclosed as **Annexure 11.** There are no significant changes observed in the water quality during the compliance period.
(iv)	Borrow sites for each quarry sites for road construction material and dump sites must be identified keeping in view the following: (a) No excavation or dumping on private property is carried out without written consent of the owner. (b) No excavation or dumping shall be allowed on wetlands, forest areas or other ecologically valuable or sensitive locations. (c) Excavation work shall be done in close consultation with the Soil Conservation and Watershed Development Agencies working in the area, and (d) Construction spoils	Complied Quarry material is being obtained from approved quarry sites only. The road so far constructed (a temporary road for construction purposes) has been made with material available on site and earth cutting generated from road corridor construction at present are dumped in Truck terminal area. • No excavation has been carried out in private property • No excavation or dumping has been carried out in wetlands, forest area or other ecologically valuable or sensitive locations. • No bituminous or hazardous material has been used

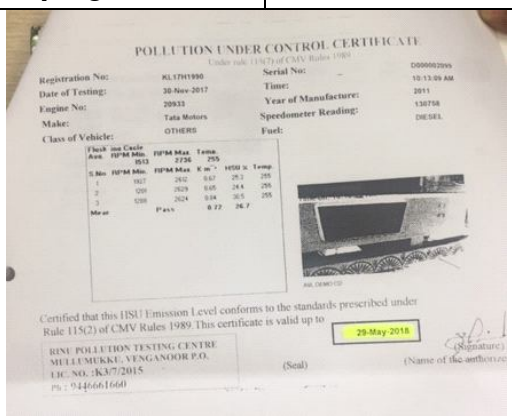
Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	including bituminous material and other hazardous materials must not be allowed to contaminate water courses and the dump sites for such materials must be secured so that they shall not leach into the ground water.	
(v)	The construction material shall be obtained only from approved quarries. In case new quarries are to be opened, specific approvals from the competent authority shall be obtained in this regard.	Complied The construction material was obtained from approved quarries. No new quarries have been opened for construction materials. In case of new quarries, necessary approvals will be obtained from the competent authority.
(vi)	The project authorities shall make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid wastes and noise level etc must conform to the standards laid down by the competent authorities including the Central/State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.	Being complied • No solid waste is being disposed of in the Coastal Regulation Zone area. • Solid waste is handled as per the Solid Waste Management Rules, 2016 • Sewage Treatment Plant (STP) will be installed in phased manner along with the project in consultation with Kerala State Pollution Control Board. • Environment Monitoring is being carried out as per Environment Monitoring Plan prescribed in EIA by NABL and MoEF&CC accredited agency; M/s. Ashwamedh Engineers & Consultant. Summary of the Ambient Air Quality Monitoring (AAQM) for duration from April-September 2017 is mentioned below. **Total Monitoring Location 5**

Parameter	Unit	Max	Min	Perm. Limit
PM_{10}	$\mu g/m^3$	98	41	100
$PM_{2.5}$	$\mu g/m^3$	40	9	60
SO_2	$\mu g/m^3$	6.2	4.0	80
NO_2	$\mu g/m^3$	9.7	3.0	80

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)

Sl. No.	Conditions	Compliance Status as on 31-03-2018
		<table><tr><td>CO</td><td>mg/m^3</td><td>BDL</td><td>BDL</td><td>4</td></tr><tr><td>HC</td><td>ppm</td><td>BDL</td><td>BDL</td><td>--</td></tr></table> • Detailed Monitoring Reports for the period October 2017 – March 2018 is attached as **Annexure 11**). • All the monitored parameters were found within the prescribed limit.
(vii)	The proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and control of Pollution) Act, 1974 and the Air (Prevention and control of Pollution) Act, 1981 from the Kerala State Pollution Control Board before commissioning of the project and a copy of each of these shall be sent to this Ministry.	Will be complied Consent To Operate (CTO) under the Water (Prevention and control of Pollution) Act, 1974 and the Air (Prevention and control of Pollution) Act, 1981 will be obtained from Kerala State Pollution Control Board before commissioning of the project. Copy of the CTO will be sent to Ministry on receipt.
(viii)	Adequate precautions shall be taken during transportation of the construction material so that it does not affect the environment adversely.	Complied During the Compliance period there was not much progress of construction work on account of Cyclone Okhi which hit the coast in Nov'17. However following precautionary measures are undertaken during transportation of the construction material as environment safeguard • Tarpaulin Cover is being used during transportation of construction material • All vehicles coming into the site are under a speed restriction of 20 kmph • Regular Water Sprinkling is done on the approach road by water tankers. • It is ensured that all vehicles entering the Port have a valid PUC certification • The dumpers have speed governors ensuring adherence to speed limit

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)

Sl. No.	Conditions	Compliance Status as on 31-03-2018
		 **Water Sprinkling in progress**  **Tarpaulin cover on trucks**  **PUC certificate**
(ix)	Full support shall be extended to the officers of this Ministry/Regional Office at Bangalore 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.	Noted. There was no visit by officers of Ministry/Regional Office at Bangalore during the compliance period. However NGT appointed committee reviewed the compliance condition of EC & CRZ on 05.02.2018 at Thiruvananthapuram. Further official from KSPCB also made visit to site on 17th January 2018. All necessary support was extended to the officials during the compliance review and site visit. The same will be extended in future also to all the officials of Ministry/Regional Office.
(x)	Ministry of Environment & Forests 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.	Noted for Compliance.
(xi)	The Ministry reserves the	Noted.

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	right to revoke this clearance if any of the conditions stipulated are not complied to the satisfaction of the Ministry.	
(xii)	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 & Forests.	Will be complied Adani Vizhinjam Port Private Ltd (AVPPL) is the concessionaire for implementing the project and operating it for the next 40 years, based on concession agreement signed between the Government of Kerala &, AVPPL on 17th August 2015. There is no change in the project profile.
(xiii)	The project proponent 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.	Complied Concession agreement with M/s AVPPL was signed on 17th August 2015. The layout of the port has been approved by Govt. of Kerala by letter No.308799/E1/15/F&PD dated 30th October 2015 **(**Submitted along with the Compliance Report of the period ending June 2016).The preliminary construction activities commenced at site on 16th November 2015 followed by official inauguration on 5th December 2015. Financing agreement forming part of financial closure was submitted by the concessionaire on 13th May 2016.
(xiv)	Kerala State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industries Center and Collector's Office/Tehsildar's office for 30 days.	Noted This condition does not pertain to project proponent. However, it is learnt that KSPCB has complied with the same.
13.	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 2006, including the amendments and rules	Noted for compliance

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	made thereafter.	
14.	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.	Complied All required clearances will be obtained before start of operation. However necessary approvals from concerned Statutory Departments / Agencies have been obtained for the construction designs/drawings relating to the proposed construction as mentioned below. • Consent to Establish from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015. • All permits required for construction of buildings as per building by laws will be obtained. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 7.12.2015 As per the exemption granted by Government of Kerala (GoK), we are not required to obtain any further permission to construct port related building within the port premises.
15.	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 Environment Clearance and copies of the clearance letters are available with the Kerala State Pollution Control Board and may also be seen on the website of the Ministry of Environment & Forest at http://www.envfor.nic.in. The advertisement should be made within 10 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	Complied Complied and intimated (with copy of advertisement) to the regional office of MoEF &CC, vide letter No. VISL/EC/MoEF/2013 dated 20-01-2014. Copy of the environment clearance is available on VISL website at http://www.vizhinjamport.in/eia-30-5-13.php.The same is also uploaded on APSEZ website at http://www.adaniports.com/ports-downloads?port=Vizhinjam-Port

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	Bangalore.	
16.	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.	Noted
17.	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.	Noted Three appeals challenging the EC granted to the project (two appeals filed at NGT, Southern Regional Bench, Chennai and one at NGT, Principal Bench, Delhi) and one original application (OA-filed at NGT, Principal Bench Delhi) indirectly challenging the CRZ Notification,2011 were filed as per the NGT Act,2010. The appeals filed at Chennai bench were later transferred to the Delhi bench. The Delhi Bench of NGT has upheld the Environment Clearance granted to the project vide its judgment dated 2nd September 2016
18.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, ZilaParishad/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.	Complied The Clearance Letter were submitted to the concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the Local NGOs from whom representations were received vide letter no VISL/EC/MoEF/2013 dated 29/01/2014
19.	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	Complied The copy of the last compliance report including the results of six monthly monitoring data (April 2017-September 2018) has been uploaded in company's web site http://www.vizhinjamport.in and also on Adani Ports website http://www.adaniports.com/ports-downloads?port=Vizhinjam-Port and

Half yearly Compliance report on conditions stipulated in Environmental & CRZ Clearance (Period: October 2017 to March 2018)		
Sl. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	submitted to the MoEF & CC Regional Office (Bangalore), Zonal office of CPCB (Bangalore), KSPCB, KCZMA vide letter No. VISL/2014-15/EE&EI-9 dated 28th November 2017. Environment Monitoring is being carried out as per the Environment Monitoring Plan prescribed in EIA by Ashwamedh Engineers & Consultant (NABL Accredited & MoEF&CC approved laboratory). Detailed Monitoring repots (Air, Water, Noise, Marine Water, Sediment) are enclosed as **Annexure 11**, additionally monthly monitoring results are also uploaded on the website of Adani Ports website http://www.adaniports.com/ports-downloads?port=Vizhinjam-Port.
20.	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.	Complied Compliance Report for the period April 2017-September 2017 has been submitted to the MoEF&CC, Regional Office (Bangalore),Zonal office of the CPCB (Bangalore), KSPCB & KCZMA vide letter No. VISL/2014-15/EE&EI-9 dated 28th November 2017 in hard copy as well through e-mail.
21.	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 Kerala 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 Offices of MoEF by e-mail.	Will be complied The project is in construction phase. The same shall be complied post commissioning during operational phase.

Enclosures:

Annexure I: Report on Shoreline monitoring October 2017 – March 2018 (in CD)

Annexure II: CSR Activities by AVPPL

Annexure III: Report on compliance of conditions of KCZMA recommendation for Environmental / CRZ clearance

Annexure IV: Compliance status of the response/commitments made during Public Hearing

Annexure V: Status of Environment Management Plan

Annexure VI: DG Set Details

Annexure VII: Scheme for Compensatory Afforestation

Annexure VIII: EMP Budgetary Provision

Annexure IX: Organizational Structure-EMP Implementation

Annexure X: Details of Labour Camp

Annexure XI: Environment Monitoring Report (October 2017 – March 2018)

Annexure I

Report on Shoreline monitoring October 2017 – March 2018 (in CD)

Annexure II

CSR Activities by AVPPL

Annexure II

CSR -VIZHINJAM

HALF YEARLY REPORT

October 2017 – March 2018

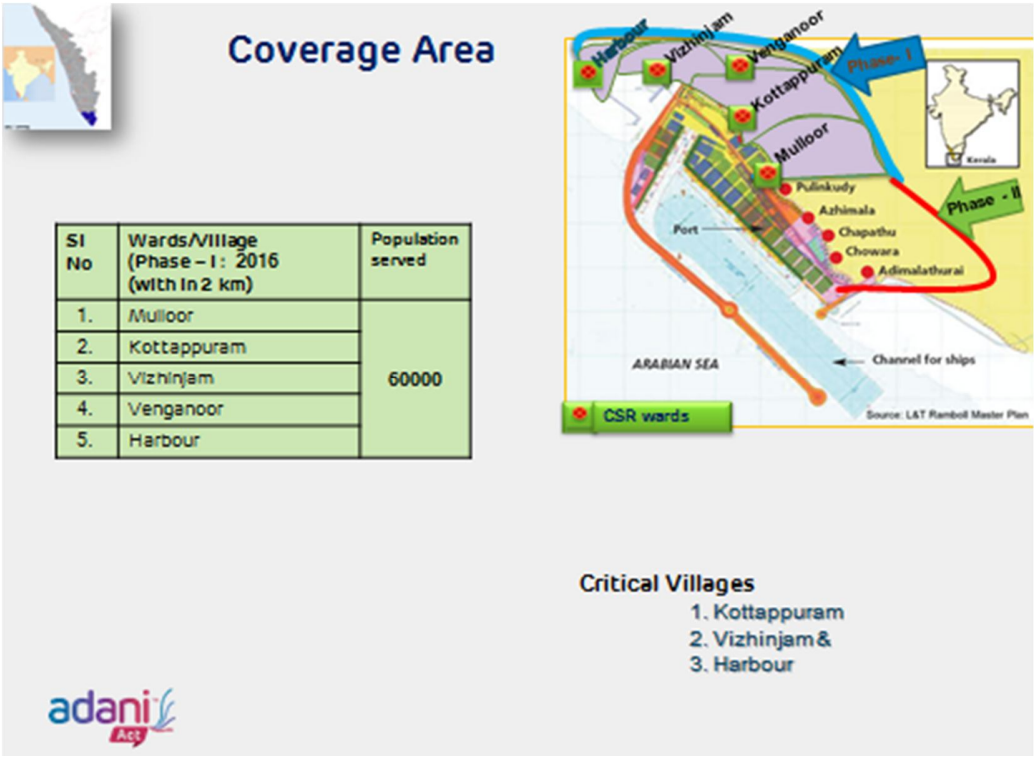
ADANI FOUNDATION

ADANI VIZHINJAM PORT PVT LTD

2nd Floor, Vipanchika Tower, Thycadu, Thiruvananthapuram – 695015

CONTENT

CSR COVERAGE AREA & TEAM



Sl No	Wards/Village (Phase – I : 2016 (with in 2 km)	Population served
1.	Mulloor	60000
2.	Kottappuram	
3.	Vizhinjam	
4.	Venganoor	
5.	Harbour	

CSR TEAM

Sl.No	Name	Designation
1	Dr. Anil Balakrishanan	Unit Head, CSR
2	Mr. Sebastian Britto A.G.	Project Officer
3	Mr. PT George Zen	Community Mobilizer
4	Mr. Stephen Vinod	Community Mobilizer
5	Ms. Maya Mohan	Community Mobilizer
6	Mr. Jithin J Kumar	Community Mobilizer
7.	Mrs. Limna B	Sr. Assistant

INTRODUCTION

Developing a port based eco-system in harmony with the needs of the local people and connecting them to the benefits of local development are the fundamental principles employed in the CSR intervention at Vizhinjam during the period Oct 2017- March18. This report has been prepared in line with the six months plan and activities carried out in the nearby five wards of Adani Vizhinjam Port viz Mulloor, Kottappuram, Venganoor, Vizhinjam and Harbour. These five wards are selected for intensive intervention as it comes within 2 k.m. from the port construction site. This is also envisaged in the Environmental Impact Assessment (EIA) study report.

The CSR intervention during the reporting period generally followed the CSR intervention strategy of Adani Foundation. Hence the report is prepared based on the consolidation of activities in four major heads.

1. Education
2. Community Health
3. Sustainable Livelihood Development &
4. Urban Infrastructure Development.

The second half of 2017-18 year of CSR intervention at Vizhinjam was focused on the mission to make a Clean, Green, Healthy and Prosperous Vizhinjam. The initiatives during the year has created a platform in building the skill set of the local youth, enhance employability, equipping them to initiate entrepreneurial activities, keeping healthy practices of sanitation and solid waste management and to reach out to the unreachable in the neighbourhoods of Vizhinjam project location. There will also be initiatives to help locals to establish their own small businesses to build a flourishing ecosystem around Vizhinjam. The immense goodwill of the people and

willingness of the Governments to go to extra mile is among the many positive signs towards extending the CSR activities to these communities.

1. EDUCATION

During the period October 2017 to March 18, six projects were completed under head of CSR-Education. This included

i. Language skill training to the students
ii. Soft skill training to the students
iii. Merit scholarship
iv. Evening school
v. Smart class room device and
vi. Anganwadi support

1.1 LANGUAGE SKILL TRAINING - (SDG No.4: Quality Education)

English language as the most common foreign language is essential to communicate in our current time. Prophesying the potential opportunities by Vizhinjam Port and allied sectors, Adani Foundation initiated a skill training to equip the students on English and foreign languages. It was a 60 hour modular language skill programme viz "**Win with English**" for the students from 7th and 8th standards in the neighbourhood area of Vizhinjam Port. A total of 500 students as listed have been trained during the year.

Sl.No	School	No of Batches	7th	8th	No. of students
1.	St. Mary's HSS, Kottappuram	3	73	77	150
2.	VPSHS Boys, Venganoor	3	63	87	150
3.	HSS for Girls, Venganoor	4	78	122	200
	Total	**10**	**214**	**286**	**500**

In that programme, the five hundred students were grouped into 10 batches with 50 students in each batch. Ten trainers with a backup plan have been engaged for the successful completion of the programme. The sessions were commenced on 13th Jan 2018 and completed on 24th March 2018. The trained students demonstrated improved interest in valuing the importance of English in their daily life and consciously became aware of pronunciation, articulation and critical thinking.

Methodology

i. **Selection:** Students from classes 7 and 8 standards are selected for the training in association with school authorities. An initial skill test (Entry Test) conducted to understand the present language level of the students.

Based on the language test, students clubbed into ten batches keeping the homogenity. Each batch comprised of 50 students. It has covered 500 students from all the five wards of Vizhinjam with focus on Kottappuram ward.

ii. The entry test for Language skills started with one hour class wise orientation programme and thereafter conducted one hour entry test. The test result of Kottappuram School announced on 16.11.2017. Out of 230 appeared 150 students passed with a cut of mark of 25%. Whereas in Venganoor Boys School and Venganoor Girls School a total of 350 students selected out of 557 appeared.

iii. The programme was formally inaugurated on 03.01.2018 in the presence of Kumari Shiny - Ward Councillor, Fr. Suresh Pious, Asst. Vicar, Vizhinjam Parish, Mr. Yesudasan SMC chairman, Principal, Headmaster, team from SB Global, Parish Education Committee member and CSR team.

Photos of Inauguration of English Skill Course at Kottappuram School

iv. SB Global, one of the NSDC partners has been selected and entrusted to conduct the training.

v. The programme was titled as "**Win with English"** included the following 12 modules with a total of 60 hours as tabled here was conducted.

Sl. No	Module	Time (hrs)
1.	Ethics	5
2.	Principles	5
3.	Communication Skills	5
4.	Vocabulary	5
5	Articulation of words	5
6.	Articulation of Ideas	5
7.	Feelings and Emotions	5
8.	Critical Listening and Reading	5
9.	Critical Thinking	5
10.	Creativity – Oral	5
11.	Creativity – Written	5
12.	Self Confidence	5

Sl. No	Module	Time (hrs)
	Total	**60 Hrs**

- The students were provided with Participants' Handbooks, where as the trainers with Facilitator's Guide. The trainings conducted from 9.00 AM to 4.30 PM on all saturdays and public holidays starting from 13th January. The entire 60 hour sessions were schedule in 9 full days and covered all the topics.
- All 10 batches were completed in time by the 10 trainers from SB Global, 10 teachers from the school. The programme has been monitored by a committee formed for the purpose with ward councillor, church representatives, school HM, Principal, CSR team representative and the representative from the training provider.
- The sessions were conducted through discussions, role-plays, group exercises and games. At government boys school, the sessions were introduced through a Football game. A film on learning English through Football was presented by the students during the concluding ceremony on 27.03.2018.
- The evaluation of the programme was conducted through a set of pre-defined parameters on **content, organization of ideas, vocabulary, grammatical clarity, body language and confidence**. Each parameter carries a total of 20 marks aggregating to 100 marks. Details of evaluation criteria are included in the annexed report.
- Certificate distribution of 150 students who completed 60 hour English language skills module at Kottappuram School was held on 03.03.2018.

Certificates were distributed by Kumari. Shyni, Kottappuram Ward Councillor, Mr. Issac Johny-Church Secretary, Mr. Yesudasan - PTA President, Mr. Vinaya Rajan-CEO, SB Global in the presence of CSR team, teachers and students.

- In the concluding ceremony, students made a talent show depicting their language skills. It was euphoric seeing the quality of change in the overall performance of students and was well appreciated by the teachers, parents and the other stakeholders. "**Be the SPARK**", a magazine prepared by the students, was also released on that occasion.
- The certificate distribution of 350 students from Venganoor Boys School and Venganoor Girls Schools for English language module was held on 27.03.2018. On that day the students split into four groups and performed songs and skits depicting their language proficiency. The method of learning English language proficiency through football game practiced by the students has been shooted and demonstrated during the programme.

- The English language skill programme conducted at Kottappuram School has been selected as the best programme in the HM level conference at Thiruvananthapuram district and was chosen to be presented in state level HM Conference.

1.2 SOFT SKILL TRAINING TO STUDENTS (SDG No.4: Quality Education)

The students from Vizhinjam particularly from fishing community lacks the required confidence to compete with mainstream students in the competetive edge. Lack of confidence and poor communication skills are the basic issues identified by teachers and experts in the field of education. Lack of parental support and poor socio-economic background has also been hindered their strive to build better career pathways.

Given that objective, a programme titled "**SPARK**" was introduced for 9th and 11th class students on softskill training focused on interpersonal skills, social skills and communication skills with practical exercises to mold

character traits, attitudes, career attributes, social and emotional intelligence quotients

The project was offered for 200 students based on an initial evaluation and selection. There were two batches of 9th standard and three batches for 11th standard. Each batch was assigned an individual trainer to complete modules of 60 hour. There were trained back up trainers to meet any contingency.

The trainers were shortlisted and selected based on their active participation in the two day Train-the-Trainer Programme at Vizhinjam. They were provided facilitator guide, session plans, power point presentations, collection of stories and activities to make the sessions live and active.

The sessions were commenced on 13th Jan 2018 and completed on 24.02.2018. The students demonstrated keen interest and gained confidence substantially in developing their social skills, knowledge of self, principles, value systems, improved awareness of various course and career options.

Topics Covered

In order to bring a positive change in the mindset of students and to motivate them to focus on better career plans with added qualities, following topics were provided as part of soft skill training to the students.

- Holland Code Test.
- Difference between job and career, identifying different career viewpoints of student.

- Importance of career planning, scope, advantages and disadvantages of various career option
- Career options after 10^{th}/12^{th}, detailed discussion on different courses.
- Awareness of competitive exams, scholarship, career after 12^{th}
- Group presentation on career choices, personal analysis, SWOT Analysis
- Goal setting – SMART GOAL, steps to reach goal
- Time management, communication skill, importance of body language
- Interpersonal skills, team building, assertiveness
- Etiquettes and types, professionalism at workplace
- Transition – school to work place
- Basic qualities
- RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional)
- SWOT, SMART goal, prioritisation, professionalism
- Communications, listening quality,
- 7Cs (Clear,Correct,Complete,Concrete,Concise Consideration, Courteous)

Modules Covered

Career Options	**Personal Awareness**
• Variety of different arts and science subjects • Scope • Limitations • Potential • Advantages and disadvantage	• Understanding personal strength, weaknesses and working of improving self-esteem • Developing a sense of purpose • Envisioning the future • Codifying Personal Value
Communication Skills	**Critical Thinking**

• Verbal, para-verbal and non-verbal communication • Listening and Speaking • Reading and writing	• Understanding the message • Applying the information • Analyzing and Evaluating the information
General Awareness	**Interacting with the world**
• The world around them… • Their town, districts, states • The country, the world they live in • Discerning use of technology	• Interpersonal Skills • Teamwork • Assertiveness
Deportment, Manners and Etiquette	
• Common courtesies • General behavior • Professionalism	

Training Methodology

The training methodology followed was generally participative in nature. To make it impressive and interactive used, video clippings, stories, reading from autobiographies of well-known personalities from different fields, listening to or reading interviews, discussions based on reading or viewing, Group / individual assignments, role-plays, power point presentations, games and other activities.

Outcome

- Students understood their personality types, interests and aptitudes. Students able to identify the cluster of occupations in which they would have the most interest and get the most satisfaction.

- Students able to identify their strengths, weaknesses, opportunities and threats. The students became aware of various career options and the scope.
- The feedback from peers helped them to do thorough personal analysis. Students reworked on their simple goals to make it SMART Goals. Through activities students realised the need for planning and prioritising to manage time.
- The communication skill exercise encouraged many students to overcome their stage fear. The writing exercise revealed that many students lacked basic skill to write. Reading exercise in English was a challenge for most of the students.
- The students acknowledged the drastic change required to be professional and brainstormed on all qualities required for such a transition.
- The students realised their strengths and had a clear goal ahead acknowledging the importance for a bright career.
- The overall feedback is very positive. 60% students showed regular attendance and valued the importance of the programme and showed remarkable difference in their personality development and clarity of goals.
- The students were enthusiastic and interested in the activity oriented approach of learning. The students found value addition in each class and showed regular progress in overcoming their stage fear.
- Many students have also expressed interest in getting training in advanced English and Computer courses.
- Separate **SPARK Magazine** from 9th batch and 11th batch has been prepared by the students. It consists of versification, drawings, essay writing and stories.

1.3 EVENING SCHOOL AT KOTTAPPURAM (SDG No.10: Reduced Inequalities)

Education is meant not only to nurture the excellence in a gifted person, but also to uplift the not-so-gifted. One of the efforts under CSR of AVPPL-AF is to support the students from Vizhinjam especially those from fishing community / weaker sections to come into the mainstream of education. Among the five wards of intervention, Kottappuram is the nearest ward of Vizhinjam Port having almost 90% people belong to fishing community. There are different reasons for their education backwardness clubbed with broken families, poor awareness on the importance of education, poor facilities in their houses/huts, alchoholic parents and other socio-economic backwardness. Given that context an intensive coaching for Exam preparation has been organised from November 2017 to March 2018 with 75 days for selected 110 SSLC students. Whereas, for Plus-two, there has been 45 days of training from Nov 2017 t0 March 2018 for selected 120 students.

Methodology

- Classes are conducted from Monday to Saturday, 4.00 pm to 7.00 p.m.
- 110 students for SSLC were divided into four batches.
- 120 students for Plus-two were divided into three batches.
- Each batch was having a mentor teacher from the school and a supplementary teacher from BED centre.
- Special classes of 20 hours on difficult subjects like English, Maths, Chemistry and Physics were arranged for each batch.
- Provided mentoring support, preparation & techniques to appear exams and proper career guidance and counselling.
- The classes were conducted at St.Mary's School, Kottappuram.

In-brief, the students and teachers opined that the classes made the students to equip in preparing exams. Further, it has provided motivation

and aspirations to the children to achieve more in career. More importantly the course has given a direction in their studies which they were ignorant.

Evening classes at St.Mary School, Kottappuram

1.4 MERIT SCHOLARSHIP (SDG No.10 : Reduced inequalities)

Adani Foundation provided scholarship to 60 students from poor socio-economic backgrounds on merit during the year 2017-18 with an amount of Rs.10,000/- per student. This included 35 students of plus one batch and 25 students of plus two batch. The students were selected based on clearly defined eligibility criteria and selection criteria. The eligibility is that the student should be from a socially and economically backward family having monthly income less than Rs.10,000/- and the student should joined either plus one or other higher courses .Applications received from the eligible candidates sorted on ward basis and selected based on merits in their SSLC final exam. Among the scholarship students 60% are from fishing community. The scholarship students were called on a monthly basis to provide a mentoring support, whereas the parents were called bi-annually to create a conducive atmosphere for the students to excel their studies.

Parents meeting

Children's meeting

Monthly Open House

In order to ensure better advancement in the academic performance and career selection, monthly open houses were conducted for the scholarship students. These programs cover specific themes such as goal setting, exam preparation, memory techniques, leadership & communication and life skills. Monthly open houses ensured quality changes in the overall performance of students in their academic and personal life. This also helped to make a joyful learning with focus on achieving the goals set by the students.

1.5 SMART CLASS ROOM DEVICE - K-YAN (SDG No.4 : Quality Education)

One of the important requests from the schools of Vizhinjam was to provide smart class room facilities as part of declaring their schools as smart schools. Towards that K-Yan, the smart classroom device developed by

IL&FS has been provided to 9 government schools in the last reporting period. During this period, five more K-YANs were provided to aided schools in the five wards of Vizhinjam. K-YAN Is a knowledge vehicle combines a hi-tech projector with a PC, a DVD writer, a TV tuner, in-built speakers, a 500 GB HDD, 3G-Internet, a wireless keyboard and a mouse all in one box.

LIST OF SCHOOLS PROVIDED K-YAN

Sl No	Name of the School	Address	Ward	Date of Distribution/ Orientation	Hands on Training	Sl.No.of K-Yan
1	St. Marys Higher Secondary School	Kottappuram Trivandrum – 695521	Kottappuram	03.01.2018	11.01.2018	KPIVQ2179051
2	Sree Ayyankali Smaraka Up School	Venganoor P.O., 695523	Venganoor	03.01.2018	12.01.2018	KPIVQ2178962
3	Venganoor Higher Secondary School, Girls	Venganoor P.O., 695523	Venganoor	03.01.2018	10.01.2018	KPIVQ2178973
4	Venganoor Higher Secondary School for Boys	Venganoor P.O., 695523	Venganoor	03.01.2018	10.01.2018	KPI40303160495
5	St. Marys Higher Secondary School- High School Wing	Kottappuram, Trivandrum – 695521	Kottappuram	03.01.2018	11.01.2018	KPIVQ2178997

Benefits

- K-YAN device performs several functions and using and maintaining separate devices, made the learning process interesting and attractive.
- Any class room wall can automatically converted into an interactive platform makes it for conducive to the teachers and students.
- The multimedia content developed according to the curriculum students from 1st standard to 12th standard makes learning fun, engaging and helps students connect to it better.

1.6. ANGANWADI SUPPORT (SDG No - 3: Good Health and Well Being)

Anganwadis are the nodal centers at community level for improving health and wellbeing of children and mothers especially those from deprived sections. Adani Foundation started intensive intervention during the year in improving the facilities of anganwadis at Vizhinjam. There are 49 Anganwadis in Kottappuram, Mulloor, Venganoor, Harbour and Vizhinjam wards of CSR intervention. Adani Foundation has initiated a flagship project viz 'SuPoshan' to curb malnutrition and Anaemia, whereby Anganvadi is one of the focal points to reach out to the targeted beneficiary group.

A need assessment survey was conducted among these 49 Anganwadis in the five wards of Vizhinjam. One of the priorities listed by the Anganwadi teachers was to provide pure drinking water facility for the kids of these institutions. Presently each anganwadi is having an average of 20 kids. Majority of them are Below Poverty Line, especially those from fishing community. The scarcity of pure drinking water made these kids vulnerable to many communicable diseases like cholera, dysentery and

other waterborne diseases.

To overcome this issue, AVPPL-AF through its CSR provided 19 Water Purifiers (RO) to the Anganwadis having water and electricity connection and also 30 water filters to the remaining 30 Anganwadis. The completion of distribution of water purfier to all Anganwadis was formally declared on 8th March 2018, on the eve of Women's day celebration.

Water Purifier

Water Filter

2 COMMUNITY HEALTH

During the reporting year, following important activities are carried out under Community Health

i. Mobile Health Care Unit (MHCU)
ii. Solid Waste Management,
iii. Sanitation
iv. Drinking Water Supply
v. Medical Camps and
vi. Suposhan

2.1 MOBILE HEALTH CARE UNIT (SDG No.3: Good Health and Well Being)

The medical report 2016-17 revealed that Kottappuram, Vizhinjam and Harbour wards are the worst affected areas with regard to the spread of Malaria, Dengue-fever, Scrub, Leptospirosis, Cancer, TB and many other communicable diseases. However, there has been no adequate facilities by government or other agencies to provide adequate medical attention even at emergencies. The CHC and PHC are often ill equipped with doctors, equipment and medicines. To overcome this, a Mobile Health Unit (MHU) was started by Adani Foundation. The operation of the unit is entrusted with HelpAge India. This project has created an immediate and short-term impact towards the improvement in the quality of life of marginalized beneficiaries.

The MHCU Vizhinjam was flagged off by **Shri. Pinarayi Vijayan**, Hon'ble Chief Minister, Kerala on 1st June, 2017. Three Ministers namely Shri. Ramachandran Kadannappalli, Minister for Ports, Shri. Kadakampalli Surendran, Minister for Tourism and Shri. E Chandrasekharan, Minister for Revenue has also attended the flag off in the presence of Shri. Karan Adani,

CEO Adani Ports, Shri. Santosh Kumar Mohapatra CEO of AVPPL and Dr. Jayakumar, MD&CEO VISL. This unit consists of a doctor, pharmacist and a social worker. The MHCU started the site visits from 5th June, 2017 onwards as tabled here.

Table showing the coverage of MHCU from October 2017 to March 2018.

Sl. No	Name of Sites	No. of Patients covered during October 17 to Mar 18						Total
		Oct	Nov	Dec	Jan	Feb	Mar	
1	Kottappuram New Church	125	114	81	184	172	161	837
2	Kadakkulam Residence Association	118	137	86	86	102	95	624
3	Karayadivila Colony	183	129	99	104	113	118	746
4	Thulavila	226	166	135	238	187	120	1072
5	Vizhinjam Theruvu Nehru Memmorial Lib	119	228	165	157	157	193	1019
6	SNDP Hall Kovalam	28	111	63	19	38	98	357
7	Gate way Residence Association	74	156	79	62	79	113	563
8	Near Harbour Engineering Department/Cost Cose/ICDS	133	166	109	67	96	117	688
9	Marian Nagar	81	115	114	65	110	129	614
10	Peoples Hall/Township	103	169	130	74	135	159	770
	Total	1190	1491	1061	1056	1189	1303	7290

Vizhinjam MHU has provided check-up/treatments to 7290 patients during the period October 2017 to March 2018. Among that majority are from the needy and disadvantaged persons and the communities. The service has been provided to community people live in the operational areas who have limited access to healthcare due to poor services by the existing healthcare facilities.

The services provided by MHU included free treatment. The doctor examined patients, diagnoses them and prescribed medicines. Wherever required, the patients were referred to pathological laboratories for detailed investigation/secondary/ tertiary health care service providers for specialist

treatment and care. Further the MHU provided free medicines for all common ailments including Hypertension, Diabetes, Arthritis, etc. These medicines were issued free to the patients by the Pharmacist based on Doctor's prescription.

The MHU van is equipped with basic diagnostic equipment such as stethoscope, BP apparatus, thermometer, weighing machine etc. for checking the vital signs. In addition to this there is a glucometer for blood sugar testing. The doctor and the paramedical team weekly visited houses of bedridden elders who otherwise cannot approach or be brought to the vehicle. They examined & clinically diagnoses the problems presented by the elder patient or caregivers and prescribes medicines and advice the patient and their caregivers.




2.2. SOLID WASTE MANAGEMENT (SDG No.11 Sustainable Cities & Communities)

Unresolved garbage disposal is one of the prominent issues in the coastal wards of Vizhinjam within the limits of Thiruvananthapuram Corporation. The corporation wards within 2km radius of Vizhinjam port is thickly populated with more than 60000 people and majority of them depend on fisheries and related occupations for their livelihood. One who travels through the coastal belt of Vizhinjam could see the littering of plastics, food waste and other garbages at prominant places making filthy scene and more importantly causing cross media pollution. It has further noted that the households are the prime generators of waste in this fishing community. The hardships due to the growing menace of piling up of wastes and garbages caused much of the increased health issues of this region. Adani Foundation has successfully undertaken the flagship programme of waste management under the CSR. Making the initiative more structured, an MoU was signed on 24 June 2016 with Corproration of Thiruvananthapuram demystifying the roles to be performed by Adani Foundation and Thiruvananthapuram Corporation. Thereafter Adani Foundation intervened in creating awareness among the community on SWM, installation of Thumboormozhi bins, Swachhagraha and Suchitha programmes.

a. Awareness classes on SWM

Educating community on better waste practices was the initial task performed under CSR. For that a total of 150 volunteers were trained intensively on volunteerism and community development. The training programme impacted ensuring the much desired participation of local community towards the issue. From this group, a team of 35 active members were selected as Resource Persons and provided further ToT and thematic training so as to equip them to organize systematic citizen-led awareness programmes at community level.

During the year 2017-18, 235 awareness classes were organized effectively by the volunteers in the respective wards which was participated by more than 5000 community people. The sessions focused on the importance of waste treatment, various decentralized modes of waste treatment, importance of segregation and the need to bring the segregated waste to the Thumboormozhi site. The community people of the locality are now well informed about the importance of seggregation of wastes, storage of plastic wastes separately and better disposal of waste. The awareness classes and focus group discussions have come up with a plan to dispose the existing waste by the community itself. Adding to that, a new plan for total cleaning of Vizhinjam has been prepared by the community themselves.

b. Thumboormozhi Bins (Alleppy Model)

Adani Foundation installed 21 Thumboormozhi Aero Bins for waste treatment at three prominent locations in the wards of Harbour, Kottappuram and Vizhinjam market areas identified by Thiruvananthapuram

Municipal Corporation. Thumboormozhi Aerobin contains rectangular bins enclosed in a room. The composting unit includes a box-like structure with ferro-cement floor, and waste materials are subjected to composting in the presence of oxygen. The garbage is dumped into a four feet high rectangular bin (4X4X4 feet volume). Inoculm sprayed will hastens composting. All this happens in the presence of air and thus there is no foul smell. Separate provision will be provided for the storage of non-biodegradable waste including plastics, glass and hazardous items and that will be taken away by the identified scrap dealers once the containers are filled.

Outcome

- Presently Thiruvananthapuram Corporation has engaged 9 Municipal workers at three Thumboormozhi locations to manage and monitor the treatment of waste.
- The bins would be opened from morning 6 am to evening 6 pm in all the three locations.
- People themselves started the habit of segregating the waste and bringing it to the sites wherever Thumboormozhi bins are placed.
- The sludge coming out of Thumboormozhi bins are used for plantation and gardening near to the bins.

Bins at Harbour Area **Bins at Vizhinjam Area**


c. Suchitha Installation at Kottappuram

"Suchitha" is a new model of waste treatment plant. It envisages the organic waste to undergo a speedy process whereby the bio-waste goes into is three types of machines. A grinder which grind the bio-waste, thereafter will transfer it to the mixing machine for thermo chemical conversion where some fertilizers innovated by Agri University suiting to requirement of soil would be applied, then to a drier and finally to the packing machine. This has been innovated by Department of Soil Science and Agricultural Chemistry, College of Agriculture, Vellayani together with a Technical innovation group. In this process the waste will be converted into manure in 2 hrs time. The final product of manure packing into separate covers. There are different machines having capacity starting from 25 kg up to 1 ton according to the requirement.

At Kottappuram, after the discussion with community and Agri University, the project of "**Suchitha**" with 250 kg capacity plant is planned. The project has been finalised and planned to execute in the land provided by Kottappuram church at Mariannagar, Kottappuram. A meeting held with the Ward Councillor of Kottappuram and the Church committee constituted a sub-committee to monitor the execution of Suchitha Project.

It is 25 lakh project and will be commissioned by end of June 2018.

d. Swachhagraha

Swachhagraha, the School level programme on clean campaign initiaited by Adani Foundation through Centre for Environment Education (CEE) and was formally launched in Thiruvananthapuram on 14.10.2017 at Govt. SMV School, Thiruvananthapuram. There were 20 teachers from various schools of Trivandrum city. The training was conducted by CEE together with the CSR team of Vizhinjam. A clean campaign plan at school level has been prepared in that training. A calender of acitvities as a follow-up to the training has been detailed out in that meeting.

2.3 PUBLIC SANITAITON & CLEAN CAMPAIGN (SDG No.11 Sustainable Cities & Communities)

a. Public Sanitation Facility under CSR

Open defecation is another prime issue prevalent in Kottappuram, Vizhinjam and Harbor wards. Women are the worst suffers due to poor sanitation facilities. However, in communities it is difficult to construct individual toilets due to the issue of water scarcity and land availability. Hence the effort was more on constructing community toilets. Two public toilets one at Vizhinjam Market area and the other

at Kottappuram were renovated and made usable under UID of CSR Vizhinjam last year. (ie, 08 October 2016.).

A new public toilet was constructed at Harbour Area during the year 2017-18, as there were more than 100 families having no toilet facilities. The toilet block was opened for the public on 15.11.2017 by the Hon'ble Mayor Adv. VK Prasanth in the presence of the CEO of Adani Vizhinjam Port Pvt Ltd. Shri.Santoshkumar Mohapatra and the ward councilor Smt. Nisa Beevi. Trivandrum Corporation has appointed one sanitory worker and is maintained on day to day basis.

b. CLEAN CAMPAIGNS

i. Cleaning Campaign at Public Places

Adani Foundation initiated Swachhagraha in the five wards of Vizhinjam as part of clean campaign programme. The objective of the programme is to make the public institutions and community to be clean always and to introduce a culture of maintaining good practices with community monitoring. The programme has been scheduled for schools, markets, bus stand, hospitals and community at large. As part of it, a ten days intensive campaign has been planned with CSR volunteers, clean 4 U livelihood group, municipal workers, ward councillors, institutional staff and the community at large. The campaign started at HALP school on 09.03.2018.

Clean campaign at HALP School

The first sanitation campaign was held on 09.03.2018 at Harbour LP School. The campaign started with a Swachhagraha pledge to the students by the Ward Councillor Smt.Nisa Beevi. Thereafter, the clean-4-u group started cleaning of class rooms, office, halls and the toilets. The corporation workers and PTA members cleaned all vegetation and other waste outside the school building. It took two day's time to clear the entire school and the vicinity.

Swachhagraha pledge to the students by the Ward Councillor and Harbour

Ward Councillor and the Corporation staff in action

Clean-4-U Group on action

PTA members supporting clearing the work

Clean campaign at Mukkola Public Health Centre

The campaign on cleaning the Public Heath Centre at Mukkola was held on 23.03.2018 under the CSR of Adani Foundation. The Ward Councillor Smt.Omana formally launched the campaign participated by the Medical Officer, hospital staff, Clean-4-U group and the Corporation workers.

Lessons learned.

The sanitation and waste management campaign made it clear that poor awareness among community in handling waste is the biggest concern to manage waste. What has been tried successfully under CSR is to create a system for behavioral change communication to change the attitude as well as the mindset of waste generators. There is a need to have a new kind of environment in these areas, where people stop depending on governmental action and themselves take positive and preventive step on waste disposal. Subsequently the total ban on plastics ordered by the Municipal Corporation of Thiruvananthapuram has substantially reduced the flow of plastic bags along with waste for disposal. Based on the extensive interactions carried out It is decided that the CSR intervention needs to be continued for another two more years to ensure a clean and safe Vizhinjam with facilities for proper sanitation and better waste management.

2.4 SUPOSHAN (SDG No. 2 and SDG No.3)

With an objective to curb malnutrition and anaemia among children, adolescent girls and women, Adani Foundation started Suposhan projects in all the five wards of Vizhinjam. The project is aimed to achieve the SDG goal-2 of “end hunger, achieve food security and improved nutrition and promote sustainable agriculture and goal-3 of healthy lives and promote well-being for all at all ages”. The project is executed intensively in all the five wards with specific objectives to reduce the occurrence of malnutrition amongst children by 95% in three years, reduce malnutrition and anaemia amongst adolescent girls and pregnant & lactating women by 70%, create awareness about the issue of malnutrition and anaemia and related factors amongst all stakeholders, create a pool of resources to be

utilised for combating the issue of malnutrition and anaemia and to support efforts in reducing IMR and MMR.

During the reporting period, good network has been built with Social Justice Department - ICDS, anganwadis, health department (CHC/PHC), referral hospitals, health workers (male & female) ANMs, LHVs, doctors, specialists such as gynaecologists, paediatricians, pharmacist, dietician lab. technician, nursing staff etc. Added to that resources were also explored from NGOs / CBOs, kudumbasree, residence associations and other community based organizations in the selected areas towards supporting the cause of children.

Intervention Strategy

- Community based intervention with Community Health Workers from local communities. (Sangini)
- Mapping the vulnerability of children / malnourished with growth chart
- Regular inputs of RUTF and other micronutrients treatment.
- Community outreach programmes / FGD among mothers and adolescent girls
- Village level meeting once in a month
- Capacity building of Sanginies
- Awareness campaigns and Celebration of special days related to health

Programme overview

Accomplishments & Achievements Oct 2017- March 2018		
No	**Details**	**Total Coverage**
1	**Community Engagement**	
1.1	House hold visits	10953

1.2	Family based counselling	3553
1.3	Aganwadi visits	738
1.4	Formations of women groups	49
1.5	Formations of Adolescent groups	49
1.6	Group Meetings	298
2	**Program Inputs**	
2.1	Focus Group Discussions	303
2.2	Village Level Events	62
2.3	Anthropometric Measurements	2775
2.4	HB screenings	3958
3	**Achievement - Positive movement**	
3.1	Conversion of children from Severe Acute Malnourished to Moderate Acute Malnourished (SAM to MAM)	26
3.2	Conversion of children from MAM to Healthy children	30

Topics for Village Level meetings and FGDs.

The sessions, house visits, counselling and awareness porogrammes helped generally to reduce malnutrition, come up with healthy food habits, bringing changes in the overall healthiness of children, adolescent girls and pregnant / lactating mothers. The topic covered for village level meetings and discussions included

1. Malnutrition among Children (0-60 Months),
2. Prevention of Malnutrition for children (0-60 Months)
3. Treatment of SAM and MAM children.

4. Anemia and Malnutrition - its impacts on Adolescent girls .
5. IFA tablets – for anaemia reduction
6. Cooking of nutritious food
7. Use of RUTF for SAM children
8. Water and Sanitation
9. Health and hygiene

In addition to the above community level programmes, following special events were conducted throughout the year

1. Training programme for the leaders of Adolescent Clubs
2. Training programme for the mothers of SAM children on how to prepare nutritious food items for Babies
3. New HB machine, hands on training and demonstration of height and weight machine on

4. Painting Competition for adolescents Club members
5. International Women's day celebrations

Treatment of SAM and MAM children

During the reporting period 34 SAM children moved to MAM and 73 MAM children to healthy. Among that twelve children of Severe Acute Malnourished (SAM) were taken to Women and Child Hospital, for the complete health check-up including blood and urine and provided medicines for improving their health from severe to moderate and then to normal health. Further 49 children of SAM and 268 children of MAM were taken to MHCU and provided medication. RUTF (Ready to Use Theraputic Food) was also provided to all the SAM children.

Model Kitchen Garden

Inorder to promote healthy and nutrient food by community themselves, grow bags with 14 types of seeds has been distributed to

selected volunteers and mothers. In addition to that selected 4 locations including Livelihood hatching Centre were used for developing model kitchen garden. It included seeds of Palak, Spinach, Amaranth Pink, Red Spinach, Green Spinach, Basala Spinach, Sambar Cheera, Mysore Cheera, Thotta Cheera, Kozhuppa Cheera, Pea, Ladies Finger, Brinjal and Tomato. The first round of nutrient food items using the kitchen garden was prepared by the volunteers was an important achievement by the Sanginis and Volunteers.

Kunju Varnangal (AF - Anganvadi Kalolsavam)

In a bid to create a platform for the kids of Anganwadis to perform the aesthetic and sports talents, a programme called “Kunju Varnagal” was organized first time at Vizhinjam by Adani Foundation with the participation of ICDS, Kudumbashree and local community based organizations. Part of the porgramme, sports events were held on 26.03.2018, participated by a total of 410 members including 294 kids, 54

Anganwadi workers and 62 parents. Competitions were held in selected items like Musical chair, Running Race, Frog Jumping, Sweet picking and Balloon breaking. It has created a platform for better social cohesion in the community, where the parents and anganwadi workers appreciated the effort.

2.5 DRINKING WATER SUPPLY (SDG No.6: Clean Water & Sanitation)

The supply of drinking water to the communities at Kottappuram and nearby areas have been continued during the reporting period too. Every day 50,000 liters of water is transported through tanker lorries to the communities under CSR of AF. For the same, 16 water tanks are provided in the wards. The treated water from the water treatment plant of Vizhinjam International Seaport Limited operated by Kerala Water Authority is used for this purpose.

2.6 MEDICAL CAMP (SDG No. 3: Good Health and Well Being)

Although Kerala has made significant gains in health indices like Infant Mortality Rate, Birth Rate, Death Rate and expectancy of life at birth, the reach out to get health facilities in the coastal and fishing communities are still remains as an alarming concern. Vizhnjam being one of the backward areas in the coastal belt of Kerala, it has been reported high incidence of communicable diseases like malaria, chikungunya, dengue fever,

leptospirosis and swine-flu especially among the fishing communities. Hence to address this issue, AVPPL-AF conducted medical camps with focus on the following groups

i. The communities at risk of multiple diseases in the intervening wards
ii. Coastal community and fishing community in the five wards
iii. Old age people.
iv. People having difficulty to access better medication.
v. People suspecting contiguous and infectious diseases.

Eye camps and cancer detection camps are the major medical camps conducted during the period.

Eye Camp

During the reporting period six eye camps were conducted in the five wards of CSR intervention. The camps were organised in association with Residence Associations, Kudumbashree groups and local Voluntary Development Organisiation. Team of doctors and technicians from Regional Institute of Ophthalmology, Aradhana Eye hospital and Chaitanya Eye Hospital supported the camp. Referral services have been arranged for cataract surgery at Govt. Eye hospital, Thiruvananthapuram. Details of the camp are given in table below.

Details of Eye Camps

Sl. No	Date	Venue	Number of Beneficiary	Supporting Hospital
1	27.10.2017	Govt. UP School, Panavila	121	Regional Institute of Ophthalmology

Sl. No	Date	Venue	Number of Beneficiary	Supporting Hospital
2	30.11.2017	Nehru Smaraka Grandhasala	56	Aradhana Eye Hospital
3	13.12. 2017	Govt. LPS, Kidarakuzhy	87	Regional Institute of Ophthalmology
4	28.12.2017	SNDP Hall, Kovalam	75	Aradhana Eye Hospital
5	17.01.2018	Drudging HOWE	121	Chaithanya Eye Hospital
6	20.01.2018	Aluninnavila	86	Aradhana Eye Hospital
		Total	**672**	

Among the total consulted, 5 patients were taken to cataract surgey through Regional Institute of Ophthalmology, 67 were listed for providing specs and for all of them medicines were given free of cost.

Cancer Detection Volunteers Training

A team of 38 volunteers from five wards were trained as cancer detection volunteers at community level. Three Resource Persons from Regional Cancer Centre took session on how to detect cancer in early stages. The training is basically to do a pre-detection camp before the actual cancer detection camp and to educate people to attend the camp.

Cancer Detection Camp

The first cancer detection camp under the CSR of AVPPL-AF was held on 21.10.2017 at Kottappuram ward. The camp was conducted with a team of 12 professionals including three doctors from the Community Onchology department of RCC (Regional Cancer Centre) and the MHCU of AVPPL-AF. A trained team

of 20 volunteers and the local VDOs like "Abhayam", Kottappuram Church Committe, and Trivandrum Social Service Soceity were also supported in organising the camp. The camp was conducted for the registered 124 people and they got the opportunity for complete screening on that day. The camp was condcuted in the Parish Hall of Kottapuram Church. Separate exmaination rooms were set for Oral Cavity Test, Breast/lump examination, Cervix examination and for social investigation. Among those tested, three persons identified of Oral cancer, five people were directed to undergo biopsy test and sample of cyst collected from women suspected of malignancy.

Pictures of Medical Camp









3 SUSTAINABLE LIVELIHOOD DEVELOPMENT

The important programmes undertook under Sustainable Livelihood Development during the period are

i. Livelihood Development Programme and
ii. Skill Development Programme.

3.1 LIVELIHOOD DEVELOPMENT PROGRAMME (SDG No.1 : No Poverty)

Livelihood development programme is one of the important areas of intervention under the CSR activities of Vizhinjam Port. This has also been highlighted in the livelihood restoration plan under the Environmental Impact Assessment Study report. Given that objective, the CSR team intervened in training the local community people especially the women from the lower economic strata of the society. Livelihood programmes followed the guidelines prepared by Adani Foundation as well as the livelihood strategy prepared under the CSR of AVPPL. The programme has undergone the following methodological process to streamline the acitivities / units.

i. Identifying and developing project proposal

Identifying suitable business unit according to the skillset of the people, available resources, finance and marketability of the product was one of the important tasks performed by the groups under livelihood programme. Based on their interest project proposal were prepared. The support of an expert consulting firm “alterneit” having end to end to solution for the above liveihood projects was also explored. Following projects were identified by the women groups to initiate their own livelihood entreprises.

i. Clean for you - Hi-Tech cleaning group
ii. Harbour - Canteen
iii. Poultry Unit - Hi-Tech Unit

iv. Happy Days - Sanitary Napkin Distribution Unit
v. Snehadeepam - Sree Bhadra, Bigshopper Unit
vi. Green going Paper - Eco-Friendly Bag Unit
vii. Prime Events - Event Mangement Group.
viii. Tasty Buddy Chips making Unit
ix. Health-pro - Community Diagnostic Lab & Vision Enterprise

ii. Raising Capital / Financials

The proposals were developed based on the condition that the project cost could be shared on the following basis

a. Beneficiary contribution – 10%
b. Bank loan – 40%
c. Subsidy from CSR – 25%
d. Subsidy from Govt through VISL - 25%

- A Bankers' platform was also created at Vizhinjam to screen and provide financial support to the projects without delay.
- At present four livelihood groups got bank loan within ten days of submission of proposals.

iii. Product Training

The selected groups have undergone three to four rounds of product training through the consulting firm "alterneit" and from outside resource agencies. The trainings were provided in their respective business ventures. A list of 26 product trainings were completed during the period.

iv. Piloting group ventures

The next step was to pilot proposed group entreprises on a small scale and understand the feasibility and market demand. Following group activities were piloted.

- "**Clean 4 U**" group has started their work through an outside agency "Smash" for house keeping and allied services. The group is also taking part in sanitation campaign of AF at Vizhinjam and has been registered as a vendor of AVPPL. **(Case study in page – 43)**

- Poultry farms, two groups started the unit. (**Case study in page-45**)

- Harbour group started '**Canteen Unit'** on a pilot basis after the training. Now submitted proposal to strengthen the unit. **(Case Study in Page-47**)

- **Snehadeepam Catering** unit has started the unit by distributing food packets to different sites.

- **Sree-Bhadra Bigshopper** unit restarted their Bigshopper unit and now expanding to strengthen the unit.

- **"Green-going"** is a new eco friendly bag unit started their work by making paper bags at a small scale taking order from the near by shops. The proposal is to establish the unit, forseeing the business opportunity after the closure of plastics in the city by Thiruvananthapuram Corporation.

- The event management group **"Prime events"** have already started organising different programmes at community level. The group is registered as one of the vendors of AVPPL for different CSR programmes. Also prepared a project for Dry-clean unit along with it.

- **"Tasty Budd**", the chips making unit has already started making of chips and selling to nearby areas. Their proposal is to establish the unit as a sustainble livelihood model.

- The **Health-pro** unit has already discussed and finalised their health venture with with Health-pro Systems Private Limited, a company

which is into Allergy management, Diagnostics, R&D of healthcare products.

3.2 LIVELIHOOD CASE STUDIES

CASE-1 : CLEAN 4 U - CLEANING SOCIETY

'Clean 4 U' is a true solution to households that can change the set-up and brings in positive vibes, started as a livelihood group at Vizhinjam under the CSR of Adani Foundation. The unit was formed in pursuant to the livelihood program organized by the CSR of Adani Foundation. The skill training programs, seminars, meetings which were conducted as part of the livelihood program resulted in teaming up and streamlining a hi-tech unit for cleaning under the name “Clean 4 U”.

The women members from Vizhinjam, Venganoor, Mulloor divisions joined as a group and formed the 'Clean 4 U’ society. It has been registered as a charitable society in June 2017. Smt Suraja TK is the president and Smt Preeja, is the secretary of the group. Smt Usha Kumari, Smt Asha Bindu, Suresh Bhavan, Smt Sati are the members of the society.

Understanding the potential demand for cleaning of houses, flats, hotels and other institutions, a group for undertaking hi-tech cleaning activities has been formed and registered as a SSI unit. The group now undertake cleaning works on contract basis in various institutions functioning within the city limits. 'Clean for U' society started cleaning works in flats, offices, hospitals, schools and also take care of two-wheelers, four-wheelers on contract basis. Monthly the group is earning 60,000 to 80,000 for the works undertook by these five members.

The working capital for the project was amounting to Rs.5,58,677/-. It was raised from the sources such as 10% contribution from members, 40% as bank loan and the remaining 50% as subsidy as follows.

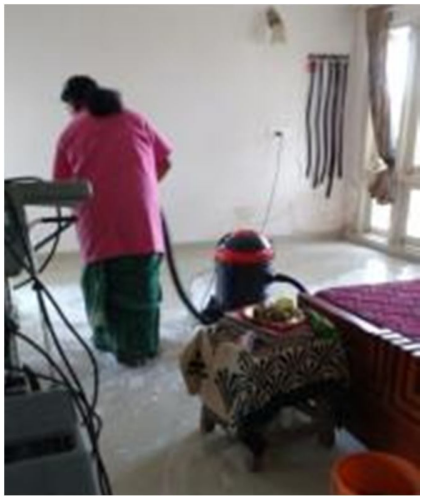
Name of the Group	Total project Cost	Loan Amount Sanctioned (40%)	AF Subsidy Amount (25%)	VISLSubsidy amount (25%)
Clean4U – Cleaning unit	5,58,677.23	2,23,470.89	1,39,669.31	1,39,669.31

The preliminary activities like preparation of project proposal, obtaining bank loan, subsidy …. etc are being carried out in November 2017 itself.

The society undertook cleaning work on a regular basis, with a minimum of Rs.3000/- for cleaning one flat and separate prices for other cleaning works. The successful implementation of the activities of the society has resulted in the improvement of the financial status of its members. The group has also entered into long term contract for the office cleaning work of CSR office.

Each member is able to earn an average amount of rupees 10000/- per month. The 'Clean for u' cleaning society has now become a symbol of self-confidence among different women groups in Vizhinjam.



Case – 2 : POULTRY FARM – Two groups

'Anaswara' and 'Tripthi' are the two poultry farms established as women Self Help Group in the Vizhinjam, Mukkola region of Thiruvananthapuram. Each group has 7 members, comprising of a total of 14 women, who have acquired special training in poultry. Each member has two Hi-tech cages with 90 fowls at home of which the first cage has already been provided. There are 1260 fowls in the farm. The poultry farm started functioning in Dec 2017. In the poultry farm plants like azola, papaya are also cultivated,

for facilitating the breeding of poultry. It is proposed to sell the poultry waste along with the eggs.

The livelihood training program organised by Adani CSR wing helped to improve the entrepreneurial skills of the women. Furthermore the skill development trainings, seminars and the support of various agencies help to develop the knowledge and skills of the women which resulted in the successful development of a suitable plan. The two groups of seven women each were registered as SSI units in August 2017.

The members of 'Anaswara' group consisit of Smt.Maheswari as President and Smt.Sindhu as secretary along with Suryakala, Ajitha, Mary, Nalini, Prasobha as members. Whereas, the other group 'Tripthi' functions with Smt Rajeswari as President and Smt Dora Johnson as Secretary along with Aswathi, Sarojam, Soudamini, Reji, Sheeba.

Each group submitted project proposals with total an estimated outlay of rupees of 7,15,050/- each. In this 40% as bank loan, 50% from subsidy and 10% from members contribution as follows.

Name of the Group	Total project Cost	Loan Amount Sanctioned (40%)	AF Subsidy Amount (25%)	VISLSubsidy amount (25%)
Anaswara Poultry Unit	7,15,050.00	2,86,020.00	1,78,762.50	1,78,762.50

The services of Dr.Ashalatha and Dr.Kamalassanan Pillai facilitated the smooth functioning of the farm. It is expected to have 270 eggs per fowl in a year. The group has now started selling eggs at the rate of Rs.7/- per egg. The poultry farm is a very simple unit and get good returns.

Case-3: Harbour Canteen

The Harbour Canteen started by a group of five women led by Smt. Sumina and Smt. Shini in Sep 2016 has been established in to profitable business unit this year, after the rigorous monitoring and handhold support extended by the CSR team of Adani Foundation.

The day to day business analysis by the CSR team and the training provided to manage the venture with market analysis supported them to turn the business from failure to success. Initially the group started business by taking money from the money-lender giving an interest of 24%. As they availed loan for raising capital investment from local money lenders, a major portion of their earnings are being remitted as interest towards the loan. Hence each member could earn only a maximum of Rs.200/- per day initially.

To overcome this, the group has prepared a comprehensive proposal to get support from Adani Foundation, Government and Financial Institution. Thereafter, the project proposal was submitted to Banks, Adani Foundation, and Vizhinjam International Sea Port Limited. The project cost prepared is

for a total of Rs.4,98,000/- with 10% as beneficiary contribution, 40% bank loan, 25% subsidy from Adani Foundation and 25% from Government of Kerala. The project is to modify enterprises for converting it into a good sea-food restaurant. The shop is located at an attractive place facing sea in a close proximity to the popular Aquarium at Vizhinjam, getting good number of walk-in customers.

Though this group of five women have no previous experience in business, highly motivated by the Management Training and support of CSR team equipped then to undertake the venture into new heights. Presently the canteen service started with breakfast at 5.00 a.m., lunch after 12.00 noon and dinner upto 9.00 p.m. The group provides special breakfast items like Puttu-kadala and Appam-Muttakkari. Lunch and dinner with special sea-food items including fish, mutton and other Non-veg items are available.

Dissemination of news on quality of food, even the foreign tourists also started coming to this restaurant. Now the group gets business with an average of Rs.12,000/- per day. That is, after all expenses including the wage of staff with Rs.800 per day, the group gets a net profit of Rs.2000/- per day.

3.3 EMPLOYABILITY SKILL COURSES

Skilling youth and making them employable is one of the priority activities

under the CSR initiatives of Vizhinjam. The EIA report from GoK, has also highlighted the need for conducting skill development programs for the youth of Vizhinjam. Under the program of Saksham, AVPPL-AF has trained 131 youths during the year 2016-17 on various NSDC courses including General Duty Assistant (Nursing Assistant), Smartphone Technician, AC Mechanic and Organic farming. It was conducted through selected NSDC partners as per NSDC standard on a pilot basis. It was a successful model, wherein the training fee was provided under CSR to the approved NSDC partners as per NSDC guidelines. The partners are entrusted with the responsibility of skill training and providing placement support along with NSDC/SSC certificate.

During the reporting year, ten days of different orientation and registration camps were conducted in the five wards of Vizhinjam. As a result 1689 students have registered for the skill courses. The courses selected for the year 2017-18 are tabled here.

Sl No	Course Name	Training Partner	Certification	No of students attended	Duration (Hrs)	students appeared exam
i.	GDA(Nursing Assistant)	IL & FS	SSC	33	420	31
ii.	Trainee Associate Retail	IL & FS	SSC	11	320	11
iii.	Asst. Beauty Therapist	IL & FS	SSC	50	290	45
iv.	Fitness Trainer	IL & FS	SSC	25	290	25
v.	Asst. Plumber	SB Global	SSC	30	350	28
vi.	Finance & Accounting	Labourne	NSDC	30	180	29

Sl No	Course Name	Training Partner	Certification	No of students attended	Duration (Hrs)	students appeared exam
		t				
vii.	Data Entry Operator	Labourne t	NSDC	50	180	25
viii.	Asst. Electrician	Labourne t	NSDC		440	
Total				229		

i. General Duty Assistant (GDA)

General Duty Assistant (GDA) having high demand in the health sector, especially in leading hospitals was considered as one of the potential skill course for the youth of Vizhinjam. The module comprises of Introduction to healthcare systems, broad functions of patients care assistant, introduction to human body structure, personal hygiene, Bio medical waste management, emergency medical response, body mechanics, positioning/transferring/mobility of patients and management of various functions. The course is intended for a period of 60 days having 420 hours under level-4 of NSQF (National Skill Qualification Frame Work) under NSDC. IL&FS is the training partner for this course. The orientation cum entry test for GDA (Nursing Assistant) were held on 18.08.2017, 24.08.2017, 24.11.2017,11.12.2017,27.12.2017 at CV Smaraka Grandhasala.

The course started on 24.01.2018 and a total of 41 students completed training. 28 students out of 33 of Batch-1 passed the exam.

Placement for the students were organized at Al-Arif Hospital, Asha care home and KIMS hospital. 29 students attended the interview and 8 selected. Placements of others are under process.

ii. Trainee Associate Retail

Retail sector is one of the biggest industry which is going creating more opportunities in Kerala. Considering the trend of retail sector growth, the course Trainee Associate Retail was implemented for the students of Vizhinjam by Adani Foundation under Adani Skill Development Centre. The course is intended for a period of 320 hours under NSDC. IL&FS is the training partner.

Orientation was started with a zero hour plan on 29.01.2018, The Skill Development Course on “Trainee Associate Retail” for the youth of Vizhinjam started on 01.02.2018 at Nehru Smaraka Grandhashala, Vizhinjam. The Batch started with 11 students and is going on.

iii. Assistant Beauty Therapist

Assistant Beauty Therapist is one of the highly demanded courses from the students of fishing community. It is also find to be a relevant course considering the demand of Beauty & Wellness sector in Kerala. The curriculum comprises of Study of the Skin, Introduction Anatomy and Physiology, Basic waxing services, Threading services, manicure and Pedicure services, Basic Skin Care and Knowledge of skin care. The course is intended for a period of 45 days under level-3 of NSQF (National Skill Qualification Frame Work) under NSDC having a duration of 290 hours. IL&FS is the training partner for this course.

Course Name	Start Date	End Date	No of students trained	No of students appeared exam	No of students passed from Batch-1	Remarks
Assistant Beauty Therapist	11.09.2017	02.01.2018	50	45	31	Result of Batch-2 of 15 students awaited

The orientation cum entry test for the course Assistant Beauty Therapist were held on 18.08.2017, 24.08.2017 and 24.10.2017. Out of 62 students attended the entry test, 50 got registrations. The first batch with 35 students was formally started on 11.09.2017 and completed on 13.11.2017.

In the first batch 31 passed the exam. The second batch with 15 students started on 06.11.2017 and completed on 02.01.2018, wherein the exam result is expected in April 2018.




Placement meeting was arranged 13.03.2018 by IL&FS for 2 batches of Assistant Beauty Therapist. In the meeting 20 students out of 28, requested to go for an OJT as trainee in beauty parlours before placement, and that has been organized at HLL Academy. All Kerala Beauty Parlour owners Association agreed to support the Placement drive. Besides, a list of students who are willing to form a “Beauty Parlour Unit” and a “Mobile Beauty Clinic” is also under progress.

iv. Fitness Trainer

Fitness trainer course has started with an intention to start fitness unit at Vizhinjam, as in Kerala people are more connected to beauty and fitness. The curriculum of Fitness trainer includes understanding human body and exercises, creation and imparting the training plans, monitoring progress and dealing with injuries and Health and safety. The course is intended for a period of 60 days having 290 hours under level-4 of NSQF under NSDC. IL&FS is the training partner for this course. The batch started with 25 students consisting of 13 male and 12 females at Spartans-gymnesium, Vellayani and Nehru Smaraka Grandhashala Vizhinjam. The course would be completed on 08.04.2018

v. Domestic Data Entry Operator

Domestic data entry operator is a highly demanded course from the women of Vizhinjam. The module included topics on document management, database management, basic understanding of computer and typing skills in both English and vernacular. The course is intended for a period of 60 days and a total of 180 hours under level-4 as per the NSQF of NSDC. Labournet is the training partner for this course.

A total of 50 students selected after entry test and counselling. The course for the first batch of "Data Entry Operator" was started on 03.01.2018 at PTM Skill Centre Azhakulam, Vizhinjam with twenty-five students and completed on 12.03.2018. All the 25 have passed the assessment exam. The second batch with 25 students started on 19.02.2018 and would be completed on 24.04.2018.




Placement drive started on 16.02.2018 in Lentbuuzz learning. 20 students had attended the interview and 10 got short listed. Further placement drive was conducted by streetBell technologies, SBL Knowledge services and Brand Acquire Technologies. The process may complete in a month time. .

vi. Assistant Plumber

Vizhinjam is a community where the demand for hard skill courses is high, that is why assistant plumber selected as a course by the youth. The modules included introduction to basic plumbing work, repairing of various types of fittings and fixtures and environment health and safety. The course is scheduled for a period of 350 hours under Level-3 of NSDC. The training partner for this course is SB Global, one of the partners of NSDC.

A total of 30 students attended the course from the 48 candidates attended the entry test. The course started on 26.09.2017 at the Training Hall of Sneha Counselling Centre at Kottappuram and completed on 20.01.2018. 27 out of 30 passed the assessment exam. Placement process under progress with Afcon, Powerlink electrical and plumbing, SK Plumbing works, Techmics solution, AJ plumbing and Sanitary works,Kripa Associates, High world Engineers. Placements were offered to all the candidates with a initial pack of 9000/- per month. However, very few has gone for the job. Intensive counselling started with the trained candidates to ensure the placement.




vii. Finance and Accounting – Tally

There was demand for the tally course at the time of registration itself from the youth of Vizhinjam. The modules of the course included basic accounting, book keeping using tally, financial management using tally, inventory management using tally…etc. The course is scheduled for a period of 60 days having duration of 180 hours under Level-1 of NSDC. The training partner for this course is Labournet.

Among 80 candidates attended for orientation, entry test and counselling 30 are selected for the course. The course started on 03.01.2018 at PTM Skill Centre Azhakulam, Vizhinjam and completed on 12.03.2018. The results of the students may be declared in April 2018. However, the placement process started for the students with R S Ratheesh & Co.

Associates, Manu & Co Associates, Margin free Market, East Fort and Capital Solutions. Twelve students already shortlisted in different firms.




4 URBAN INFRASTRUCTURE DEVELOPMENT

Urban Infrastructure Development is another important visible activity undertook under the CSR of Adani Foundation. Underpinned by SDG No**.** 9 to build resilient infrastructure, 15 infrastructure projects were undertaken during the year 2017-18 under the CSR of Adani Foundation executed through HOWE at Vizhinjam.

1.1 List of UID project undertook at Vizhinjam

Sl.No	Project	Ward	Amount (Lakhs)
1	New two storied building for HALP School, Harbour, Vizhinjam	Harbour	100.00
2	New Two storied building for Govt. UP School, Mulloor, Panavila, Vizhinjam	Mulloor	122.00
3	Play Ground at Kottappuram, Vizhinjam	Kottappuram	30.00
4	New toilet blocks at Ayyankali smaraka UP school, Venganoor	Venganoor	15.00
5	Construction and renovation of Marian Nagar Drain	Kottappuram	14.00
6	Renovation of Azad Smaraka Public library at Vizhinjam	Vizhinjam	5.55
7	New building for Community Health Centre, Vizhinjam	Vizhinjam	297.00
8	Renovation of public bathing facility at Karimpallikkara, Kottappuram, Vizhinjam	Kottappuram	14.00
9	Construction of new Public Toilet block at Charuvila, Kottappuram, Vizhinjam	Kottappuram	16.00
10	Renovation and Cleaning of Public wells	All 5 wards	10.00
11	Community Resource Centre at Thulavila, Kottappuram, Vizhinjam	Kottappuram	29.00
12	Construction of a Septic tank for public toilet at Vizhinjam market area	Vizhinjam	7.00
13	Setting up of a skill centre at Mulloor	Mulloor	250.00

Sl.No	Project	Ward	Amount (Lakhs)
14	Palliative Care Centre at Marian Nagar	Kottappuram	200.00
15	Setting of Livelihood hatching centre	Kottappuram	5.00

Selection Strategy

- Infrastructure development requirement mapped through community need assessment and stakeholder consultations.
- Prioritized the needs of the community.
- Appointed local consultant architect "Keerthi and Bhavana" to prepare plan and BoQ for major UID works under the supervision of HOWE.
- Estimate prepared by Adani commercial team
- Identified vendors for the execution of the projects by HOWE/AVPPL
- HOWE is entrusted to do direct monitoring of the projects.
- Every Tuesday reviewed the progress of all UID works at site office.

STATUS OF THE PROJECT DURING THE REPORTING YEAR

i. TWO STORIED BUILDING AT HALP SCHOOL (SDG No.4 Quality Edn)

Harbour Area LP school is one of the oldest schools at Vizhinjam. It is the only school with 460 students studying in Vizhinjam, whereas in other schools have only 50 to 180 students. The school was having two main buildings, of which one is a double storied building and the other is a single storied. The double storied building has been closed as it is found with cracks, certified in danger situation. The request to construct a new building by demolishing the old one was quite important not only due to the need for the facility but also on the safety concern of the students. The request for constructing a new building in that school was came from

the local MLA, ward councillor, SMC chairman and from the school authorities.

Understanding the need from the school, Adani Foundation agreed to construct a two storied building with 10 class rooms under the CSR of AVPPL-AF. The work awared to Omar construction company through HOWE/Commercial team. Demolition of old school building has been awarded to a local contractor through auction process by Trivadrum Municipal Corproation on 22.05.2017**.** After the demolition of old school building the earth excavation and the material Mobilisation started in Sep 2017**.** The foundation stone for HALP school was laid by Shri.Santosh Kumar Mohapatra, CEO, AVPPL on 12.10.2017 in the presence of Harbour Ward Councillor, Smt.Nizabeevi and Jamath Council representatives**.** Presently all RCC works and block works completed. The electrical and plastering works are in progress. It is planned to complete the building before the beginning of coming academic year in Jun 2018.

. Old dilapidated building

Demolition of old building

Foundation stone laying

Progress of work

ii. TWO STORIED BUILDING AT GOVT. UP SCHOOL, MULLOOR (SDG No.4)

Mulloor school is one of the oldest schools established at Mulloor ward during the year 1888. It was started as an LP-School and has been taken over by Government in 1947. Further in 1962, the school has been upgraded to Upper Primary. The EIA report also explicitly says on providing infrastructure support to this school for ensuring better education facilities for the students. Presently the strength of school is 140 with 76 boys and 64 girls. English medium classes are also started three years back considering the demand from the local community. It is the only Upper Primary School within five wards of CSR of intervention. The remaining 8 Government schools are Lower Primary School. The Harbour Department of Government of Kerala and the SMC of Mulloor school requested Adani Foundation to construct a two storied building by

demolishing the existing sheeted building. The request has also come from the Councillor, School authories and the Education department to provide a building support under the CSR.

Old sheeted building

Demolition of old building

Foundation stone laying

Progress of work

Considering the need and the request from various sources it has been decided under the CSR of AVPPL-AF to construct a two storied building ("ground + one" floor) in the place of an old asbestose sheeted building with facilities for Library, class room, kitchen and dining hall. A detailed plan and estimates prepared under the supervision of HOWE in July 2017. After getting the approval from the Municipal Corporation, the demolition of old building was completed on 23.12.2017. The Foundation Stone for the building was laid by Adv..V K Prasanth, Hon. Mayor of Trivandrum on 28.03.2018 in the presence of Mulloor Ward Councilor Smt. C Omana, School Principal, SMC,

PTA representatives AVPPL/HOWE representatives and Team CSR. The building with 10 class rooms is scheduled to be completed in six months' time.

iii. PLAYGROUND AT KOTTAPPURAM

Playing Football, Crickect or Volley ball is a routine entertainment of youth and kids of Coastal Community especially the fishing community. One of the repeated request from the localites of Kottappuram ward is to have a playground for their kids. It has been conveyed by the community that they used to play beach side where the Port work has been commenced now. The consultation with Community People, Ward Councillor and Church Committee identified a Playground close to Kottappuram School to be renovated for the same.

Considering the need, Adani Foundation under CSR decided to modify the ground at Kottappuram owned by St Mary's Higher Secondary School having length of about 150 mtrs and breath of 110 mtrs. The scope of the work is to make the ground usable for Football and Athletic items. Further needs to provide two protective nets on the boundary wall, repair work of boundary walls and renovation of the dilapidated Volleyball court.

The construction work started in the presence of Dist. Asst. Collector Mr. Anupam Mishra IAS, Kottappuram Ward Councillor Smt. Shyni, Kottappuram, Parish Asst. Vicar Fr. Vishal Varghese, Parish Counsel Secretary Mr. Isaac Johnny, PTA President Sri. Yesudasan, Principal, Headmaster, CSR team, and HOWE engineering team on 26.02.2018. The work can be completed in 3 month time and the project cost is 30 lakhs. The leveling and grading and the excavation of goal posts is progressing.

Old position **Kickoff- Play Ground work**

iv. AYYANKALI SCHOOL TOILET

Ayyankali school, Venganoor was built by Sri. Mahatma Ayyankali, a renowned social worker in Kerala, who established this school in 1905 with an aim to provide quality education for the students from marginalized sections, especially scheduled caste. There was a request from local MLA, Ward Councillor and the SMC of Ayyankali Smaraka UP-School, for providing separate toilet block for boys and girls under CSR. The school is having classes from Pre-KG to 7th standard. It is managed by Kerala Pulayar Maha Sabha (KPMS), one of the marginalised sections of society coming under the category of Scheduled Caste. The school is set-up in 55 cents of land within the CSR intervention area limit. Presently, the school is having a strength of 173 children. It included 88 girl students, 85 boys students and eight lady teachers. The school has only two toilets for girl students, one urinal for Pre-KG girl students and a toilet for teachers. Even, the present condition of existing toilets are pathetic. Hence, the request for supporting toilet facilities for Ayyankali school has been considered under the CSR for the year 2017-18. The construction work of separate toilets and Urinals for boys and girls and the toilets for teachers has started on 16.01.2018. The estimated project cost is 15 lakhs.

v. MARIAN NAGAR DRAIN (SDG No.6: Clean Water and Sanitation)

There are three major drains flowing to Vizhinjam sea, joning at Port site. They are (1) Marian Nagar drain (2) Mulloor drain and (3) Gangayar drain. Out of this three drains, the Marian Nagar drain is flowing through Kottapuram ward towards Port. During the year 2016, there happened flood due to heavy rain at Marian Nagar and caused damages to 50 houses having more than 200 people. This was due to the poor maintenance of this drain and blockage of water to the sea. Thereafter, the localities from Kottappuram ward along with Kottappuram Church committee has requested to clear the drain and to construct 140 meters of connecting drain at Marian Nagar area to ensure free flow of water.

Considering the importance of the work, Adani Foundation initiated the renovation/construction of drain at Marian Nagar in Kottappuram ward. The work included 140 meters of re-construction of drain and close to 1 k.m. repair works. The work was undertaken by Omar construction company through HOWE. The construction work of Marian Nagar drain completed on 15 August 2017. The work infact helped the free flow of water to sea.

vi. RENOVATION OF AZAD SMARAKA PUBLIC LIBRARY, VIZHINJAM

(SDG No.16 Peace, Justice and Strong Institutions)

Upgradation of Public library at Vizhinjam is one of the activities undertook under UID of CSR for the year 2017-18. Given that, CSR team along with the local leaders and Ward Councillor identified **Azad Smaraka Grandhasala** for renovation during the year. This library is affiliated to **Kerala Grandhsala Sangham**, located at Vizhinjam junction, the prime location of Vizhinjam Village. However, the library is defunct due to poor infra-facilities and lack of furnitures. The library is placed in a small building with a total floor area of 52.5 square meter in two floors as ground floor area of 25.760 square meter and first floor area of 26.679 square meter. The Library has been renovated with plastering, painting, tiling and electrification. Ground floor is renovated with book-shelf for keeping books. First floor is made with facilities for reading and conducting small meetings. In front of the Library, there built a cubicle for reading of Newspaper. The upgradation work of Azad Memorial Library was started on 1st January 2018 and completed by the end of March 2018.

Work started on 01.01.18 | Old building | Building after renovation

vii. CHC VIZHINJAM (SDG No. 3 : Good Health and Well Being)

Vizhinjam is one of the high risk areas in Thiruvananthapuram district with maximum number of communicable diseases reported in the last few years. Improving the existing health facilities is one of the immediate requirements of Vizhinjam. Towards that Government of Kerala has planned to upgrade the Community Health Centre – Vizhinjam and based the request a concept plan has been prepared by Adani Foundation under the guidance of Dr.Pankaj Doshi, Head, Adani Health Care Services

The new building plan for CHC consist of basement, ground floor, first floor and second floor, wherein the understanding was that the cost for the construction of second floor would meet from the CSR of AVPPL-AF. The plan was presented to ACS-Health on September 2016 and was approved by Government of Kerala on 17th December 2016. Government of Kerala issued an order under GO (Rt) No.842/17/F&PD dated 01.11.2017 accorded the Administrative Sanction (AS) for the new IP block of CHC building. As per the issued order, the revised estimate for the building comes to Rs.779 lakhs with the Government component of Rs.482 lakhs and CSR component of 297 lakhs from Adani Foundation. The work is entrusted with Harbour Engineering Department and has been awarded to a local contractor. Presently the demolition of old building completed and the soil test is going on for starting the other construction works.

viii. PUBLIC BATHING FACILITY AT KARIMPALLIKKARA, KOTTAPPURAM (SDG No.6: Clean Water and Sanitation)

Karimpallikkara is a fishermen colony in the ward of Kottappuram close to Adani Vizhinjam Port. There exist an open pond at Karimpallikkara, where both men and women use for washing and bathing purpose. There are close to 345 houses near to this pond, where almost 150 families depend on this pond. The ward councilor and the local community requested to renovate this pond with multiple facilities and proper drainage so as to maintain the usefulness and cleanliness of it for the community. The pond is having natural source of water. The request has been considered favourably under the CSR.

Based on the request, facilities with five numbers of bathing facility for females, One bathing facility for gents, repair work of compound wall , pond cleaning, metal sheet sepratator for men and women, nalas for free flow of waste water and connecting to existing drains, washing facilities for men and women were planned to construct under the CSR.

The upgradation works of started on 29.01.2018 in the presence of Kumari. Shyni - Ward Counsellor, Isaack John-Church Secretary, CSR team and local community leaders. The estimated cost is 14 lakhs and the work would be completed in four months' time.

Old facility **Kick-off work**


Work under progress


ix. COMMUNITY TOILET (SDG No.6 : Clean Water and Sanitation)

Ozavila colony at Kottappuram ward is having a community toilet, which was totally dilapidated and is not in use for the last several years. There was a request from ward councilor and the local community to construct a new toilet block, so that Trivandrum Corporation would ensure maintenance and its operation. This colony is having 200 families, where about 75 families are not having toilet facilities due to lack of space in their premises. Open defecation is prevalent in this area, where the women from the families are the worst suffers. Hence the request has been considered under the CSR of AVPPL - AF. The construction started on 14.3.2018 and would be completed in four months' time.

Old dilapidated community toilet **New one under progress**

x. COMMUNITY RESOURCE CENTRE – KOTTAPPURAM

(SDG No.16 : Peace, Justice and Strong Institutions)

Kottappuram ward being a fishing community often lacks the connectivity with mainstream agencies including governance institutions, service delivery agencies and civil society platforms. Besides, it is a thickly populated community, having little space for community meetings, orientations, people's advocacy forums, community based consultations, interface/dialogues with multi stakeholders including Civil Society Organisations and timely information on various government schemes and welfare measures. The structure, scope, operational protocol and streamlining of such a centre would finalized jointly by Corporation of Trivandrum and the CSR wing of AVPPL-AF.

The Ward Councilor of Kottappuram has identified an old building owned by Trivandrum Municipal Corporation in the heart of the ward for that purpose. The building is about 600 square feet, which needs to be demolished and made into a G+1 building to use as a Community Resource Centre. The plan and estimate and the permission from Corporation to demolish the old building has also been obtained for the purpose. However, an Anganwadi is working in that building and hence, the demolition could not be performed till the Anganwadi is shifted to suitable place by the

concerned authorities. Matter has been brought before the Mayor and Councilor of Thiruvananthapuram Corporation.

xi. SEPTIC TANK AT MARKET TOILET
(SDG No. 6 Clean Water and Sanitation)

In the year 2016-17, a public toilet was renovated under the CSR at Vizhinjam Market and opened it for community in November 2016. However, there was an issue of capacity of septic tank due to large quantity of water and waste coming from the wash area, bathroom and toilets. In a review meeting with Mayor, it was requested to study and provide some facilities to avoid the over-flow of sewage. Presently, the tank is get filled in every 15 days. This is the only toilet available for more than 200 families and fishing vendors at Vizhinjam market area. Hence, the request for providing a 50 Kl septic tank has been considered under the CSR. The construction of this septic tank at market toilet costing 5 lakhs has been started on 12.02.2018. The work could be finished in two month time.

xii. CONSTRUCTION OF A SKILL DEVELOPMENT CENTRE
(SDG No.8: Decent work and Economic)

Skilling youth and making them employable is one of the priority activities under the CSR initiatives of Vizhinjam. The EIA report of Government of Kerala has highlighted the need for conducting skill development programmes for the youth of Vizhinjam. Considering that AVPPL-AF has commenced skill development program viz Saksham under ASDC in 23-11-2016. Presently the programme are conducted through rented spaces at Vizhinjam.

Building own skill centre as per the guideline of NSDC is one of the projects initiated under the UID of CSR. It has been decided to cosntruct a skill centre

in the Port land itself adjacent to Thottam Nagar Bhagavathy temple (Pocket-4, behind site office). The concept plan and detailed engineering were prepared for a three storied building with 7500 square feet for that purpose. It would have space and facilities for class rooms, labs, conference halls and other requirements as instructed by NSDC.

xiii. PALLIATIVE CARE CENTRE AT MARIAN NAGAR

(SDG No.3 : Good Health and Wellbeing)

One of the requests from Vizhinjam and Kottappuram communities are to support them in building a palliative care unit at Vizihinjam. The report from Sneha Counselling centre at Kottappuram revealed that there were 150 cancer affected people in and around Kottappuram community of which 70 cases requires Palliative care assistance. This was discussed with Kottappram church committee and based on that, it has been decided to provide infrastructure support to set a palliative care center under the CSR of AVPPL-AF. The scope of the building, land for the building, equipment, furniture and fixtures and the operation of the centre would be managed by the church committee. A concept plan for the same has also been shared by the church committee.

A team of architects and engineers from HOWE along with CSR team has visited the site and to “Arumana” one of the Palliative care centre at Thiruvananthapuram run by Pallium India. The unit is chaired by Dr.M.R. Rajagopal, recent Padmashree holder for his contribution to the cancer affected patients. The concept plan has been revised and as per the plan, it is proposed to construct a building of 7500 square feet for the proposed palliative care centre and the work could start by the mid of June 2018.

xiv. Livelihood Hatching Centre (SDG No.1 : No Poverty)

Inorder to promote the livelihood programmes and to support the communities to come-up with innovative livelihood projects. a Livelihood Hatching centre has been started at Mukkola, Vizhinjam under the CSR at Kottappuram. The space is basically to conduct the livelihood training programmes, information centre on various livelihood schemes, facilities to incubate livelihood models and provide hand-hold and follow-up support for the livelihood programs. The centre would also extend facility for volunteers, sanginis and other community people to interact and explore schemes and resources.

2. OTHERS

2.1 Support Extended During Ockhi Cyclone

Kottappuram is one of the thickly populated fishermen colonies in the south-west corner of Kerala, known for its traditional fishing and fish related business. Being an urban agglomeration under the city limits of Thiruvananthapuram Corporation with a population of more than 12000 people, Kottappuram has all the complexities of an urban center. It shares boundaries with the upcoming International Vizhinjam Sea Port.

The strange course of “Ockhi cyclone” that hit the coastal belt of Kerala on 29.11.2017 has made their life quite miserable. It was first of this kind in the memoirs of Kottappuram. Cyclone Ockhi originated in the Gulf of Thailand travelled nearly 4000 nautical miles left a way of massive destruction in Srilanka, Lakshadweep, SouthIndia and Maldives reached Gujarat from a depression to a mature cyclone. More than 245 fatalities were caused by Ockhi, including 218 in India and 27 in Srilanka and it left at least 551 people, mainly fishermen, missing.

The inflicted destruction by cyclone has largely affected the life and livelihood of fishing community at Kottappuram. On the day of Cyclone, more than 1000 fishermen from Kerala went for deep sea fishing where 100 odd were from Kottappuram ward alone. Amidst the Disaster Mitigation effort by shifting the people from low lying areas to safer places, the community people especially the women folk rushed to “Kochu Palli (Old Church) at Vizhinjam Harbour when they realized that around 70 fishermen from their area haven’t returned from sea. The day was critical to manage the rescue and relief operations. Initial four to five hours was challenging to manage the crowd and to initiate rescue operations. The

entire rescue and relief operations were managed from Kochupalli, the face of Vizhinjam Harbour. As there was no public address system initially, the volunteers from CSR did the role to communicate and coordinate the request and agonies of community people with church committee and District Administration.

Provision of relief measures including drinking water, food, medical support and psycho-social support to the affected families and the community at large was another important task that the CSR team undertook voluntarily. A team of 30 volunteers, five CSR staff and a Mobile Health Care Unit coordinated the relief measures at Kochupalli for a continuous period of ten days of rescue operations. The team ensured arranging 50000 bottles of purified bottled drinking water during the days. Further, CSR team arranged 40,000 cooked food packets during rescue operation for the people in relief camp. Indeed, timely supply of food and drinking water managed to take the confidence of community and to control the crowd for effective relief operations.

Another area of support that CSR team extended was on 'medical assistance' with a Mobile Health Care Unit (MHCU) of Adani Foundation along with doctor, pharmacist, social worker, health volunteers and medicines. The doctor and the team constantly checked the people in relief camp and referred critical cases to nearby hospitals. The timely action of MHCU along with a medical team from state government kept the health and safety of people under control. Further, the medical team provided First Aid and immediate care to the rescued people. The medical team also assisted confirming death cases and directed to shift such bodies to mortuaries for further procedures.

Indeed, crowd management was one of the difficult tasks faced by the team, where around 4000 people from Kottappuram and Vizhinjam gathered at Kochupalli. Convincing and consoling such group of people was an important function that the volunteers and the CSR team did successfully. The teaming up of volunteers resulted keeping peace, consoling the situation and informing police wherever it is necessary. The support further extended to the affected families for liaison with district authorities and leaders including the Ministers to raise their issues and concerns.

The rescue and relief center at Kochupalli has been closed on 10.12.2017 with a mass pray organized by the church committee. It's true that the community hasn't come out from the shock of Ockhi to a normal life. It was difficult for the fishing people to go back to sea immediately after cyclone. Considering the genuineness of the situation, Adani Foundation under its CSR distributed 50,000 kg of rice to the houses in the affected area. The community people, local leaders and church committee expressed their wholehearted gratitude to the entire Adani CSR team and the volunteers for being with them during the hard time of emergency.

Aftermath of Ockhi - Psycho social support

Understanding the need for conducting programmes to overcome the fear and trauma created in the minds of cyclone victims and their families, a series of psycho-social programmes were conducted under CSR. Providing counselling support and building confidence to the fishermen rescued from the cyclone was one of the priorities.

Johnson 40 yrs. from Kottappuram said "on the day of cyclone we four were at deep sea for fishing. Suddenly a huge wave hurled our boat, where

two of us drowned on the spot. We two caught on our boat. But another wave has broken our boat totally. I witnessed that the other person was sinking deep to the sea. Then I tied my leg with one of the broken wood-piece so as to be floated over the sea. Five days I was like that in sea without food and water facing death almost at a stage of collapse. On fifth day a helicopter rescued me to Kochi."

While narrating the incident, Johnson was crying the loss of his three co-workers. Johnson purchased the boat taking loan of 8 lakhs a month back. He is having wife and three kids of age 10, 8 and 5 yrs. Now he is reluctant to go back to sea, as the mind is still caught by the fear of cyclone. His leg got injured as it tied-up with wooden piece for five days in the sea. The counselling support extended by CSR team has provided the much required confidence to go for fishing subject to lifesaving jackets and safety equipments. This is not only the case of Johnson but also the 41 fishermen from Kottappuram who have been rescued from sea. , he still finds it difficult to go for fishing after Ockhi, although he wakes up and get ready by early morning around 2.30 am, but returned fear of floated dead bodies and gigantic waves.

Continuous counselling and psycho-social support that the CSR team provided made the victims and affected families to understand the reality and built confidence to come out of stress. Indeed, the counselling programme revealed the importance of providing lifesaving jackets and other safety equipment to the fishing boats. Concerned to that Adani Foundation under CSR decided to provide 1000 lifesaving jackets to 500 fishing boats at Kottappuram. The proposal for providing safety equipment with GPS and signaling facility has also been considered under CSR. Providing alternate livelihood opportunities to the widows of the affected

families, better education and career guidance facilities to the children of the victims, undertaking continuous confidence building exercises and compensation packages to the affected families are the key other projects that the CSR team has prepared for Kottappuram community.

Another important development is that Adani group has provided an amount of 2.5 crores to the 50 death cases reported.

2.2 INTERNATIONAL WOMEN'S DAY CELEBRATION

Adani Foundation celebrated International Women's day at Vizhinjam on 8 March 2018. The celebration was held on the theme "**Press for Progress**" as declared by UN women. Adani Foundation, Vizhinjam strongly believe that building a vibrant Vizhinjam is possible only if it is nurtured by

providing a conducive environment that offers unbiased opportunities to women.

The programme was inaugurated by Mr. Sushil Nair, Head Corporate Relations, Adani Vizhinjam Port Private Ltd. On that eve Adani Foundation honored three women elected representatives Kumari. Shyni, Ward Counsellor, Kottappuram, Smt. Omana, Ward Counsellor, Mulloor and Smt. Nissa Beevi, Ward Counsellor, Harbour among the five wards of CSR intervention area. Besides, three Sanginis were also honoured for their invaluable contribution towards Suposhan programme. Letter of appreciation and mementos were given to selected Sanginis.

2.3 Local Employment

One of the repeated requests from the nearby communities of Port project is to provide them job opportunities during port construction. This has been discussed with HOWE and the contractors of Port on a regular basis. As on end of March 2018, 189 Keralites are engaged by contractors in different construction activities wherein 84 are from the five nearby areas of Port. Meeting of contractors specifically for this purpose is called and monitored on every 15 days. They engaged in different sections like construction, helpers, security, office assistant and even in supervisory cadres.

2.4 Employee Volunteering Porgramme (EVP)

Adani Foundation initiated "Employee Volunteering Programme" to provide better voluntary service of Employees of the company to the community at large.

The purpose of EVP is to take account of the volunteering efforts by the employees with proper recording. Recognize such efforts and promote a culture of volunteerism among the employees is the main objectives behind it. Following process was listed for the programme as recommended in the VC with Adani Foundation held on 22.01.2018.

- Develop a plan under CSR for EVP at Vizhinjam.
- Maintain uniformity in activities without compromising the core values and
- Develop a department wise available skill set based on mapping of expertise and interest of employees for effective volunteerism.
- The activities in EVP can be done in multiple ways such as adopt a ward or cluster for driving the activities on cleanliness, SuPoshan etc.
- Interest can also be leveraged for livelihood program like preparing Business Development Plans, Marketing support, Cash Management, Business Forecast etc.
- Engage in activities like blood donation, cloth donation, shramdhan…etc
- Technical skills can also be volunteered in making quality engineering projects at community level or at house-hold level.
- Port centric counseling, skill development programme, disaster preparedness may also be explored for EVP.
- Further Suggested e-news letters on EVP activities for multiplier effect.

2.5 Film on CSR

To portray CSR initiatives with a touch on the feel of community, a film on CSR-Vizhinjam has been shooted from 19.02.2018 to 24.02.2018. It included major CSR activities conducted in the areas of Education, Community Health, Sustainable Livelihood Development and Infra structure development under the guidance and support of AF-HO. This was one of the instruction/suggestion of the expert committee of NGT. The film would be showed in different community meetings, skilling progammes, community engagement programmes and in social media.

Annexure

CSR – VIZHINJAM,

MEDIA COVERAGE

OCTOBER 2017 TO MARCH 2018

അദാനിഗ്രൂപ്പിന്റെ സി.എസ്.ആർ. പദ്ധതിയുടെഭാഗമായി ഹാർബർ എൽ. പി.സ്കൂളിന്റെ പുതിയകെട്ടിടത്തിന്റെ ശിലാസ്ഥാപനം തുറമുഖ കമ്പനി സി.ഇ.ഒ. സന്തോഷ് കുമാർ മൊഹാപത്ര നിർവഹിക്കുന്നു

ഹാർബർ എൽ.പി. സ്കൂളിൽ അദാനിഗ്രൂപ്പ് കെട്ടിടം നിർമിച്ചുനൽകും

വിഴിഞ്ഞം: അദാനി തുറമുഖകമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെഭാഗമായി ഹാർബർ എൽ.പി. സ്കൂളിന് ഇരുനിലക്കെട്ടിടം നിർമിച്ചു നൽകുന്നു. ഇതിന്റെ ശിലാസ്ഥാപനം തുറമുഖകമ്പനിയുടെ ചീഫ് എക്സിക്യൂട്ടീവ് ഓഫീസർ സന്തോഷ്കുമാർ മൊഹാപത്ര നിർവഹിച്ചു.

സ്കൂൾ കെട്ടിടം അപകടാവസ്ഥയിലായതിനെത്തുടർന്ന് പത്തു ക്ലാസ്മുറികളുള്ള ഇരുനിലക്കെട്ടിടം നിർമിച്ചുനൽകുന്നത്. നഗരസഭയുടെയും പൊതുവിദ്യാഭ്യാസവകുപ്പിന്റെയും സഹകരണത്തോടെയാണ് പദ്ധതി നടപ്പിലാക്കുക.

ആറുമാസത്തിനുള്ളിൽ പദ്ധതി നടപ്പിലാക്കും. കൗൺസിലർ നിസാബീവി അധ്യക്ഷയായി. എസ്.എം.സി.ചെയർമാൻ നിസാർ, വിഴിഞ്ഞം ജമാ അത്ത് കൗൺസിൽ അംഗങ്ങൾ, അദാനിഗ്രൂപ്പിന്റെ സി.എസ്.ആർ. മേധാവി ഡോ. അനിൽബാലകൃഷ്ണൻ, കോർപ്പറേറ്റ് റിലേഷൻസ് മേധാവി സുശീൽ കുമാർ തുടങ്ങിയവർ പങ്കെടുത്തു.

ഹാർബർ സ്കൂൾ മന്ദിരം

വിഴിഞ്ഞം● ഹാർബർ എൽപി സ്കൂളിലെ പുതിയ ഇരുനിലക്കെട്ടിടത്തിന്റെ ശിലാസ്ഥാപനം വിഴിഞ്ഞം അദാനി ഗ്രൂപ്പ് സിഇഒ സന്തോഷ് കുമാർ മോഹപത്ര നിർവഹിച്ചു. വാർഡ് കൗൺസിലർ നിസാ ബീവി അധ്യക്ഷത വഹിച്ചു. നഗരസഭ, പൊതു വിദ്യാഭ്യാസ വകുപ്പ് എന്നിവയുമായി സഹകരിച്ചു സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയിൽ ഉൾപ്പെടുത്തിയാണു നിർമാണം.

Foundation Laying Ceremony at Govt HALP School for a two storied building by Shri. Santoshkumar Mohapatra, CEO, AVPPL in the presence of Ward Councilor Smt. Nisa Beevi, school authorities and other delegates.

അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നഗരസഭ ഹാർബർ വാർഡിൽ പണിത പൊതു ശൗചാലയം മേയർ വി.കെ.പ്രശാന്ത് പൊതുജനത്തിനായി തുറന്നു നൽകിയപ്പോൾ

അദാനി കമ്പനി ഹാർബർ വാർഡിൽ പണിത ശൗചാലയം ഉദ്ഘാടനം ചെയ്തു

വിഴിഞ്ഞം• അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നഗരസഭ ഹാർബർ വാർഡിൽ പണിത പൊതുശൗചാലയം മേയർ വി.കെ.പ്രശാന്ത് പൊതുജനത്തിനായി തുറന്നു നൽകി. നഗരസഭയുമായി സഹകരിച്ചു പണിത സമുച്ചയത്തിൽ എട്ട് ശുചിമുറികളാണ് ഉള്ളത്.

കോട്ടപ്പുറം, വിഴിഞ്ഞം വാർഡുകളിൽ നവീകരിച്ച ശുചിമുറികൾ നേരത്തെ തുറന്നു കൊടുത്തിരുന്നു.

വാർഡ് കൗൺസിലർ നിസാബീവി, അദാനി ഗ്രൂപ്പ് സിഇഒ: സന്തോഷ് കുമാർ മൊഹാപത്ര, സിഎസ്ആർ മേധാവി ഡോ.അനിൽ ബാലകൃഷ്ണൻ എന്നിവർ പ്രസംഗിച്ചു.

വിഴിഞ്ഞം ഹാർബർ വാർഡിൽ അദാനി തുറമുഖ കമ്പനി സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി സ്ഥാപിച്ച പൊതുശൗചാലയ സമുച്ചയത്തിന്റെ ഉദ്ഘാടനം മേയർ വി.കെ.പ്രശാന്ത് നിർവഹിക്കുന്നു

വിഴിഞ്ഞത്ത് പൊതുശൗചാലയ സമുച്ചയം ഉദ്ഘാടനം ചെയ്തു

വിഴിഞ്ഞം: അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി ഹാർബർ വാർഡിൽ നിർമിച്ച പൊതുശൗചാലയ സമുച്ചയം മേയർ വി. കെ.പ്രശാന്ത് ഉദ്ഘാടനം ചെയ്തു. നഗരസഭയുമായി സഹകരിച്ചാണ് പദ്ധതി നടപ്പാക്കിയത്. എട്ടു ശൗചാലയങ്ങളാണ് സമുച്ചയത്തിലുള്ളത്. കോട്ടപ്പുറം വാർഡിലും നേരത്തേ ഇതേ പദ്ധതി നടപ്പാക്കിയിരുന്നു. പരിപാടിയിൽ കൗൺസിലർ നിസാബീവി, അദാനി സി.ഇ.ഒ. സന്തോഷ് മൊഹാപാത്ര, സി.ആർ.എസ്. മേധാവി ഡോ. അനിൽ ബാലകൃഷ്ണൻ, കമ്പനി പ്രതിനിധികൾ തുടങ്ങിയവർ പങ്കെടുത്തു.

അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നഗരസഭ ഹാർബർ വാർഡിൽ പണിത പൊതു ശൗചാലയം മേയർ വി.കെ.പ്രശാന്ത് പൊതുജനത്തിനായി തുറന്നു നൽകിയപ്പോൾ

അദാനി കമ്പനി ഹാർബർ വാർഡിൽ പണിത ശൗചാലയം ഉദ്ഘാടനം ചെയ്തു

വിഴിഞ്ഞം● അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നഗരസഭ ഹാർബർ വാർഡിൽ പണിത പൊതുശൗചാലയം മേയർ വി.കെ.പ്രശാന്ത് പൊതുജനത്തിനായി തുറന്നു നൽകി. നഗരസഭയുമായി സഹകരിച്ചു പണിത സമുച്ചയത്തിൽ എട്ട് ശുചിമുറികളാണ് ഉള്ളത്.

കോട്ടപ്പുറം, വിഴിഞ്ഞം വാർഡുകളിൽ നവീകരിച്ച ശുചിമുറികൾ നേരത്തെ തുറന്നു കൊടുത്തിരുന്നു.

വാർഡ് കൗൺസിലർ നിസാബീവി, അദാനി ഗ്രൂപ്പ് സിഇഒ: സന്തോഷ് കുമാർ മൊഹാപത്ര, സിഎസ്ആർ മേധാവി ഡോ.അനിൽ ബാലകൃഷ്ണൻ എന്നിവർ പ്രസംഗിച്ചു.

മുല്ലൂർ പനവിള ഗവ. യുപി സ്കൂളിന് പുതിയ ഇരുനില മന്ദിരം: നിർമാണം അദാനി ഗ്രൂപ്പ്

വിഴിഞ്ഞം∙ രാജ്യാന്തര തുറമുഖ പദ്ധതിയോടനുബന്ധിച്ചു സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി (സിഎസ്ആർ) ഭാഗമായി അദാനി തുറമുഖ കമ്പനി മുല്ലൂർ പനവിള ഗവ.യുപി സ്കൂളിനു 10 ക്ലാസ് മുറികളുള്ള പുതിയ ഇരുനില മന്ദിരം പണിതു നൽകും. ഇതിന്റെ പ്രാഥമിക ജോലികൾ കഴിഞ്ഞദിവസം തുടങ്ങി.
ആധുനിക സൗകര്യങ്ങളും സജ്ജീകരണങ്ങളോടുമുള്ള താവും പുതിയ മന്ദിരം.

വിദ്യാലയങ്ങളെ സ്മാർട്ട് സ്കൂളുകളാക്കുന്ന സർക്കാർ പദ്ധതിയോടു സഹകരിച്ചു നടത്തുന്ന പുതിയ സംരംഭത്തിന്റെ നിർമാണം അടുത്ത അധ്യയന വർഷം പൂർത്തിയാക്കുകയാണു ലക്ഷ്യമെന്ന് സിഎസ്ആർ ചുമതലയുള്ള അനിൽ ബാലകൃഷ്ണൻ പറഞ്ഞു.
സ്കൂളിലെ പഴയ മന്ദിരം പൊളിച്ചുമാറ്റുന്ന ജോലികൾക്കാണു തുടക്കമായത്.
വാർഡ് കൗൺസിലർ സി.ഓമന, സ്കൂൾ അധികൃതർ എന്നിവരുൾപ്പെടെയുള്ളവരുടെ സാന്നിധ്യത്തിലായിരുന്നു ജോലികൾക്കു തുടക്കം കുറിച്ചത്.
ഹാർബർ ഏരിയ എൽപി സ്കൂൾ മന്ദിരത്തിന്റെ നിർമാണവും പുരോഗമിക്കുകയാണ്.

പദ്ധതിയുടെ ഭാഗമായി വിഴിഞ്ഞം പ്രദേശത്തെ സർക്കാർ വിദ്യാലയങ്ങൾക്കു നൽകിയ സ്മാർട്ട് ക്ലാസ് റൂം ഉപകരണമായ കൈറ്റ് എഡ്യുഡ് വിദ്യാലയങ്ങൾക്കും ഈ വർഷം നൽകുമെന്നും അധികൃതർ അറിയിച്ചു.

അദാനി തുറമുഖ കമ്പനി മുല്ലൂർ പനവിള ഗവ. യുപി സ്കൂളിനു പുതിയ ഇരുനില മന്ദിരം പണിതു നൽകുന്നതിനോടനുബന്ധിച്ചു പഴയ മന്ദിരം പൊളിച്ചു നീക്കുന്നു.

Malayala Manorama – 27-12-2017
News on construction of a two storied building at Mulloor UP School under the CSR of Adani Group

Kerala Kaumudy- 28.12.2017

News on Eye camp under the CSR of Adani Foundation

വിഴിഞ്ഞത്തെ ആസാദ് ലൈബ്രറി നവീകരിക്കുന്നു

വിഴിഞ്ഞം ആസാദ് സ്മാരക ഗ്രന്ഥശാലയുടെ നവീകരണം തുടങ്ങി. വിഴിഞ്ഞം അന്താരാഷ്ട്ര തുറമുഖകമ്പനിയുടെ സാമൂഹികപ്രതിബദ്ധതാപദ്ധതിയുടെ ഭാഗമായാണ് ലൈബ്രറി പുതുക്കിപ്പണിയുന്നത്.

കേരള ഗ്രന്ഥശാലാസംഘത്തിന്റെ അംഗീകാരത്തോടെയാണ് ലൈബ്രറി പ്രവർത്തിക്കുന്നത്. ഗ്രന്ഥശാലയുടെ സ്ഥാപക പ്രസിഡന്റ് എം.എം. കബീർ പരിപാടി ഉദ്ഘാടനം ചെയ്തു.

45 ദിവസത്തിനുള്ളിൽ ലൈബ്രറിയുടെ നവീകരണം പൂർത്തിയാക്കാനാണ് പദ്ധതി.

വിഴിഞ്ഞം ആസാദ് സ്മാരക ഗ്രന്ഥശാലയുടെ നവീകരണപ്രവർത്തനങ്ങൾക്ക് തുടക്കം കുറിച്ചപ്പോൾ

ലൈബ്രറിയിൽ നിലവിലുള്ള ഫർണിച്ചർ മാറ്റി പകരം പുതിയ അലമാരകളും ഫർണിച്ചറും നൽകുമെന്ന് അദാനി ഗ്രൂപ്പ് അറിയിച്ചു.

ഗ്രന്ഥശാല സെക്രട്ടറിയും വിഴിഞ്ഞം വാർഡ് കൗൺസിലറുമായ റഷീദ്, പ്രസിഡന്റ് ഹനീഫ്, അദാനി കമ്പനിയുടെ സാമൂഹികപ്രതിബദ്ധതാവിഭാഗം മേധാവി ഡോ. അനിൽബാലകൃഷ്ണൻ തുടങ്ങിയവർ ഉദ്ഘാടനച്ചടങ്ങിൽ പങ്കെടുത്തു.

മാതൃഭൂമി Wed, 03 January 2018
digitalpaper.mathrubhumi.com/c/25055134

അനന്തപുരി

സിറ്റി കൗമുദിയിൽ

നേത്രചികിത്സാ ക്യാമ്പ് ഇന്ന്

ഫോൺ : 9446750295

Mathrubhumi – 3.01.2018

നവീകരണം തുടങ്ങി

വിഴിഞ്ഞം● അദാനി വിഴിഞ്ഞം രാജ്യാന്തര തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പരിപാടിയുടെ ഭാഗമായി വിഴിഞ്ഞം ജംക്‌ഷനിലെ ആസാദ് സ്മാരക ഗ്രന്ഥശാലയുടെ നവീകരണ പ്രവർത്തനങ്ങൾക്കു തുടക്കമായി. ഗ്രന്ഥശാലാ സ്ഥാപക പ്രസിഡന്റ് എം.എം.കബീർ ഉദ്ഘാടനം ചെയ്തു.

വാർഡ് കൗൺസിലർ എൻ.എ.റഷീദ്, ഹനീഫ്, ഡോ.അനിൽ ബാലകൃഷ്ണൻ എന്നിവർ പ്രസംഗിച്ചു. നവീകരണ പ്രവർത്തനം 45 ദിവസത്തിനുള്ളിൽ പൂർത്തിയാക്കുമെന്നു കമ്പനി അധികൃതർ അറിയിച്ചു.

Malayala Manorama

Renovation works of Azad Library at Vizhinjam begins- being renovated under CSR initiatives of Vizhinjam International Port Company –library is recognized by Kerala Granthasaala Sangham-M M Kabir, founder president inaugurated the works- plans to complete renovation works of the library in 45 days- new almirahs and furniture will be supplied- replacing the existing ones- Adani Group informed- Library Secretary a& Ward Councilor Rashid, President Haniff, Dr Anil Balakrishnan, CSR Head- Adani Company etc attended the inaugural event.

അദാനി വിഴിഞ്ഞം രാജ്യാന്തര തുറമുഖ പദ്ധതിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി ഭാഗമായി കോട്ടപ്പുറം സെന്റ് മേരീസ് ഹയർ സെക്കൻഡറി സ്കൂളിൽ നടപ്പാക്കുന്ന വിവിധ പദ്ധതികളുടെ ഉദ്ഘാടനം നടന്നപ്പോൾ.

കോട്ടപ്പുറം സ്കൂളിൽ പദ്ധതികൾക്ക് തുടക്കം

•അദാനി ഗ്രൂപ്പിന്റെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി

വിഴിഞ്ഞം• അദാനി വിഴിഞ്ഞം രാജ്യാന്തര തുറമുഖ പദ്ധതിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി ഭാഗമായി കോട്ടപ്പുറം സെന്റ് മേരീസ് ഹയർ സെക്കൻഡറി സ്കൂളിൽ വിവിധ പദ്ധതികൾക്കു തുടക്കമായി.

ഹൈസ്കൂൾ വിദ്യാർഥികൾക്കായി രണ്ടു മാസത്തെ ഇംഗ്ലിഷ് ഭാഷാ പരിശീലനം, ഹൈസ്കൂൾ ഹയർ സെക്കൻഡറി വിദ്യാർഥികൾക്കായി 60 മണിക്കൂർ കരിയർ സോഫ്റ്റ് സ്കിൽ പരിശീലനം എന്നിവയുടെ ഉദ്ഘാടനം വാർഡ് കൗൺസിലർ ഷൈനി വിൽഫ്രഡ് നിർവഹിച്ചു.

പരിശീലനത്തിനുള്ള വിൻ വിത്ത് ഇംഗ്ലിഷ്, സ്പാർക്ക് എന്നീ പുസ്തകങ്ങളുടെ പ്രകാശനവും നടന്നു.

സ്കൂൾ കളിസ്ഥലം, കോട്ടപ്പുറത്ത് കമ്യൂണിറ്റി റിസോഴ്സ് കേന്ദ്രം, പൊതു ശുചിമുറികൾ എന്നിവയുടെ നിർമാണം ഈ മാസം തന്നെ ആരംഭിക്കുമെന്നു സാമൂഹിക പ്രതിബദ്ധതാ വിഭാഗം മേധാവി ഡോ. അനിൽ ബാലകൃഷ്ണൻ പറഞ്ഞു.

പിടിഎ പ്രസിഡന്റ് എസ്.യേശുദാസ് അധ്യക്ഷത വഹിച്ചു. വിഴിഞ്ഞം ഇടവക സഹവികാരി ഫാ.സുരേഷ് പയസ്, സെറിൻ എഫ്. റോക്കി, ശ്രീലതാ ദേവി, വി.രാജു, വിനീത എന്നിവർ പ്രസംഗിച്ചു.

News on Soft Skill Training, English Language course and K-YAN distribution held at Kottappuram School on 03.01.2018

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport CSR Activities by Adani Vizhinjam Port Private Limited		

അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി ഭാഗമായി വിഴിഞ്ഞം കോട്ടപ്പുറം കരിംപള്ളിക്കരയിൽ പൊതു കുളിസ്ഥലത്തിന്റെ നവീകരണ പ്രവർത്തനത്തിനു തുടക്കം കുറിച്ചപ്പോൾ.

തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി പൊതു കുളിസ്ഥലത്തിന്റെ നവീകരണം തുടങ്ങി

വിഴിഞ്ഞം● അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി വിഴിഞ്ഞം കോട്ടപ്പുറം കരിംപള്ളിക്കരയിൽ പൊതു കുളിസ്ഥലത്തിന്റെ നവീകരണ പ്രവർത്തനം തുടങ്ങി. 14 ലക്ഷം രൂപ വകയിരുത്തിയ പദ്ധതിയിൽ സ്ത്രീകൾക്കും പുരുഷന്മാർക്കും പ്രത്യേകം കുളിമുറികൾ, വസ്ത്രങ്ങൾ അലക്കുന്നതിനുള്ള സൗകര്യങ്ങൾ, ചുറ്റുമതിൽ എന്നിവ ഉണ്ടാകും.

മൂന്നു മാസത്തിനകം പൂർത്തീകരിക്കാൻ കഴിയുമെന്നു കമ്പനി അധികൃതർ പറഞ്ഞു. വാർഡ് കൗൺസിലർ ഡബ്ല്യു.ഷൈനി, ഇടവക സെക്രട്ടറി ഇസഹാക് ജോണി, സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതി (സിഎസ്ആർ) മേധാവി അനിൽ ബാലകൃഷ്ണൻ എന്നിവരുടെ നേതൃത്വത്തിലാണു പദ്ധതിക്കു തുടക്കം കുറിച്ചത്.

Translation:
Renovation works of public bathing ghat at Vizhinjam Kottapuram Karimpallikkara began – as part of CSR initiatives of Adani Vizhinjam Port Company- split bathing for men and women, facilities to wash clothes, compound wall planned in the Rs 14 lakhs project- to be completed in three months- company authorities informed- project began in the presence of Ward Councilor W Shiny, parish secretary Isaac Johnny & CSR Head Anil Balakrishnan

News on construction of Playground under the CSR of Adani Foundation Mathrubhumi 27.02.2018

സ്കൂളിനു കളിക്കളം നിർമിച്ചു നൽകുന്നു

കോട്ടുപുറം സ്കൂളിൽ അദാനി ഗ്രൂപ്പ് നിർമിക്കുന്ന കളിക്കളങ്ങളുടെ നിർമാണോദ്ഘാടനം അസി. കളക്ടർ അനുപം മിശ്ര നിർവഹിക്കുന്നു

തിരുവനന്തപുരം ▸ വിഴിഞ്ഞം കോട്ടുപുറം സെൻറ് മേരീസ് ഹയർ സെക്കൻഡറി സ്കൂളിനു പുതിയ കളിക്കളങ്ങൾ നിർമിക്കുന്നു. അദാനി തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായാണിത്.

30 ലക്ഷം ചെലവഴിച്ച് ഓപ്പൺ ഗാലറിയും ഫുട്ബോൾ, ബാസ്കറ്റ്ബോൾ, വോളിബോൾ എന്നീ കളിക്കളങ്ങളുമാണ് നിർമിക്കുക. അസി. കളക്ടർ അനുപം മിശ്ര പദ്ധതി ഉദ്ഘാടനം ചെയ്തു. മൂന്നു മാസത്തിനുള്ളിൽ പദ്ധതി പൂർത്തിയാക്കും. അദാനി ഗ്രൂപ്പ് സി.എസ്.ആർ. മേധാവി ഡോ. അനിൽ ബാലകൃഷ്ണൻ, കൗൺസിലർ ഷൈനി, ഇടവക സഹവികാരി വിശാൽ വർഗീസ്, സെക്രട്ടറി ഇസാക്ക് ജോണി, പി.ടി.എ. പ്രസിഡൻറ് യേശുദാസ് സ്കൂൾ അധികൃതർ തുടങ്ങിയവർ പങ്കെടുത്തു.

Malayala Manorama 27.02.2018

കോർട്ട് നിർമ്മാണം തുടങ്ങി

വിഴിഞ്ഞം● അദാനി വിഴിഞ്ഞം തുറമുഖകമ്പനിയുടെസാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയിലുൾപ്പെടുത്തി കോട്ടപ്പുറം സെന്റ്മേരീസ് എച്ച്എസ് സ്കൂളിനോടു ചേർന്ന കളിസ്ഥലത്ത്കോർട്ടുകളുടെ നിർമാണപ്രവർത്തനങ്ങൾക്കു തുടക്കം. ഫുട്ബോൾ, ബാസ്ക്കറ്റ് ബോൾ, വോളിബോൾ, തുറന്ന ഗാലറി ഉൾപ്പെടെ 30 ലക്ഷത്തോളം രൂപയുടെപദ്ധതിയാണ് നടപ്പാക്കുന്നതെന്നു കമ്പനി പ്രതിനിധികൾ പറഞ്ഞു. മൂന്നു മാസത്തിനുള്ളിൽ പൂർത്തീകരിക്കും.

News on womens' day celebration at Vizhinjam - Malayala Manorama 09.03.2018

അദാനി ഗ്രൂപ്പ് വനിതകളെ ആദരിച്ചു

മാതൃഭൂമി Fri, 09 March 2018 digitalpaper.mathrubhumi.com/

Indian Express
10.03.2018

Women ward councillors awarded at Vizhinjam on Women's Day

AVPPL-AF celebrated International Women's day at Vizhinjam by honouring women ward councillors of three adjacent wards. Certificate of appreciation was given to top performers among community health volunteers (Sangini) and the official declaration on the installation of water purifiers in all the 49 anganwadis in Vizhinjam CSR area was made. Sushil Nair was the chief guest of the programme.

Port Company Adani Group – honoured elected women representatives and lady volunteers in the health sector- in connection with Women's Day- Councillors Kumari Shyni, Ms.Omana, and Ms.Nissabeevi were the honoured. Adani Group Corporate Relations Head Sushil Nair inaugurated the program- new waters were also erected in 49 Anganwadis in Vizhinjam region - for distribution of drinking water- Adani Group CSR Head Dr. Anil Balakrishnan, resource team members etc. also attended

മുല്ലൂർ പനവിള യു.പി.എസിന് പുതിയ കെട്ടിടം പണിയുന്നു

അദാനി ഗ്രൂപ്പിന്റെ സാമൂഹികപ്രതിബദ്ധതാ പദ്ധതിപ്രകാരം നിർമാണം

അദാനി തുറമുഖഗ്രൂപ്പിന്റെ സാമൂഹികപ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി വിഴിഞ്ഞം മുല്ലൂർ പനവിള ഗവ. യു.പി. സ്കൂളിന് ഇരുനിലക്കെട്ടിടം നിർമിച്ചുനൽകുന്നു. നാല് ക്ലാസ് മുറികളും, ലാബ്, ഭക്ഷണശാല എന്നിവയും സജ്ജമാക്കും. ആറുമാസത്തിനുള്ളിൽ പദ്ധതി പൂർത്തീകരിക്കും.

മേയർ വി.കെ.പ്രശാന്ത് ശിലാസ്ഥാപനം നടത്തി. കൗൺസിലർ ഓമന, ഹെഡ്മാസ്റ്റർ ഡി.ജെ.സാം, സ്കൂൾ വികസന സമിതി ചെയർമാൻ, അദാനി ഗ്രൂപ്പ് സി.എസ്.ആർ. മേധാവി ഡോ. അനിൽ ബാലകൃഷ്ണൻ, പി.ടി.എ. പ്രസിഡന്റ് വി.എൻ.അജി, ബാലരാമപുരം എസ്.ജി.അനീഷ് എന്നിവർ പങ്കെടുത്തു.

മുല്ലൂർ പനവിള ഗവ. യു.പി. സ്കൂളിന്റെ പുതിയകെട്ടിടത്തിന് മേയർ വി.കെ.പ്രശാന്ത് കല്ലിടുന്നു

മാതൃഭൂമി Fri, 30 March 2018
digitalpaper.mathrubhumi.com/c/27460856

Corporation Mayor V K Prasanth- laid Foundation stone and- inaugurated construction works – of double storied building- for Mulloor UP School- being built as part of CSR initiatives of Adani Vizhinjam Port Company- Councilor C Omana, CSR Head Dr Anil Balakrishnan, PTA President V N Aji, School Development Council Chairman Vayalkkara Sasidharan, BPO S G Aneesh, HM DJ Sam etc spoke- Construction of the building – comprising of 10 class rooms, library, canteen – will be completed in six months- Anil Balakrishnan informed-

Malayala Manorama dated 31.03.2018
ON CONSTRUCITON OF BUILDING AT MULLOOR UP SCHOOL

ശിലാസ്ഥാപനവും നിർമ്മാണോദ്ഘാടനവും

വിഴിഞ്ഞം: മുല്ലൂർ പനവിള ഗവ. യു.പി.സ്കൂളിൽ അദാനി വിഴിഞ്ഞം ഇറമുഖ കമ്പനി സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നിർമ്മിച്ച നൽകുന്ന ഇരുനില മന്ദിരത്തിന്റെ ശിലാസ്ഥാപനവും നിർമ്മാണോദ്ഘാടനവും മേയർ വി.കെ. പ്രശാന്ത് നിർവഹിച്ചു. വാർഡ് കൗൺസിലർ സി. ഓമന അദ്ധ്യക്ഷയായിരുന്നു.

അദാനി ഫൗണ്ടേഷൻ സാമൂഹിക പ്രതിബദ്ധതാ വിഭാഗം മേധാവി ഡോ. അനിൽ ബാലകൃഷ്ണൻ, പി.ടി.എ പ്രസിഡന്റ് വി. എൻ. അജി, സ്കൂൾവികസനസമിതി ചെയർമാൻ വയൽക്കര ശശിധരൻ, ബി.പി.ഒ. എസ്.ജി. അനീഷ്, സ്കൂൾ എച്ച്.എം. ഡി. ജെ. സാം തുടങ്ങിയവർ സംബന്ധിച്ചു.

മുല്ലൂർ പനവിള ഗവ. യു.പി സ്കൂളിൽ അദാനി വിഴിഞ്ഞം ഇറമുഖ കമ്പനി സാമൂഹിക പ്രതിബദ്ധതാ പദ്ധതിയുടെ ഭാഗമായി നിർമ്മിച്ച നൽകുന്ന ഇരുനില മന്ദിരത്തിന്റെ ശിലാ സ്ഥാപനവും നിർമ്മാണ ഉദ്ഘാടനവും മേയർ വി.കെ. പ്രശാന്ത് നിർവഹിക്കുന്നു.

Kerala Kaumudi

Construction of School building under the CSR of Adani Foundation

Annexure III

Report on compliance of conditions of KCZMA recommendation for Environmental / CRZ clearance

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Report on compliance of conditions of KCZMA recommendation for Environmental / CRZ clearance.		

Annexure III

Half yearly compliance report of conditions stipulated in KCZMA recommendation for Environment and CRZ Clearance		
Sr. No.	**Conditions**	**Compliance Status as on 31-03-2018**
(I)	The developmental works and the construction of the structures may be undertaken as per the plans approved by the concerned local Authorities, local administration, conforming to the existing local and central rules and regulations including the existing provisions of CRZ Notification.	Complied Necessary approvals from concerned Statutory Departments / Agencies have been obtained • Consent to Establish from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015. • All permits required for construction of buildings as per building by laws will be obtained as and when required. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 7.12.2015 As per the exemption granted by Government of Kerala (GoK), we are not required to obtain any further permission to construct port related building within the port premises.
(ii)	Since the project envisages development of roads, infrastructural facilities, dredging of the lake and kayals proper environmental safety measures must be ensured.	Complied All safety measures are being adopted. Full time Environment & Safety professionals are employed by AVPPL, contractors & subcontractors to oversee the implementation of environmental safety measures. Third party IMS audit is being carried out by principal contractor and the report is shared with AVPPL. All work plans are executed after assessing the defined HSE plans. It is also submitted that dredging of lakes or kayals are not envisaged as part of this project
(iii)	The project proponent must obtain necessary clearance separately from the Kerala State Pollution Control Board, Health Department and other appropriate Authorities when such implementation programmes are undertaken.	Complied "Consent for Establishment" has been obtained from Kerala State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015.
(iv)	The construction should be undertaken, if any with least damages to the existing	Not Applicable There is no mangrove in the vicinity of the

Half yearly compliance report of conditions stipulated in KCZMA recommendation for Environment and CRZ Clearance		
Sr. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	mangroves. A buffer zone of 50m shall be provided for mangroves present in the area.	project area.
(v)	The project proponent must take necessary arrangements for disposal of solid wastes and for the treatment of effluents / wastes. It must be ensured that the effluents/solid wastes are not discharged into the backwater area/sea.	Being Complied As prescribed in EIA during construction stage Contractor has been made responsible for management of Solid Waste. Necessary arrangement has been made for collection, segregation and disposal of Solid Waste as per Solid Waste Management Rules, 2016 • No solid waste is being disposed of in the Coastal Regulation Zone area. • Currently no effluent is generated
(vi)	The project proponent should provide necessary facilities for official of the Kerala Coastal Zone Management Authority (KCZMA) for inspection of the project site and its premises at any time.	Being complied During the compliance period Member Secretary and official of KCZMA reviewed the EC & CRZ compliance as part of NGT direction on 05.02.2018 at Thiruvananthapuram. All the necessary facilities/support to officials of KCZMA during the review were provided to the KCZMA official. Additionally we are also meeting Member Secretary & officials of KCZMA time to time for suggestion and to appraise them of various project related work/component. Copy of Six monthly EC&CRZ clearance compliance report is sent to KCZMA regularly. The same will be continued in future also.
(vii)	The KCZMA may be duly informed of any construction/developmental works/major activities undertaken in the CRZ area of the project	Complied Following construction activities are in progress: • Member Secretary KCZMA is also the member secretary of NGT appointed expert appraisal committee; the expert committee meets every six months to review the compliance of Environmental Clearance. • Regular meetings are held with officials of KCZMA to appraise them

Half yearly compliance report of conditions stipulated in KCZMA recommendation for Environment and CRZ Clearance		
Sr. No.	**Conditions**	**Compliance Status as on 31-03-2018**
		on various project related activities, recently there suggestion was taken on afforestation activities. • Till 31st March 2018 amounting to 2.26Milm^3 has been utilized for reclamation of 30 Ha area. As of November 2017, 35 Ha. reclamation was done. Some portion of reclaimed area has been washed away due to cyclone Ohki, which passed Kerala coast on 30th November 2017. There has been nil dredging and reclamation thereafter. • As per the directions of NGT quarterly/half yearly reports are being furnished to KCZMA including the details of the development works. • Cyclone Okhi has hit Thiruvananthapuram and adjoining area in the Month of Nov'17 due to the same not much work has been carried out in CRZ area during the compliance period. • Breakwater – 565 meter length of breakwater has been completed which forms part of the new fishing harbor but during cyclone Ohki approx. 200 meter of breakwater was partially washed off. • Onshore Cross Shore Profiling data for 10 lines from CSP 1 to 10 lying in Tamil Nadu was not collected post cyclone Okhi from December 2017, the same is informed to KCZMA vide letter No. AVPPL/KCZMA/2017-18/254 dated 28th February 2018. • Turbidity buoy – 3 is not working since December 17 due to cyclone Okhi and its redeployment in under process.
(viii)	Environmental clearance must be obtained from the Ministry of	Complied Environment & CRZ Clearance has been

Half yearly compliance report of conditions stipulated in KCZMA recommendation for Environment and CRZ Clearance		
Sr. No.	**Conditions**	**Compliance Status as on 31-03-2018**
	Environment & Forests.	obtained from Ministry of Environment & Forest vide MoEF letter dated 03rd January, 2014 (F.No.11-122/2011-IA.III)
(ix)	An adequate financial provision has to be made for environmental protection measures.	Complied A total of Rs. 40 Crore has been set aside for environmental protection measures as per the EIA report. For the details of the amount spent during the compliance period refer **Annexure 8.**
(x)	Scrutiny fee of Rs. 10,00,000/- (Rupees Ten lakh only) to be remitted under the head account 1425-800-97 applications for scrutiny fee etc. for CRZ clearance, in the district/Sub Treasury concerned, if private parties are involved in the project and the chalan receipt in original be forwarded to the Science & Technology Department quoting this letter.	Not Applicable The condition is not applicable since the application for CRZ/Environmental clearance was submitted by Vizhinjam International Seaport Ltd.(VISL), a Government of Kerala undertaking

Annexure IV

Compliance of the response/commitments made during Public Hearing

Annexure IV

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
1	Good compensation package for all livelihood issues have been included for all related PAPs for all affected sectors including the fisheries sector. Strict adherence to EMP compliance with all relevant rules and regulations will be done	Being Complied In consultation with the fishermen, enhanced livelihood compensation was sanctioned by GoK, instead of Rs.7.1 crores suggested earlier in the EIA stage. Out of this amount, Rs.32.04 crores have been disbursed till 31st March 2018 for a total number of 2391 Livelihood Affected Persons (LAPs) whose verification was complete in all respects. This includes 2116 number of boat owners as well to whom kerosene is supplied free of cost during the port construction period. Verification of the documents of balance LAPs is in progress.
2	Land under the Jamaath which includes Karimppaly, Magham, Varuthari Pally, etc. need to be protected and should not be acquired.	Complied
3	Compensation for the land acquired (rail/road connectivity and back up areas) are paid promptly and any for additional land required also will be paid in the same way.	Complied Compensation for all the procured land has been disbursed along with R&R package. Same policy will be followed for the remaining extent of land also.
4	Additional fish landing centre will be constructed	Being Complied The work for construction of the fish landing centre (Rs.16 crores) and the fishery breakwater (Rs.131.12 crores) has been initiated as part of the funded work component of the concession agreement with AVPPL. 565 meter length of breakwater has been completed which forms part of the new fishing harbour, but during cyclone Ohki approx. 200 meter of breakwater was partially washed off. At present fishing boats are docked in the proposed area affecting the progress of fishery berth. The GoK has initiated discussions with fishermen representatives for removal of the boats to facilitate construction work.
5	Existing harbour will be improved	Being Complied

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	under the CSR provisions of the project	Tenders for modernization of the existing fishing harbour was invited by HED and work awarded. However the works could not be initiated due to sectoral protests among different fishermen groups.
6	Fisherman will get first preference to cross the ship channel	Will be complied Will be complied as per the applicable laws
7	GoK/VISL will monitor the shore line changes during construction and operational phases. If necessary, intervention to arrest erosion will be carried out.	Being Complied Year round status of the shoreline is being mapped from Feb 2014 for a stretch of 40km. Monitoring is being continued for the construction phase. The 1st Mathematical Report prepared by L&T Infrastructure Engineering Pvt. Ltd. (LnTIEL) based on Shoreline Monitoring data for the period Feb'15-Feb'17 has been submitted with previous compliance report (Apr'17-Sep'17) in Nov'17. Last mathematical modelling report has affirmed that the shoreline change is in line to the prediction done as part of the EIA report. We are continuing with the same practice, and, the shoreline data from March 2017 to February 2018 is submitted to LnTIEL for mathematical modelling to assess the impact on shoreline under the guidance of National Institute of Ocean Technology (NIOT). Mathematical modelling report so prepared will be submitted within due course to all the statutory authorities.
8	Water supply provision to the Vizhinjam fishing village	Complied Scheme has been commissioned in April, 2013 by VISL by expending an amount of Rs. 7.3 crores. For O&M of the same an amount of Rs. 3.97 crores has been spent till date by VISL. AVPPL have installed 20 water tanks in the water scarce areas in the project neighbourhood and water is being supplied on a daily basis on mobile

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
		water tankers.
9	Construction of the new fishing harbour will be simultaneously completed with the port project	Being Complied The work for construction of the fish landing centre (Rs.16 crores) and the fishery breakwater (Rs.131.12 crores) has been initiated as part of the funded work component of the concession agreement with AVPPL. 565 meter length of breakwater has been completed which forms part of the new fishing harbour, but during cyclone Ohki approx. 200 meter of breakwater was partially washed off. At present fishing boats are docked in the proposed area affecting the progress of fishery berth. The GoK has initiated discussions with fishermen representatives for removal of the boats to facilitate construction work.
10	Railway work will be initiated after Environment Clearance (EC)	Complied To minimize the impacts, tunnelling methods are being explored for the rail route through Konkan Railway Corporation Limited. Work has been awarded to Konkan Railway Corporation.
11	Job Opportunity - Preference will be given to local people during construction stage	Being complied. Preference is being given to local people based on Skill & competency during the construction stage. Out of the total persons employed at site, 200 are from Kerala and 88 out of them are from nearby area within 10 km from project site.
12	Rehabilitation measures ensures employment opportunities for fishermen	Being Complied Refer point No. 1
13	Take all possible measures for judicial use of lighting system as part of the Green Port concept to reduce the carbon footprint	Will be Complied Will be considered with appropriate planning.
14	Appropriate action like providing compensation or alternate employment etc to fishermen will	Being Complied Refer point No. 1

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	be implemented wherever applicable after the Environment Clearance	
15	Compensation, Resettlement and Rehabilitation benefits to all the livelihood affected and displaced fisherman will be implemented after the Environment Clearance	Being Complied Refer point No. 1
16	Waste management is included in the EMP and C&D waste management is part of the SWMP.	Being Complied Adequate budgetary provision has been kept for waste management as part of EMP as well as CSR. As mentioned in EIA contractors have been made responsible for management of Waste including waste from labour colony during the construction stage, All contractors working at site are following the waste management practices in line to waste management rules 2016. As per the MoU signed with Municipal Corporation of Thiruvananthapuram, 21 Thumboormozhi Aero Bins were installed under CSR and municipal corporation has engaged 9 workers for managing them, during the compliance period all the Thumboormozhi were ran properly. In addition to this through awareness classes a total of 5000 people were educated on importance of segregation of solid waste. Also a 250 kg Suchitha plant for turning waste into compost is expected to be installed by June 2018 in Kottappuram.
17	Upgradation of PHC at Vizhinjam will be carried out	Being Complied Revised Plan for upgrading Community Health Centre (CHC) –Vizhinjam was presented to the Department of Health, Government of Kerala by Adani Foundation. As per the revised plan Adani Foundation would construct the second floor in the upcoming building at CHC with necessary equipment support,

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
		whereas the basement and first floor would be constructed by harbour department. Work for construction has been awarded to a local contractor and demolition is completed. At present soil testing in under progress.
18	New fishing harbour with all the infrastructural facilities will be constructed with reserved rights to mooring/berthing the boats	Being Complied Refer point No. 9
19	Appropriate compensation will be given to the resort owners as per the regulatory advice of KCZMA and MoEF since the resorts are seen to be located in No Development Zone (NDZ) as per CRZ Notification 2011	Being Complied Based on G.O,(Rt) No.2021/2017/RD dated 27-04-2017, government ordered to pay compensation for land and not for the structures since they were in violation of CRZ notification. Later based on G.O,(Rt) No.17/2017/F&PD dated 08-08-2017 the GoK ordered to pay compensation for structures constructed in violation of CRZ notification also. However based on the advice of the Advocate General Kerala the payment for structures constructed in violation of CRZ notification has been withheld since the EC condition specifies that the compensation shall be given to authorized-cum-affected (having valid clearances as applicable) resort owners.
20	Rail, Road, Coastal and Inland Waterways connectivity will be ensured to the rest of Kerala and other Indian Peninsula Ports	Being Complied This is one of the objectives of the project and this will be fully materialised once all phases of the project are implemented.
21	Waste Management, Water Treatment plants, etc. will be part of an operational EMP	Noted for Compliance
22	Shoreline monitoring on 15 km both sides on regular basis during construction and operation as suggested in EIA report will be carried out	Being Complied Refer point No. 7
23	VISL will ensure that appropriate	Being complied.

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	dredging and reclamation methodology as suggested in EIA report will be adopted to contain the turbidity within applicable limits.	3 Continuous turbidity monitoring station are installed to measure turbidity on real time basis. Turbidity results are comparable with baseline. However on account of Okhi there was no/limited dredging and reclamation during the compliance period. Further, Turbidity Buoy 3 was damaged during cyclone Okhi and is not working since 1st December 2017.Work for rectification of the damage is underway and will be completed soon.
24	Appropriate measures relating to maintenance of health, hygiene, safety and security will be implemented as per EIA report	Being complied. Appropriate institutional mechanism for maintenance of health, hygiene, safety, security has been put in place. An officer of VISL has been designated as Head (EHS & CSR) for effective implementation of the stipulated EHS safeguards & CSR activities. AVPPL, the concessionaire executing the project has also appointed officers for EHS & CSR. In addition to the above, independent environment, health and safety consultants have been appointed as required in the concession agreement signed with AVPPL. It is also ensured that contractors working at site also deploy EHS professional to implement suggested EMP measures. Proper provisions for maintenance of health, hygiene, safety, security for workforce in labour colony has also been provided/ ensured. Please refer **Annexure 9**.
25	VISL will ensure that livelihood issues of Mussel collectors are addressed as per the EIA report	Being Complied Till date 271 Mussel collectors have been compensated for Livelihood loss expending an amount of 12.65 crores. Although they were offered alternate livelihood plan through cage fishing they opted for one time settlement siting the risks involved in such fishing.
26	VISL will ensure all the project	Being complied

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	components i.e., including road/rail connectivity are implemented in time. In addition the planned CSR and EMP measures will also be implemented and monitored to ensure the socio-economic development of the region.	Only work for road construction has begun in limited way, rail corridor work is yet to start. Status of construction stage EMP in matrix format is enclosed as **Annexure 5.** CSR activities are detailed in **Annexure 2**.
27	The implementation of the EMP/RAP/CSR will be ensured through the institutional and regulatory mechanism with regular monitoring and periodic compliance reports to the MoEF	Being complied Refer point 24 above. Regular monitoring of Environment Parameters is being carried out. Six monthly compliance reports are submitted to all concerned regulatory authorities.
28	Special care will be taken to minimise the tree felling in the backup area and to plan the development in tune with the topography.	Being complied Being complied to the extent possible, but in line with the technical requirements of the project. Due permission is taken for the same from concerned department (Forest Department). For carrying out compensatory afforestation in lieu of the trees felled, forest department has identified an area of 12 Ha. Of land for AVPPL in Sainik School, Trivandrum the afforestation activities will commence with the onset of monsoon.
29	The livelihood restoration measures for fishermen affected during construction phase as reported in the EIA has to be implemented	Being complied Refer point No. 1 and point No. 25
30	Dredging materials will be used for reclaiming (filling) the sea and additional materials are not required	Being complied The dredged material till 31st March 2018 amounting to 2.26Milm^3 has been utilized for reclamation of 30 Ha area. As of November 2017, 35 Ha. reclamation was done. Some portion of reclaimed area has been washed away due to cyclone Ohki, which passed Kerala coast on 30th November 2017. There has been nil dredging and reclamation thereafter. The dredged material has been used for reclamation only.

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
31	The number of fishermen who will be temporarily affected in the Adimalathura stretch have been assessed and livelihood restoration measures have been framed for the construction period	Will be complied Earlier it was proposed that the fishermen at Adimalathura will be compensated for the construction period of three years, treating them as temporarily affected. However based on the request of the fishermen (stating that demarcation of the shipping channel and movement of ships would affect them permanently) their compensation has been enhanced considering seven years of livelihood loss. The GoK order to this affect including declaration of the area as no fishing zone is expected in May 2018 followed by disbursement of compensation.
32	There will be no erosion on the shoreline on account of dredging the deep sea at (-) 18m to (-) 20m	Being complied Year round status of the shoreline is being mapped for a stretch of 40km a (Last Six month Monitoring Report is attached as **Annexure 1**). The Shoreline Modelling Report based on shoreline data from February 2015 to February 2017 was submitted with previous compliance report (April 17 to September 17). Mathematical modelling report prepared shows that there is no significant impact on shoreline. This is in line with the predictions in the EIA. Shoreline modelling based on monitoring data collected for the period March 2017 – February 18 has been initiated and Modelling Report so prepared will be submitted in due course.
33	An Area Development Plan (ADP) is being prepared by CEPT University (Ahmedabad) for planned development of the region to avoid haphazard development.	Being complied An integrated Area Development Plan is being prepared through the CEPT university, in consultation with Town Planning, Tourism, Industry and other line departments. The final report is expected in May 2018.
34	Maximum 3 ships are expected per	Will be complied

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	day in phase I. Appropriate traffic mechanism to cross the ship channel for fisherman with first priority will be practised as is happening in Cochin Port where fishing harbour, container berth, navy, shipyard, inland water transport etc are co-existing	During the operation phase
35	An additional fish landing centre has been suggested at Vizhinjam to decongest the existing harbour, and to cater to the needs of the fisherman in the 15 km vicinity including Pozhiyur & Poovar, considering the suitability of the site having natural bay, increased tranquillity and operational / infrastructural convenience than location like Pozhiyur–Poovar estuary	Being complied Refer point No. 1
36	Implementation of CSR measures and planned development of the region through well designed area development plan will arrest the formation of slums and the like.	Being complied Details of CSR activities carried out during the compliance period is given in **Annexure 2**. Refer point 33 above for area development.
37	"Inconvenience Allowances" during construction period of three years to the fisherman (As per EIA Report)	Being complied Inconvenience allowance in the form of kerosene for outboard engines for circumventing the construction site will be provided to affected boats during the construction period. An amount of 27.2 crores have been sanctioned by the GoK on this account in November 2017. 2391 beneficiaries have been identified and disbursement commenced in December 2017, and 3.3 Cr has been disbursed till date on this account.
38	As per the Entitlement Framework, Hardship Allowance is suggested in the EIA/EMP for resort workers who lost their job due to acquisition of	Complied Compensation for livelihood loss; Rs 6.08 Crores out of allocated 6.11 Crores has been disbursed to 211 out 211 number of

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	the resort	resort workers and settled completely.
39	During the construction period of three years livelihood assistance to the shore seine fisherman in the 2km ship channel foot print beach has been suggested although they can move further southward and continue with their activity.	Will be complied Refer point No. 31.
40	Ensure that all EMP related aspects are properly implemented during construction and operational phase	Being complied As the project is in construction stage, construction stage EMP is being implemented. Operation stage EMP will be implemented during operation stage. Refer **Annexure 5** for status of Construction stage EMP.
41	A dedicated port road directly connecting to NH-47 bypass is envisaged.	Being complied This is part of the concession agreement signed with AVPPL.
42	Rail connectivity is proposed along the outer side of the stream running parallel to the harbour road and that too on elevated structures without affecting the entry to the fishing harbour	Will be complied The Konkan Railway Corporation has been engaged as consultant for turnkey execution of the project. The option of tunnel is being looked into to minimize the disturbance.
43	The port project will not affect the inflow of Neyyar river and AVM canal	Noted for compliance This is a fact, since both are away from the project site
44	The port road will be access controlled for the exclusive use of container and related port movements. The suggestion for a new approach road can be considered on technical feasibility and subject to surrendering of adequate land by the beneficiaries	Will be complied Scope of providing connectivity for the local residents to the nearest Vizhinjam-Poovar road will be considered subject to surrendering of adequate land by the beneficiaries
45	The Master Plan has already included a reservoir/ground water recharge facility adjoining the road for water-shed management	Will be complied
46	Where ever possible and based on eligibility, local people will be employed	Will be complied Refer Point No. 11

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
47	Reconstruction of Roads in the nearby area- Adequate provisions have been made for the old fishing harbour and its linkage roads as it will be adopted as a part of best practice and beautification process	Being complied Being complied on a routine basis through HED, the maintenance agency for the fishing harbour and the coastal road network.
48	The development of the warehouse area will be taken up	Will be complied This is part of the proposed port estate development.
49	Livelihood Compensation considered for those who were affected at Adimalathura during construction phase and those affected in the project foot print area at Mulloor and Valiyakadappuram during construction/ operation phase	Will be complied Refer point No. 1 Refer point No. 31
50	CSR activity suggested a skill development centre to equip the local people to adapt to the industrial needs of port/tourism and fisheries so that they can be appropriately employed based on their merit. However during construction period the EIA study has suggested to adequately employ local population to the maximum extent possible	Being complied Land for skill development centre has been identified in the port area itself, detail engineering is done for a three storied building with 7500 square feet for this purpose. Building will be developed with class rooms, labs, conference halls and other requirements as per the guidelines of NSDC. For employment to local population refer Point No. 11.
51	Loss of livelihood to the traditional fishermen who do shell fishing in the Mulloor beach area is a real issue/impact. All necessary provisions for livelihood assistance have been considered in the EIA Report.	Being complied Refer point No. 25
52	Only prohibited area for fishing is inside the breakwater. However fishing will be restricted along ship channel and port limits subject to safety norms and operational requirements.	Will be complied During operation phase
53	The existing notification of the	Will be complied

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
	Vizhinjam Port includes the Vizhinjam Fishing harbour. The revised Notification will include the Vizhinjam Deep Water Port based on revised Port limit provided in the EIA report. Except inside the breakwater of the Deep Water Port in all other areas of the port limit fishing is allowed with all safety and operational restrictions.	Revised port limits for (i) fishing harbour/minor port and (ii) Vizhinjam seaport will be notified. Restrictions on fishing will be as per the applicable laws.
54	There will only be a movement of 8 barges per day during the construction period of 3 years and the same will not be a hindrance for the fisherman to cross since this is far less than the number of ships being crossed by them daily in the international ship channel.	Will be complied Inconvenience, if any, to fishing will be monitored during the construction phase.
55	The maximum rate of accretion at southern side of the harbour will be 21.6 m/year in the 1st year and by the end of tenth year it reduces to 0.5 m/year. The shoreline evolution along the south side of the port will get stabilized in the initial years. On stabilization, the maximum net increase in the shoreline accretion would be around 27m immediately south of the port which reduces to negligible levels within 2.3km alongshore. There will not be any impact on the shoreline along Poovar-Pozhiyar sector which is about 7km away from the proposed port.	Being complied Refer Point 32
56	The 8 resorts affected will be compensated in line with R&R package in place but subject to the advice of the KCZMA/MoEF considering that all these resorts are in NDZ as per CRZ Notification, 2011	Being complied Refer point No. 19

Compliance of the Response/Commitments made during Public Hearing		
Sl. No.	**Responses/Commitments**	**Status as on 31.03.2018**
57	The cruise terminal proposed in the project, will promote tourism in the Kovalam-Poovar belt and the region may become the cruise hub/tourism gate way of India in future	Noted for Compliance Once the first phase of port becomes operational, it would naturally attract cruise tourism. Based on the development of cruise business, dedicated cruise berths will be planned in a phased manner. Action is also being taken in consultation with the State tourism department, to design port linked tourism packages covering the Kovalam-Vizhinjam- Poovar tourism corridor
58	CSR activity considers training the local people to adapt to the new economic development of the area	Being complied Refer point No. 50
59	The Coast Guard & Navy Berth are as per the needs of the Ministry of Defence on national security	Being complied Specific conditions have been included in the concession agreement relating to use of berths by Navy/Coast Guard.

Annexure V

Status of Environment Management Plan

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Status of Environmental Management Plan.		

Annexure V

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
1	Capital dredging	Marine water quality	o Check turbidity levels with baseline levels as reference during entire monitoring programme o Preparation of Dredge/reclamation Management plan o Discharge of waste into sea will be prohibited o Oil Spill control measures will be adopted o Ensure that slop tanks will be provided to barges/ workboats for collection of liquid/ solid waste o Marine environmental monitoring as per environmental monitoring programme	Being Compiled o Dredging has stopped since November 2017 as the dredgers were damaged during Okhi cyclone. o The dredged materials till 31st March 2018 amounting to 2.26Milm^3 has been utilized for reclamation of 30 Ha area. As of November 2017, 35 Ha. reclamation was done. Some portion of reclaimed area has been washed away due to cyclone Ohki, which passed Kerala coast on 30th November 2017. o Turbidity level is being monitored continuously at three locations by establishing 3 Real Time Turbidity buoys, one turbidity buoy (Buoy – 3) was damaged during cyclone Okhi and is not operational since December 2017. Results obtained were found comparable to baseline figures. o Discharge of waste into sea is prohibited o Preliminary work for identification of suitable vendor to develop Facility Level Oil Spill Contingency Plan has started. o Marine Environmental Monitoring at 5locations as per the Environment Monitoring Plan prescribed in EIA has commenced since August 2016, one additional marine water monitoring location has been added from October 17 after
		Marine ecology		

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
				suggestion from NGT committee and the parameters are within permissible limits. o Six monthly monitoring reports are regularly submitted to regulatory authorities.
2	Material transport and construction activities	Air Quality	o Most of the Breakwater stones will be transported from the quarries to the nearest harbour. From there through Barges it will be transported to project site. This is will avoid substantiate flow of Heavy Vehicles during construction Phase thereby minimizing impact on Air and Noise Quality in the project region. o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment etc o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to	Being Complied o At present due to unavailability of stones break water construction has stopped and no stones are transported for breakwater construction. o It is ensured that all vehicles entering the Port have a valid PUC certification o Adequate sized construction yard has been provided for storage of construction materials, equipment tools, earthmoving equipment etc. o The dumpers have speed governors ensuring adherence to speed limit o Also signage for speed control are displayed inside port area o Water sprinkling is carried out for supressing dust o It is ensured that all trucks transporting material are covered by tarpaulin at top o Regular awareness programme on various Environment aspects is being imparted to workers and employees.

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			reduce excessive dust suspension in air and dispersion by traffic o Water sprinkling will be carried out to suppress fugitive dust o Environmental awareness program will be provided to the personnel involved in developmental works o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers o High noise generating activities such as piling	Being Complied o Noise levels are being monitored every fortnight and are found to be well within the permissible limits within the project area. o Contractors are also monitoring the Noise level in their work area and results are within the stipulated limit. o Protective gear like earplugs, muffs are provided to workers exposed to noise level beyond threshold limits

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			and drilling will be scheduled at daytime (6.00 am to 10pm) to minimise noise impacts o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
		Disturbance to Natural Drainage pattern	o Port development is mostly on reclaimed land o Rainwater/surface water harvesting pond included in design o Existing drainage near port boundary (backup area) will be integrated with port storm water drainage & management plan o Existing drains / Streams that are passing in ware house area will not be closed/ diverted. And these streams will be de-silted and enhanced to improve their carrying capacities	Being Complied o Measures have been taken for maintaining the natural flow of the streams debouching in the construction site, by laying drain pipes beneath the temporary road. A mix of water harvesting pond with appropriate drains are planned for the operational phase
		Vegetation and Strain on existing infrastructure	o Port development is planned mostly on reclaimed land; o Land use at backup area, PAF Zone and warehouse area will be mostly coconut plantation and low mixed plantation o Adequate green belt will be developed in port and its associated (backup area, PAF, warehouse and road & rail connectivity). o Temporary workers camp with self-sufficient infrastructure facilities.	Being Complied o Care is taken to limit the felling of trees to the bare minimum. Plantation of saplings along the road margins, road medians and port boundary are planned as part of the master plan development o Temporary Worker camps with all necessary infrastructure facilities (Water, Electricity, Sanitation, Fuel, etc.) has been provided
		Existing Traffic	o NH-47 bypass under construction around 2.0	Being Complied

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			km from the proposed Port site and the Transportation of construction materials will be carried out during non- peak hours. Hence a dedicated road of 45 M RoW is proposed to connect site with NH Bypass o Regularization of truck movement o Majority of rock for breakwater construction will be transported through sea route via barges from nearby quarry sites o A dedicated rail network of approximately 15 km is proposed from port to Nemom railway station	o Traffic monitoring & regularization is being carried out for maximum efficiency o During the compliance period no breakwater construction took place on account of damage due to Cyclone Okhi o Rock transportation through sea route via barges from nearby quarry site is being explored. o The Konkan Railway Corporation has been engaged as a consultants for turnkey execution of the project, the option of tunnel is being looked into to minimize the disturbance.
3.	Land Reclamation	Existing Water Resources like Groundwater and surface water	o Land to be reclaimed will be separated from adjoining land by creating containment bund. o Return sea water will be sent back to sea through appropriate channels.	Being Complied o The existing drains are maintained for unhindered disposal of surface drainage water.
4.	Solid Waste Management	Soil quality	o Construction waste will be used within port site for filling of low lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. o Other recyclable wastes will be sold. o Excavated soil at backup, PAF Zone and ware house area will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from	Being Complied o Construction waste is used within port site for filling of low lying areas in line to C&D Waste Management Rules 2016. o Burning of refuse at construction sites is prohibited. o Contractors working at the site have been made responsible for management of Solid Waste during construction stage. They have obtained Consent of Kerala State Pollution Control Board and complying with the

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			construction waste. o Burning of refuse at construction sites will be prohibited. o All control measure will be taken to avoid the contamination of groundwater during construction phase	provisions pertaining to management of Solid Waste in line to Solid Waste Management Rules 2016. o There is no disposal of waste in the project area which may lead to groundwater contamination
5.	Handling of hazardous wastes	Human safety and property loss	o Adequate safety measures as per OSHA standards will be adopted o Construction site will be secured by fencing with controlled/limited entry points. o Hazardous materials such as lubricants, paints, compressed gases, and varnishes etc., will be stored as per the prescribed/approved safety norms. o Construction site will be secured by fencing with controlled/ limited entry points o Medical facilities including first aid will be available for attending to injured workers. o Handling and storage as per statutory guidelines. o Positive isolation procedures will be adhered o Hazardous wastes will be disposed through approved KSPCB/CPCB vendors.	Being Complied o Adequate safety measures as per OSHA standards are adopted as and when necessary as per the HSE Plan o Construction site is being secured by fencing with controlled/limited entry points o Medical facilities including first aid are available for attending to injured workers. o Handling and storage as per statutory guidelines. o Hazardous waste is disposed through approved KSPCB/CPCB vendors.
6.	Water Resources	Water scarcity / Pollution	o Water requirement during the construction is expected to be around 0.10 MLD	Being Complied o The water supply scheme had already been

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			o Water will be sourced from Vellayani lake o Avoid/minimise the loss during conveyance o Optimized utilization of the water o Care will be taken to prevent the runoff from the construction site to the nearby natural streams, if any	commissioned with the source as Vellayani Lake. 3.00 MLD of raw water will be available for treatment with a net availability of 2.49 MLD of potable water. Out of this 1.49 MLD of water shall be distributed to the locality as part of social welfare measures of VISL. The balance 1.0 MLD is for the port use. Water requirement during construction will be met from the above quantity. The tapping point has already been provided by KWA at a distance of approximately 50m from the port site. Water requirement during construction is being met from the above source.
7.	Fishing	Fishermen and fishing villages	o Signboards will be placed at the construction activities in order to make fishermen aware of the ongoing construction activities o Necessary marker buoys will be installed o Interactions will be initiated with the fishing community before commencement of construction works	Being Complied o Signboards have been placed for demarcation of construction area. o A dedicated whatsapp group has been formed by CSR team for Continuous interaction with fisherman/fishing community members to facilitate the flow of various project related information/updates as necessary/useful
8.	Tourism	Effect on tourism	o Tourism activity is observed at Kovalam located about 2.0 km towards the North of Proposed Port. Mathematical Modelling studies on shoreline changes show the insignificant impact due to the port	Being Complied o The tourism activity in the nearby Kovalam area is not impacted by the construction of the port. o Shoreline monitoring for a stretch of 40

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
			development on the existing coastline. However, the Shoreline monitoring during construction as well as operation Phases were proposed. o A cruise terminal and related facilities is part and parcel of the project. This is to largely compensate the losses made o For all acquired properties and land adequate compensation will be provided based on legally valid documents	Km (20 Km on both sides of the project site) is being done and reports are regularly submitted to regulatory authorities. o Once the first phase of port becomes operational, it would naturally attract cruise tourism. Based on the development of cruise business, dedicated cruise berths will be planned in a phased manner. Action is also being taken in consultation with the State tourism department, to design port linked tourism packages covering the Kovalam-Vizhinjam- Poovar tourism corridor o Based on G.O,(Rt) No.2021/2017/RD dated 27-04-2017, government ordered to pay compensation for land and not for the structures since they were in violation of CRZ notification. Later based on G.O,(Rt) No.17/2017/F&PD dated 08-08-2017 the GoK ordered to pay compensation for structures constructed in violation of CRZ notification also. However based on the advice of the Advocate General Kerala the payment for structures constructed in violation of CRZ notification has been withheld since the EC condition specifies

Status of Environment Management Plan- Port site- Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
				that the compensation shall be given to authorized-cum-affected (having valid clearances as applicable) resort owners.
9	Breakwater	Change in shoreline	o Shoreline monitoring shall be carried out o Suitable Shoreline protection measures will be implemented based on the observations	Being Complied Comprehensive Shoreline Monitoring is being carried out under the technical Guidance of NIOT and Six monthly monitoring reports are being submitted regularly as part of EC & CRZ Compliance The existing Shoreline Monitoring arrangement consists of: o Engaging of M/s Ocean Science & Surveying for Cross Shore Beach Profiling perpendicular to the shoreline 20 KM on either side of the port at 500 meter intervals which includes bathymetry survey upto CD -10 and landside survey upto HTL + 100 meter and photographic documentation of morphological changes, seasonal beach sediment sampling and analysis at 81 locations, bathymetry survey of 40 km x 15 km twice in a year, monthly monitoring of littoral zone, seabed sediment sampling per sq.km in 80 sq.km, current measurement with ADCP at 4 locations for 3 seasons, tide measurement, continuous wave measurement by wave

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
				rider buoy, water sampling and analysis, continuous turbidity monitoring at 3 locations, bathymetry and cross section survey of 6 rivers debouching into the sea in 40 Km stretch study area, continuous weather monitoring by Automatic Weather Station. o The 1st Mathematical Report prepared by L&T Infrastructure Engineering Pvt. Ltd. (LnTIEL) based on Shoreline Monitoring data for the period Feb'15-Feb'17 has affirmed that the shoreline change is in line to the prediction done as part of the EIA report the same is submitted with the previous compliance (April 17 – September 17). We are continuing with the same practice, and, the shoreline data from March 2017 to February 2018 is submitted to LnTIEL for mathematical modelling, report so prepared will also be submitted to all the regulatory authorities. o Additionally comparison of analyzed data with satellite image and drawing of conclusions for accretion and erosion by NIOT has also started
10	Effect on existing	Movement of fishing boats	o Detailed modelling studies have been carried out on tranquillity conditions in the fishing	Being Complied o Wave, current and tide data are being

Status of Environment Management Plan- Port site- Construction Stage
Potential Impacts and Mitigation Measures of Various Project Activities

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
	fishing harbour		harbour with port development. The studies reveal that the tranquillity conditions will be improved in fishing harbour with construction of the port. Further minor accretion happening within the fishing harbour will be arrested o Traffic of Marine vessel/ fishing boats will be planned without affecting each other o Adoption of fishing harbour to manage it to perform as per International standard o A new fishing harbour provided under CSR initiatives because of additional tranquillity creator. o Loss of livelihood will be either taken care of in the new port premises or adequately compensated mostly in the form of employment	monitored along with the shoreline monitoring of 40 km stretch. Based on the above, the modelling studies done at the EIA stage has been further evaluated. o The 1st Mathematical Report prepared by L&T Infrastructure Engineering Pvt. Ltd. (LnTIEL) based on Shoreline Monitoring data for the period Feb'15-Feb'17 has affirmed that the shoreline change is in line to the prediction done as part of the EIA report. Report submitted with the last six monthly compliance report of April – September 17. We are continuing with the same practice, and, the shoreline data from March 2017 to February 2018 is submitted to LnTIEL for mathematical modelling o Traffic of Marine vessel/ fishing boats will be planned without affecting each other o The work for construction of the fish landing center (Rs.16 crores) and the fishery breakwater (Rs.131.12 crores) has been initiated as part of the funded work component of the concession agreement with AVPPL. 565 meter length of breakwater has been completed which

Status of Environment Management Plan- Port site- Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
				forms part of the new fishing harbor, but during cyclone Ohki approx. 200 meter of breakwater was partially washed off. At present fishing boats are docked in the proposed area affecting the progress of fishery berth. The GoK has initiated discussions with fishermen representatives for removal of the boats to facilitate construction work. o In consultation with the fishermen, an enhanced livelihood compensation package was sanctioned by GoK, instead of Rs.7.1 crores suggested earlier in the EIA stage. Till date Rs.32.04 crores have been disbursed till 31st March 2018 for a total number of 2391 livelihood affected persons (LAP's) whose verification was complete in all respects. This includes 2116 numbers of boat owners as well to whom kerosene is supplied free of cost during the port construction period. Verification of the documents of balance LAP's is in progress.
11	Shoreline changes	erosion/accretion	Final shoreline Impact management plan will be prepared in consultation with agencies like CESS/INCOIS, NGO and local bodies and will implemented. The draft shoreline impact	Being Complied o NIOT has been engaged to give technical advice on technical aspects related to shoreline monitoring & shoreline

Status of Environment Management Plan- Port site- Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			management plan is given in Appendix 6.6.	evolution. o Comprehensive Shoreline Monitoring is being carried out under the technical Guidance of NIOT and six monthly monitoring reports are being submitted regularly as part of EC & CRZ Compliance. o Wave, current and tide data are being monitored a 40 km stretch. Based on the above, the modelling long with the shoreline monitoring of studies done at the EIA stage has been further evaluated. o The 1st Mathematical Report prepared by L&T Infrastructure Engineering Pvt. Ltd. (LnTIEL) based on Shoreline Monitoring data for the period Feb'15-Feb'17 has affirmed that the shoreline change is in line to the prediction done as part of the EIA report. o We are continuing with the same practice, and, the shoreline data from March 2017 to February 2018 is submitted to LnTIEL for mathematical modelling

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Environmental Management Plan - Road/Rail Corridors*
***Construction work has partially commenced in road corridor for only 500 meters**

Sl. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2018
1	Environmental Management and Monitoring Facility Equipment for EMP (Meters, Vehicles and Buildings)	This will include institutional requirements, training, environmental management and monitoring. Provision for purchasing required equipment.	Noted for Compliance o An Environment Management Cell has been established to look after day to day affairs like Monitoring, Training o An officer of VISL has been designated as Head (EHS & CSR) for effective implementation of the stipulated EHS safeguards & CSR activities. AVPPL, the concessionaire executing the project has also appointed officers for EHS & CSR. In addition to the above, independent environment, health and safety consultants have been being appointed as required in the concession agreement signed with AVPPL. o Necessary equipment will be purchased. o Third party environmental monitoring has commenced since August 2016 and the monitoring results are satisfactory
2	Altered Road embankment	Retaining walls and gabions should be provided	Noted for Compliance o Road construction activities have just started and only 500 meter of road cutting activity has been done. Retaining walls and gabions will be provided as and when required.
3	Dust	o Water should be sprayed during the construction phase, at mixing sites, and temporary roads. o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to prevent dust.	Being Compiled o As road construction activities have just begun only earth cutting was carried out for 500 meters during the compliance period. All the trucks transporting the cut material were covered with tarpaulin.

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Environmental Management Plan - Road/Rail Corridors* *Construction work has partially commenced in road corridor for only 500 meters			
Sl. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2018**
		o Vehicles delivering materials should be covered to reduce spills and dust blowing off the load.	o Water sprinkling was carried out at regular interval over the temporary road during transportation of cut material. o Dumpers transporting cut materials were allowed during nonpeak hours only
4	Air Pollution	o Vehicles and machinery are to be maintained so that emissions conform to National and State standards. o All vehicles and machineries should obtain Pollution Under Control Certificates (PUC).	Being Complied o Ambient air quality monitoring is carried out at 5 locations as per the Environment Monitoring Plan prescribed in EIA and has commenced since August 2016, the results obtained are within the limits prescribed by National Ambient Air Quality Standards (NAAQS) o It is ensured that all vehicles have Pollution Under Control Certificate (PUC)
5	Noise	o Machinery and vehicles will be maintained to keep their noise to a minimum. o Construction of noise barriers of an average length of 100m and eight feet height where ever necessary. o Proper maintenance of the rail track and rail wagon, by frequent lubrication to avoid frictional noise. o Regular monitoring shall be carried out as per the Environmental Monitoring Plan.	Being Compiled o All the machinery and vehicles are maintained to keep the noise at minimum o Noise monitoring is being done since August 2016, and the readings are within the limits at port site o At present only road cutting is carried out for 500 meter length and barriers will be installed where ever necessary in future o Regular monitoring of ambient Noise is carried out since August 2016 as per the Environmental Monitoring Plan prescribed in EIA and results are within the prescribed limit at port site.
6	Loss of low lying land and	o Impacted ponds can be enhanced by constructing	Will be complied

Environmental Management Plan - Road/Rail Corridors* *Construction work has partially commenced in road corridor for only 500 meters			
Sl. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2018**
	ponds	bridged structures like Gabions to avoid plugging of springs. o Mitigation/Compensation shall be affected for the completely impacted ponds. o At Chainage km 6.500 the Railway alignment goes below the Existing NH and then at km 6.600 it will hit pond. The pond will be excavated partially and the soil material shall be used to fill in the western part and an equivalent area lost may be excavated to compensate the loss of effective pond area.	o At present only 500 meter of earth cutting activity has been carried out for road corridor and no low lying area or ponds has been impacted. o For impacted ponds in road alignment suitable mitigation measure will be adopted during construction.
7	Flood Impacts and Cross Drainage Structures	Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events.	Will be complied
8	Alteration of drainage	o In sections along watercourses, earth and stone will be properly disposed of so as not to block rivers and streams, thereby preventing any adverse impact on water quality. o All necessary measures shall be taken to prevent earthworks and stone works from impeding cross drainage at streams and canals or existing irrigation and drainage systems in conformity to the Contractors visual integration and management plan and EMP.	Will be complied
9	Contamination from Wastes	All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into rivers and irrigation systems	Will be complied
10	Borrow pits	Borrow pits are to be identified, opened and closed	Will be complied as and when required

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Environmental Management Plan - Road/Rail Corridors* *Construction work has partially commenced in road corridor for only 500 meters			
Sl. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2018**
		after consultations and proper documentation	
11	Quarrying and Material sources	o Quarrying will be carried out at approved and licensed quarries only. o Details of Quarrying material sources are given in Chapter 4.	Will be complied
12	Soil Erosion and Soil Conservation	o On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. o On sections with filling and deep cutting their slopes should be covered by sod, or planted with grass, etc. o If existing irrigation and drainage system, ponds are damaged, they will be suitably repaired. o Retaining walls and gabions shall be suitably provided.	Will be complied
13	Loss of agricultural topsoil	o Arable land should not be used for topsoil borrowing. o Topsoil will be kept and reused after excavation is over. o Any surplus to be used on productive agricultural land.	Will be Complied o All the top soil excavated during the 500 meter earth cutting activity at present is stacked in PAF area with proper protection for reuse in future.
14	Compaction of Soil and Damage to Vegetation	Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation.	Will be Complied
15	Loss of trees and Avenue Planting	o Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. o Landscaping shall be done at major junctions.	Being Compiled o 12 Ha of land is identified by social forest department to carry out compensatory afforestation activities (at an aerial distance of 24 km from project site). In lieu of 1127 tress cut till now we require 7 Ha area for

Environmental Management Plan - Road/Rail Corridors* *Construction work has partially commenced in road corridor for only 500 meters			
Sl. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2018**
			afforestation however keeping future felling of trees we are in the process of doing afforestation on 12 Ha land in Sainik School Trivandrum. Principal Chief Conservator of Forest has submitted the scheme for afforestation to Government of Kerala for approval (Attached as **Annexure 7**), and necessary funds for the same will be deposited to forest department. It is expected that afforestation activities will commence with the onset of monsoon.
16	Vegetation clearance	Tree clearing within the ROW should be avoided beyond that which is directly required for construction activities and/ or to reduce accidents. Especially in plantation and house garden areas both along road and rail alignment.	Will be complied o Special care is taken to minimise the tree felling to the extent possible, but in line with the technical requirements of the project. Due prior permission is taken for tree felling from Forest Department.
17	Fauna	Construction workers should protect natural resources and animals. Hunting of birds and other local animals is prohibited.	Being Complied o Construction workers are housed in labour camp near the project site and are provided with all the basic amenities such as drinking water, proper sanitation, canteen etc. Regular awareness session is being given to the construction workers regarding importance of natural resources and animals.

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Environmental Management Plan - Road/Rail Corridors* *Construction work has partially commenced in road corridor for only 500 meters			
Sl. No.	**Environmental Impacts and Issues**	**Mitigation Measures**	**Status as on 31.03.2018**
			o Hunting of birds & other local animals is strictly prohibited
18	Traffic Jams and congestion	If there is traffic congestion during construction, measures should be taken to relieve it as far as possible with the co-operation of the traffic police.	Will be complied
19	Health and Safety	All contractors' staff and workers must wear high visibility purpose made overalls or trousers/a waist coat at all times All operators working with any materials above head height (even in trenches) must wear hard hats all at times on the worksite.	Being Compiled o All the workers are provided with Personal Protective Equipment's (PPE) and it is ensured that they wear it all the time o Also all the contractors working at site have a dedicated health and safety person to oversee the work carried out.
20	Pollution of Streams parallel or along the alignments	Construction material /waste should be disposed of properly so as not to block or pollute streams or ponds with special attention to confining concrete work.	Will be Complied o At present earth cutting activity is carried out only in 500 meter distance and the top soil is stacked in the PAF area. No construction material/waste is disposed in streams or ponds
21	Cultural Remains	Construction should be stopped until authorised department assess the remains to preserve Archaeological relics and cultural structures like Temples, mosques and churches. Archaeologists will supervise the excavation to avoid any damage in the relics.	Will be complied

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Environment Management Plan – Warehouse Area* (Construction Phase) *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
WAREHOUSE AREA (Construction Phase)				
1	Material transport and construction activities	Air Quality/Dust	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards. o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt. o Providing adequately sized construction yard for storage of construction materials, equipment, tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water should be sprayed during the construction phase, at mixing sites, and temporary roads. o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to prevent dust. o Vehicles delivering materials should be covered to	Complied o Monthly Environment Monitoring is being carried out and all the parameters are within the stipulated limit o It is ensured that all vehicles entering the area have a valid PUC certification o Vehicles entering the site have are following speed limit o Tarpaulin cover is used in vehicles

Environment Management Plan – Warehouse Area* (Construction Phase) *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			reduce spills and dust blowing off the load. o Environmental awareness program will be provided to the personnel involved in developmental works. o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation.	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB. o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A). o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors. o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers. o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am	Complied o Ambient Noise is being monitored fortnightly for Day & Night time and results are within the prescribed limit. Construction equipment machinery procurement is done in accordance with specifications conforming prescribed standard. Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs)

Environment Management Plan – Warehouse Area* (Construction Phase) *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			to 10 pm) to minimize noise impacts. o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
2	Construction of Buildings, Roads, Sheds, etc.	Vegetation and Strain on existing infrastructure	o Most of the land is covered with coconut trees and few other trees. Trees that are cut down will be accounted for and the same no. of trees of the same or some other species will be replanted at another location to compensate for the loss of greenery.	Will be Complied At present no trees are cut in the warehouse area
		Water Environment	o The streams 1 and 2 will be made to avoid entering the warehouse area by diverging them into the Karichal River. o A tunnel like arrangement with RCC structures will be used so as to not affect the streams (3 and 4) that will go through the warehouse area. The streams will be made to go under the warehouse areas through the tunnel. o Another option is to divert the stream through the boundary o An application has been filed with the irrigation department for permission.	Will be complied Will be appropriately planned in consultation with the concerned departments
			o The low lying area in the region is already made use by the local people, and has been degraded.	Will be complied Will be appropriately planned in consultation with the concerned

Environment Management Plan – Warehouse Area* (Construction Phase) *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			There are no active ecological systems in the area. As far as possible, during operation phase the network of streams that add to the low lying area of the region will be diverted or channeled under the constructed buildings to avoid impact to the low lying area. o Filling of low lying areas (if required) shall be done	departments
			o Construction waste such as cement, paint, and other construction waste will flow into the downstream parts of the streams and Karichal River. Construction will be avoided during rainy season. Good housekeeping practices, such as cement being stored in dry areas will be taken care of. Labour camps will be provided with proper support services.	Will be complied
		Disturbance to Natural Drainage pattern	o As mentioned above, formidable measures will be taken to avoid the disturbance to the natural flow of water. If some structure or building comes in the way of the existing flow of water, the flow will be redirected to the closest stream in the drainage pattern. o In sections along watercourses, earth and stone will be properly disposed of so as not to block rivers and streams, thereby preventing any adverse impact on water quality. o All necessary measures shall be taken to	Will be complied

Environment Management Plan – Warehouse Area* (Construction Phase) *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			prevent earthworks and stone works from impeding cross drainage at streams and canals or existing irrigation and drainage systems in conformity EMP.	
		Existing Traffic	o Transportation of construction materials will be carried out during non- peak hours. o Regularization of truck movement. o Existing roads shall be strengthened and shall be used for the construction material transportation.	Will be complied
3	Solid Waste Management	Soil quality	o Construction waste will be used within warehouse site for filling of low lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. Other recyclable wastes will be sold. o Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from construction waste. o Burning of refuse at construction sites will be prohibited.	Will be complied

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Project Auxiliary Facility (PAF)* ZONE - Construction Phase
***Only Boundary Wall Construction in limited way has started in this area during the compliance period**

Sl. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2018
1	Material transport and construction activities	Air Quality/Dust	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards. o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt. o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water should be sprayed during the construction phase, at mixing sites, and temporary roads o In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular	Complied o Monthly Environment Monitoring is being carried out and all the parameters are within the stipulated limit o It is ensured that all vehicles entering the area have a valid PUC certification o Vehicles entering the site have are following speed limit o Tarpaulin cover is used for vehicles transporting the construction material o Water sprinkling is carried out on the temporary roads by contractors o Environment awareness programme is provided to the personnel engaged in development work

Project Auxiliary Facility (PAF)* ZONE - Construction Phase *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			intervals to prevent dust. o Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. o Environmental awareness program will be provided to the personnel involved in developmental works. o Use of tarpaulin covers and speed regulations for vehicles engaged in transportation.	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB. o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A). o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors. o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such	Complied Ambient Noise is being monitored fortnightly for Day & Night time and results are within the prescribed limit. Construction equipment machinery procurement is done in accordance with specifications conforming prescribed standard. Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs)

Project Auxiliary Facility (PAF)* ZONE - Construction Phase *Only Boundary Wall Construction in limited way has started in this area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			as acoustic controls, insulation and vibration dampers. o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts. o Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
2	Construction of Buildings, Roads, Parking features, etc.	Vegetation and Strain on existing infrastructure	o Most of the land is covered with coconut trees and few other trees. Trees that are cut down will be accounted for and the same no. of trees of the same or some other species will be replanted at another location to compensate for the loss of greenery. o There are very few existing buildings and infrastructure on the PAF zone area land which will be acquired and people in that area will be rehabilitated.	Will be complied Will be complied alongside the road and port boundaries
		Existing Traffic	o Transportation of construction materials will be carried out during non- peak hours.	Will be complied

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

Project Auxiliary Facility (PAF)* ZONE - Construction Phase ***Only Boundary Wall Construction in limited way has started in this area during the compliance period**				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			o Regularization of truck movement. o The existing roads shall be strengthened and shall be used for the construction material transportation.	
		Solid Waste	o Construction waste will be used within port site for filling of low lying areas. o Composted bio-degradable waste will be used as manure in greenbelt. Other recyclable wastes will be sold. o Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. o General refuse generated on-site will be collected in waste skips and separated from construction waste. o Burning of refuse at construction sites will be prohibited.	Will be complied

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Status of Environmental Management Plan.		

BACK UP AREA* – Construction Phase *Construction of buildings has commenced in only in reclaimed area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
1	Material transport and construction activities	Air Quality	o To reduce impacts from exhausts, emission control norms will be enforced / adhered. o All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards o Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt o Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. o Provide enclosures on all sides of construction site o Movement of material will be mostly during non-peak hours. o On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic o Water sprinkling will be carried out to suppress fugitive dust o Environmental awareness program will be provided to the personnel involved in developmental works o Use of tarpaulin covers and speed regulations for	Being Complied o Ambient air quality monitoring is carried out at 5 locations as per the Environment Monitoring Plan prescribed in EIA and has commenced since August 2016, the results obtained are within the limits prescribed by National Ambient Air Quality Standards (NAAQS) o It is ensured that all vehicles have Pollution Under Control Certificate (PUC) o Water sprinkling was carried out at regular interval over the temporary road during transportation of cut material. o All the trucks transporting material are covered by tarpaulin cover. o Signage's for speed control are placed within the port area o Adequate storage for construction material is provided within the port area on reclaimed land o Environmental awareness program was carried out for contractors working at site.

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Status of Environmental Management Plan.		

BACK UP AREA* – Construction Phase *Construction of buildings has commenced in only in reclaimed area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			vehicles engaged in transportation	
		Noise	o Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB o Procurement of machinery / construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used o Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors o Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts o Personnel exposed to noise levels beyond threshold limits will be provided with protective	Being Compiled o All the machinery and vehicles are maintained to keep the noise at minimum o Regular Noise monitoring is being carried since August 2016, and the readings are within the limits at port site o At present only building work has commenced in limited way and barriers will be installed where ever necessary in future o Regular monitoring of ambient Noise is carried out since August 2016 as per the Environmental Monitoring Plan prescribed in EIA

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Status of Environmental Management Plan.		

BACK UP AREA* – Construction Phase *Construction of buildings has commenced in only in reclaimed area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			gear like earplugs, muffs, etc. o Ambient noise levels will be monitored at regular intervals	
2	Construction Activities	Water Environment	o Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events. o All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into the water bodies.	Being Compiled o The contractors working at site have obtained separate consent from KSPCB for their batching plant and they have constructed settling pond for wash water generated. o No wash water is disposed into the water bodies.
		Land Environment	o On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. o On sections with filling and deep cutting their slopes should be covered by sod, or planted with grass, etc. o If existing irrigation and drainage system, ponds are damaged, they will be suitably repaired. o Retaining walls and gabions shall be suitably provided.	Will be complied
			o Arable land should not be used for topsoil borrowing. o Topsoil will be kept and reused after excavation is over.	Will be complied

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan.

BACK UP AREA* – Construction Phase *Construction of buildings has commenced in only in reclaimed area during the compliance period				
Sl. No.	**Activity**	**Relevant Environmental Components likely to be impacted**	**Proposed Mitigation Measures**	**Status as on 31.03.2018**
			o Any surplus to be used on productive agricultural land.	
			o Construction vehicles should operate within the Backup Areas avoiding damage to soil and vegetation.	Will be complied alongside the road and port boundaries
			o Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. o Landscaping shall be done at major junctions.	Refer point No.15 of Environment Management Plan – Road/Rail Corridors
			o Tree clearing within the backup areas should be avoided beyond that which is directly required for construction activities and / or to reduce accidents.	Will be complied to the extent possible considering the technical requirements

Annexure VI

DG Set Details

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
D.G Set Details.

Annexure VI

D.G Set Details					
Sl. No.	**P & M Number**	**Working Status**	**Capacity KVA**	**Location**	**Pollution Control Measure**
In Use					
1	G005082/14353	In use	82.5	Test Pile 01	Adequate Stack Height
2	D3.9616/1600141	In use	5	At zero point	Adequate Stack Height
3	D3.5301/1600135	In use	5	Near approach jetty 2	Adequate Stack Height
4	15890	In use	250	DG shed (Fabrication Yard)	Manufacturer certificate with up-flow type exhaust
5	22655	In use	160	DG shed (Fabrication Yard)	Adequate Stack Height
6	4535	In use	125	DG shed (Fabrication Yard)	Adequate Stack Height
7	22208	In use	20	Labour Camp	Adequate Stack Height
8	22654	In use	160	CP 30 Batching Plant	Adequate Stack Height
9	G005082/9125	In use	82.5	Loadout Jetty 02	Adequate Stack Height
10	22206	In use	20	Labour Camp	Adequate Stack Height
11	N7F250734	In use	62.5	Near B & R site office	Adequate Stack Height
12	G00125/10622	In use	125	Loadout Jetty 02	Adequate Stack Height
13	16292	In use	82.5	P G 01	Adequate Stack Height
14	G005082/10617	In use	82.5	Test Pile 01	Adequate Stack Height
15	1720916	In use	125	Near to batching plant	Adequate Stack Height
16	1720624	In use	25	Site office	Adequate Stack Height
17	G17I30803	In use	62.5	POB	Adequate Stack Height
Not In Use					
18	G005040/7836	Not in use	40	Test Pile 01	Not in Use
19	SGL-15/1704X285	Not in use	15	Site office	Not in Use
20	G00 5040/15492	Not in	40	Test Pile 01	Not in Use

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
D.G Set Details.

D.G Set Details					
Sl. No.	**P & M Number**	**Working Status**	**Capacity KVA**	**Location**	**Pollution Control Measure**
		use			
21	G005125/15504	Not in use	125	Fabrication Yard	Not in Use
22	G005082/4462	Not in use	82.5	Loadout Jetty 02	Not in Use
23	5637	Not in use	40	Loadout Jetty 02	Not in Use
24	CP40D5P/F40	Not in use	40	Near B & R site office	Not in Use

Annexure VII

Scheme for Compensatory Afforestation

SFA2-118/2017

Social Forestry Division Office
Rajiv Gandhi Nagar, Vattiyoorkavu P.O
Thiruvananthapuram-13
Phone No:0471-2360462
Dated: 24.03.2018

From

The Assistant Conservator of Forests,
Social Forestry Division,
Thiruvananthapuram.

To

The Chief Executive Officer& Managing Director,
Adani Vizhinjam Port, Pvt.Ltd,
2nd floor, Vipanchika Tower,
Thycaud, Thiruvanathapuram.

Sir,

Sub :- Scheme for compensatory afforestation in lieu of tree felling for Vizhinjam International Sea Port Project-reg :-

Ref :- Letter No.SW3-18396/17 dtd 23.03.2018 of Principal Chief Conservator of Forests (Social Forestry).

Attention is invited to the subject matter. I am hereby forwarding a copy of the scheme which has been submitted to Government of Kerala for your information and necessary action.

Yours Faithfully,

Assistant Conservator of Forests

SCHEME FOR COMPENSATORYAFFORESTATION IN LIEU OF TREE FELLING FOR VIZHINJAM INTERNATIONAL SEA PORT PROJECT

SOCIAL FORESTRY DIVISION, THIRUVANANTHAPRAM

KERALA FOREST DEPARTMENT

CONTENTS

SCHEME FOR COMPENSATORYAFFORESTATION IN LIEU OF TREE FELLING FOR VIZHINJAM INTERNATIONAL SEA PORT PROJECT

1. Introduction

Vizhinjam International Deepwater Multipurpose Seaport project is a flagship project of the Government of Kerala (GoK) The project site is located at Vizhinjam, 16 km south of the capital city of Thiruvananthapuram. A fully owned company of GoK, named Vizhinjam International Seaport Ltd. (VISL) was formed to oversee the activities related to the development of the project. Ministry of Environment, Forests & Climate Change issued environmental & CRZ clearance to the project vide letter F.No.11-122/2011- IA.III dated 3rd January 2014.

Pursuant to the environmental clearance, GoK has entered into a concession agreement with M/s Adani Vizhinjam Port Private Ltd. (AVPPL) on 17th August 2015 for development and operation of the project for a concession period of 40 years. The preliminary works for the development of the project were initiated at the site on 16th November 2015, followed by official inauguration on 5th December 2015.

2. Guidelines for felling and removal of trees

As a measure against indiscriminate cutting of trees grown on government land and to conserve tree growth, government have constituted Committees at Corporation/Municipality/Panchayath levels and prescribed procedure for the purpose of taking a decision on felling of tree growth in public land. As per G.O (Rt) No. 172/2010/F&WLD dated 21.01.2010, the user agency should plant and protect compensatory plants at the rate of 1:10 in lieu of trees felled.

3. Sanction for tree felling for Vizhinjam project

For development of Vizhinjam project, Assistant Conservator of Forests (SF), Thiruvananthapuram had granted permission to M/s Adani Vizhinjam Port Private Ltd to fell 1127 trees as detailed below:

Sl. No	Permission letter no. & date	No. of trees
1.	SF A2-118/2017 dated 30.01.2017	81
2.	SF A2-118/2017 dated 09.03.2017	113
3.	SF A2-118/2017 dated 12.12.2017	933
	Total	**1127**

4. Government decision and action taken

In the meeting convened by honourable Minister of Ports on 05.04.2017 to discuss issues related to felling of trees in the acquired land for truck terminal area of the Port site, it was *inter alia* decided that Forest department may identify land for compensatory afforestation of 10 times the number of trees felled and M/s AVPPL will make available the required funds at the disposal of Kerala Forest department (***annexure – 1***).

Forest department has identified 12.0 ha of land for compensatory afforestation in the Sainik school campus at Kazhakkoottam. The Principal and Administrative Officer, Sainik school, Kazhakkoottam has accorded necessary sanction to Forest department to take up compensatory afforestation activities in the campus (***annexure -2***). M/s AVPPL have confirmed that necessary funds will be deposited on approval of the scheme for compensatory afforestation by government. A copy of consent letter no. AVPPL/SFD/2017-18/370 dated 20.03.2018 is appended (***annexure– 3***).

5. Specific objectives of the scheme

i. Compensate the greenery lost for port construction and ancillary development.
ii. Beautify the landscape with tree architecture.
iii. Mitigate noise and air pollution.
iv. Provide fresh air and act as lung to the society.
v. Improve the biodiversity of the tract.
vi. Provide safe haven for urban avifauna.
vii. Develop a sustainable model for urban forestry.
viii. Increase carbon sequestration to mitigate adverse effects of climate change.

6. Details of CA site

During 2016-17 Kerala Forest department had taken up compensatory afforestation activities in 20.0 ha in the Sainik school campus, Kazhakkootam in lieu of tree felling for 4 laning of Thiruvananthapuram – Mukkola section of NH–47 (new NH- 66). The plantation has come up very well and has been widely appreciated by M/s NHAI and Sainik school authorities. The permission granted by Sainik school authorities now is a clear testimony of the success achieved and conscious move to tap the accruable long term tangible and intangible benefits of bringing the campus under green cover. The identified plot of land lies contiguous to this. Being defence land, the area is secured and protected by compound wall on all four sides.

7. Implementation strategy

7.1. Pre- planting works

The present vegetation mostly consisting of acacia thickets with random pole crop, thorny bushes and other inhospitable outgrowth may be cut, heaped and burned, lest they interfere/compete with the planted stock. After excluding inspection paths, roads and patches with shallow soil from 12.0 ha of land identified in Sainik school campus, it is assessed that 16840 seedlings of fruit bearing, flowering , medicinal and multipurpose miscellaneous timber species can be planted at an espacement of 2.5 m x 2.5 m (approximate plantable area – 10.50 ha). The number of seedlings required to be raised, inclusive of casualty replacement @ 10%, is 18524. Pits of 45 cm x 45 cm x 45 cm will be taken up during April- May to facilitate weathering. Only one year old seedlings raised in containers of size 20 cm x 40 cm raised by Social Forestry wing will be utilised for planting.

7.2. Selection of Species

To restore and revive the pre existed vegetation of the terrain, the following indigenous fruit bearing species are recommended.

a) Fruit bearing

1. Njaval (*Syzygium cumini)*
2. Elengi (*Mimusops elengi)*
3. Ambazham (*Spondias pinnata*)
4. Mavu (*Mangifera indica)*
5. Plavu *(Artocarpus heterophylla)*
6. Anjily *(Artocarpus hirsutus)*
7. Pera (*Psidium gujava)*
8. Aathi (*Anona squamosa)*
9. Puli (*Tamarindus indica*)
10. Nelli *(Emblica officinalis)*
11. Rambuttan (*Nepheliu mlappaceum*)
12. Chamba (*Syzygium samarangense*)
13. Anapulinji(*Averrhoaca rambola*)
14. Mullathi(*Annona muricata*)
15. Sappota(*Manikaa sapota*)

b) Flowering

1. Kanikonna *(Cassia fistula)*
2. Manimaruthy *(Lagerstroemia speciosa)*
3. Chamatha *(Butea monosperma)*

4. Mandaram *(Bauhinia variegata)*
5. Chempakam *(Plumeria rubra)*

c) *Medicinal*

1. Kumpil *(Gmelina arborea)*
2. Veppu *(Azadirachta indica)*
3. Kudampuli *(Garcinia cambogia)*
4. Kanjiram *(Strychnos nuxvomica)*
5. Rekthachandanam *(Pterocarpus santalinus)*
6. Chandanam *(Santalum album)*
7. Ungu *(Pongamia pinnata)*
8. Aal *(Ficus species)*
9. Koovalam *(Aegle marmelos)*
10. Thanny *(Terminalia bellirica)*
11. Asokam *(Saraca asoca)*
12. Pathimukam *(Caesalpinia sapans)*
13. Marotty *(Hydnocarpus pentandrus)*

d) *Timber*

1. Rosewood *(Dalbergia latifolia)*
2. Teak *(Tectona grandis)*
3. Mahagony *(Swietenia macrophylla)*
4. Poovarsu *(Thespesia populnea)*
5. Matty *(Ailanthus excelsa)*
6. Kambakam *(Hopea parviflora)*
7. Karimaruth *(Terminalia tomentosa)*
8. Vellakil *(Dysoxylum malabaricum)*

e) *Bamboos, reeds, canes and palms*

The list is only indicative and not exhaustive.

7.3. Planting operations

Planting activities will be commenced in June with the outbreak of monsoon for early establishment, steady growth and better survival. Wherever the soil is shallow, soil binders like ramacham, etc may be crowbar planted. The fringes may be planted with agave, pathimugham etc. as cattle barrier/ bio fence and to reduce fire hazards from adjoining habitation. Other conventional post planting operations like weeding, casualty replacement, terrace formation, application of manure, soil working, fire protection etc will be carried out from time to time. In areas where

acacia secondary growth is not there, only heaping and burning may be done to facilitate area for planting.

7.4. Soil and Moisture Conservation Works

The strategy is (i) to divide long slopes of land into a series of shorter ones to reduce the velocity of runoff water and (ii) to retain the water in the land for longer period so as to allow maximum water to be absorbed and held in the soil and less water flows down the slope of the land at non-erosive velocity.

7.4.1. Measures Proposed

1. *Contour trenching*

Contour trenching includes excavation along a uniform level across the slope of the land in the upper and middle reaches. Bunds may be formed in the transition and lower reaches using the debris and materials excavated from them. Contour trenches decrease the length of slope into smaller sections which retard the rate of runoff and soil erosion. Water collected in these trenches will increase the moisture regime and support the growth of vegetation. Contour trenches break the velocity of runoff and water percolates through the soil slowly and travels down. They also protect the contour or boundary bunds in the land from the runoff from upper portion. The trenches may be continuous or interrupted (staggered/ intermittent) type. Trenches get filled with soil over a period of time. Planting of soil binder trees/ shrubs on the upper edges of the trenches is beneficial. Trees/ shrubs like *Emblica officinalis, Vetiveria zizanioides*, bamboos etc may be taken up on the upper edges of the trenches through planting/seed sowing. It is proposed to undertake staggered contour trenches of size 2 m x 0.5 m x 0.5 m. Trenches may be taken up in lower reaches also, wherever required.

8. Corporate Social Responsibility

Kerala is a land scarce state and getting compact plot of land for taking up compensatory afforestation activities is an uphill task, more so in the periurban areas of the bustling Thiruvananthapuram city. Sparing nearly 12.0 ha of land for CA activities is indeed an act of extreme benevolence and magnanimity on the part of Sainik school authorities. Goodwill and cooperation of the residents is essential for establishment, survival and healthy upcoming of the plantation to achieve the long term benefits of the afforestation activities undertaken in the campus. The Sainik school authorities have requested to dig a bore well to supplement the water requirements of students, teachers and staff residing in the campus, which

currently is experiencing acute shortage of water. The water source established will encompass multiple areas of services like facilitation to education institution, supply of drinking water and domestic amenities, irrigation, extension to vegetable farming and horticultural cropping to resident community- to mention only a few. The facility developed can be utilized for establishing decentralized nursery to raise planting stock for greening periurban areas of Thiruvananthapuram city in future. In view of the accruable tangible and intangible benefits arrayed above, this may very well be portrayed as one of the unique and best models of corporate social responsibility (CSR) initiative. Last but not least, no price can be tagged to any investment for the welfare of our future defence personnel, guardians of territorial integrity and saviours of nation's security. Forest department strongly endorse their request and M/s AVVPL has agreed to provide Rs. 2.00 lakh for digging bore well and installation of pump set in the school campus.

9. Source of Fund

M/s Adani Vizhinjam Port Private Limited have conveyed consent to place necessary funds at the disposal of Forest department vide annexure - 3.

10. Budget

The financial requirement to implement the scheme is appended ***(annexure-4).*** Since the project area falls within the city limits and periurban areas, mobilising labour is difficult and wage rates are high compared to forest areas. Hence, implementing the scheme with the current Forest Schedule of Rates (FSR) will not be viable. An enhancement of 50% over and above FSR for labour components has, therefore, been factored in the proposed costing. Earlier, in an identical case of compensatory afforestation in lieu of four laning of Thiruvananthapuram – Mukkola NH – 47 (new NH – 66), M/s NHAI had agreed for enhancement of 50% over and above FSR and had been approved vide G.O(Rt) No. 28/2016/F&WLD dated 25.01.2015 (***annexure – 5***). Forest department has introduced contract system for taking up forestry works w.e.f. 11/2017, and hence provision for 10% contractor's profit (CP) has been included in the costing. Depending on site conditions and contingencies at the time of execution upward/downward variations to the extent of 10% may be anticipated.

11. Implementation

The scheme will be implemented by Social Forestry Division, Thiruvananthapuram.

12. Administrative requirement

The proposed work is not included in the annual plan of operation of the implementing office. Hence separate administrative sanction or enabling government order is required for implementation.

13. Peoples' participation

The local public may be actively got involved in the implementation of the scheme. Services of the Non Governmental Organisations, Self Help Groups, Kudumbasree etc may be sought in various stages of execution of the scheme. Voluntary involvement of students and organisations like NCC, NSS, Students Police Cadet, Scout etc from educational institutions may be solicited at various stages of implementation so as to foster sense of ownership and belonging among the younger generation.

14. Monitoring and evaluation

The implementation of the scheme will be monitored at various levels of officers in the hierarchy and concurrently evaluated by the Vigilance wing of Forest department.

15. Cost benefit analysis

Like in any other forestry/ greening activity, quantification of accruable benefits in terms of money is difficult in respect of this scheme also. Pure air and water are prime products of forests and together they constitute our life line. It is a now recognised that not even the most modern theories of economics or the best tools of financial auditing have achieved fair success in attaching a price tag to a well created and functioning eco-system as the goods and services rendered are too complex and multifactorial. Hence a detailed cost benefit analysis is not being ventured into.

16. Conclusion

Development and conservation need not be on conflicting terms, but have to go hand in hand. One need not be at the cost of the other. This scheme is one such humble effort in that direction.

Range Forest Officer,
Social Forestry Range, Thiruvananthapuram

Assistant Conservator of Forests
Social Forestry Division, Thiruvananthapuram

Principal Chief Conservator of Forests (SF)

GOVERNMENT OF KERALA

No.1317594/E1/2017/F&PD

Fisheries & Ports (E) Department
Thiruvananthapuram
Dated: 24-04-2017

From

Additional Chief Secretary

To

The Additional Chief Secretary,
Forest Department.

The Additional Chief Secretary,
Environment Department.

The Principal Chief Conservator of Forests,
Thiruvananthapuram.

The Director,
Directorate of Environment and Climate Chage.

The Member Secretary,
Kerala State Bio-diversity Board.

Assistant Conservator of Forests,
Social Forestry Division, Thiruvananthapuram.

The Managing Director,
Vizhinjam International Seaport Limited, Thiruvananthapuram.

The Director and Chief Executive Officer,
Adani Vizhinjam Ports Private Ltd, 2nd Floor,
Vipanchika Towers, Near Thycaud Guest House.

Sir,

Sub:- Port Department - Request for seeking permission for felling of existing trees –Minutes forwarding of - reg.

Ref:- Government letter of even No. dated 03-04-2017

In inviting your attention to the reference cited, I am to forward herewith the copy of the minutes of the meeting held on 05-04-2017 by Hon'ble Minister (Ports) to discuss issues related to the felling of trees in the acquired land for Truck Terminal area in the Adani Vizhinjam Port site for favour of information and further action if any.

Yours faithfully,

P.T.JOY
Under Secretary
For Additional Chief Secretary to Government.

Approved for issue,

Section Officer

വകുപ്പിന് നൽകാൻ അദാനി വിഴിഞ്ഞം പോർട്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ് സന്നദ്ധമാണെന്ന് യോഗത്തിൽ അറിയിച്ചു.

പദ്ധതി പ്രദേശത്തുനിന്ന് നീക്കം ചെയ്യേണ്ടി വരുന്ന തെങ്ങ്, കവുങ്ങ് എന്നിവ വനവൃക്ഷങ്ങളുടെ ഗണത്തിൽപ്പെടാത്തവ ആയതിനാൽ അവ മുറിച്ചുമാറ്റുമ്പോൾ പകരം 1:10 എന്ന അനുപാതത്തിൽ വൃക്ഷത്തൈകൾ പുതുതായി വച്ച് പിടിപ്പിക്കേണ്ടതുണ്ടോ എന്നതിൻമേൽ വ്യക്തമായ വിശദീകരണം വനം വകുപ്പിൽ നിന്ന് വേണമെന്ന് യോഗത്തിൽ അദാനി വിഴിഞ്ഞം പോർട്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ് അഭിപ്രായപ്പെട്ടു. ഇതിനുള്ള വിശദീകരണം പരിശോധിച്ചു നൽകാമെന്ന് പ്രിൻസിപ്പൽ ചീഫ് ഫോറസ്റ്റ് കൺസർവേറ്റർ യോഗത്തെ അറിയിച്ചു. യോഗത്തിൽ താഴെപ്പറയുന്ന തീരുമാനങ്ങൾ എടുത്തു.

1. പദ്ധതി പ്രദേശത്തുനിന്ന് നീക്കം ചെയ്യേണ്ടിവരുന്ന തെങ്ങ്, കവുങ്ങ് തുടങ്ങിയവ വനവൃക്ഷങ്ങളുടെ ഗണത്തിൽപ്പെടാത്തവ ,ആയതിനാൽ അവ മുറിച്ചുമാറ്റുമ്പോൾ പകരം 1:10 എന്ന അനുപാതത്തിൽ വൃക്ഷത്തൈകൾ പുതുതായി വച്ച പിടിപ്പിക്കേണ്ടതുണ്ടോ എന്നതിന്മേൽ വനംവകുപ്പ് വിശദീകരണം നൽകുന്നതായിരിക്കും.
2. മുറിച്ച് മാറ്റുന്ന മരങ്ങൾക്ക് പകരമായി (1:10 അനുപാതത്തിൽ) പുതിയ വൃക്ഷത്തൈകൾ വച്ചു പിടിപ്പിക്കേണ്ട സ്ഥലം വനംവകുപ്പ് കണ്ടെത്തുന്നതായിരിക്കും.
3. മരം മുറിക്കുന്നതിനുള്ള ആദ്യഘട്ട അനുമതി വനംവകുപ്പ് ഉടൻതന്നെ നൽകുന്നതായിരിക്കും.
4. വിഴിഞ്ഞം പദ്ധതിയുമായി ബന്ധപ്പെട്ട് മുറിച്ച് നീക്കുന്ന മരങ്ങൾക്ക് പകരമായി പുതിയ വൃക്ഷത്തൈകൾ വച്ചുപിടിപ്പിക്കുന്നതിനാവശ്യമായ തുക അദാനി വിഴിഞ്ഞം പോർട്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ് വനം വകുപ്പിന് നൽകുന്നതായിരിക്കും.

യോഗത്തിൽ പങ്കെടുത്ത എല്ലാപേർക്കും ബഹു. മന്ത്രി നന്ദി രേഖപ്പെടുത്തുകയും യോഗം കൃത്യം 4.20 PM ന് അവസാനിച്ചു.

SAINIK SCHOOL KAZHAKOOTAM
PO - SAINIK SCHOOL
DIST - TRIVANDRUM (KERALA) - 695 585

1009/SST/Q/2018

16 Feb 18

Assistant Conservator of Forests
Social Forestry Division
Rajeev Gandhi Nagar
PTP Nagar, Vattiyoorkavu – PO
Thiruvananthapuram - 695013

REPLACING ACACIA THICKETS IN THE CAMPUS WITH NATIVE SPECIES

1. Reference is made to your letter No SFA1-179/2016 dt 14 Feb 18.

2. In apropos to the correspondence made with your department on the above subject, the school administration is appreciative of your department's efforts by way of afforestation and maintenance of natural water sources earlier in the school campus. At this juncture, maximum co-operation and support from your department as well as NHAI are expected with regard to our requests mentioned in para 4, 5 and 6 of this office letter No 1009/SST/Q/2018 dt 31 Jan 18. This institution is optimistic that the approach as detailed in para (i) of your letter under reference, would fructify and the school would be benefited on that account.

5. Principal is hereby pleased to accord permission to your department to undertake the proposed activities in the newly identified patch of land in the school campus.

SAINIK SCHOOL KAZHAKOOTAM

(B Girish Kumar)
Lt Col
Administrative Officer
for Principal

Ref: AVPPL/SFD/2017-18/370 Date: 20th March 2018

The Assistant Conservator of Forest,
Social Forestry Division,
Thiruvananthapuram

Sub: - Compensatory Afforestation due to cutting and removal of existing trees for the development of Vizhinjam Project- Reg.

Ref:

I. Our letter AVPPL/GoK/2017-18/310 dated 12th Jan 2018
II. Your letter SFA2-118/2017 dated 07th March 2018
III. Our letter AVPPL/SFD/2017-18/361 dated 09th Match 2018
IV. Your letter SFA2-118/2017 dated 12th March 2018

Dear Sir,

With reference to subject matter, we have already confirmed our consent to take up the compensatory afforestation activities vide our letter under **reference III** above. Subsequently, we have received your letter submitting the detail of expenses as per current Forest Schedule Rates and attendant ancillary expenses.

We hereby confirm that necessary funds will be deposited once the scheme for compensatory afforestation is approved by the Government of Kerala (GoK). You are requested to kindly proceed with submitting the necessary scheme to the GoK.

Thanking You
Yours Sincerely,

Rajesh Jha,
Chief Executive Officer

Copy to:

1. The Additional Chief Secretary, Department of Ports, Government of Kerala
2. The Principal Chief Conservator of Forestry Division, Thiruvananthapuram
3. The Managing Director & CEO, Vizhinjam International Seaport Limited

Adani Vizhinjam Port Private Limited
2nd Floor, Vipanchika Tower, Thycaud
Thiruvanathapuram
Kerala-695014

Social Forestry Division,Thiruvananthapuram

Annexure

Financial requirement for Phase - II of Compensatory Afforestation at Sainik school, Kazhakoottam (2017-18 to 2020-21)

Sl no.	Item of work	Unit	Rate (Rs)	Physical target	Financial target (Rs.)			
					I year	II year	III year	Total
1	Clearing boundary line to a width of 1.5m to facilitate survey.	km	900.45	5	4502.25			4502.25
2	Survey with prismatic compass		900.45	5	4502.25			4502.25
3	Slash felling in ordinary area	ha	7165.9	12	85990.80			85990.80
4	Dragging out the debris and acacia felled waste materials		2900	12	34800.00			34800.00
5	Heaping and burning		8599.08	12	103188.96			103188.96
6	First burning		358.15	12	4297.80			4297.80
7	Collection of bamboo stakes for alignment	1000 nos	580	16840	9767.20			9767.20
8	Transportation of stakes		145	16840	2441.80			2441.80
9	Aligning and staking 2.5m x 2.5m	ha	1791.33	12	21495.96			21495.96
10	Making platform of size 1.m x 1.m with inward slope 30cm depth in uphill side with inword slopes to planted and natural seedlings.	100 nos	1015	16840	170926.00			170926.00
11	Digging pits 45 x 45 x 45cm in hard soil before rain		2509.61	16840	422618.32			422618.32
12	Repairing damaged platforms		507.5	16840	0.00	85463.00	85463.00	170926.00
13	Cost of big basketted seedlings	Nos	45	18524	833580.00			833580.00
14	Transport of big bag seedlings from nursery sites at Alappuzha and Attingal to planting site @ 500 seedlings per trip and Rs. 70/ km.	LS	LS	LS	450000.00	45000.00		495000.00
15	Loading big bag seedlings from nursery and unloading at the planting site.	500 nos /trip	4mm /trip	18524 nos-(37 trips)	42920.00	4292.00		47212.00
16	Headload transport of seedlings from vehicle site to planting site upto 250 mts.	100 Nos	60.55	18524	11216.28	1121.63		12337.91
17	Covering pits, digging planting holes and planting	100 Nos	188.5	18524	34917.74			34917.74

18	Replacing casualty	ha	232	12	2784.00	2784.00		5568.00
19	I weeding (I) 1st year, (2) 2nd year (3) 3rd year	ha	(1) 4299.54 (2) 2895.36 (3) 2866.36	12	51594.48	34744.32	34396.32	120735.12
20	II weeding (I) 1st year, (2) 2nd year (3) 3rd year	ha	(1) 4299.54 (2) 2149.77 (3) 2149.77	12	51594.48	25797.24	25797.24	103188.96
21	Cost of cowdung including transportation.	LS	LS	LS	50000.00			50000.00
22	Cost of fertilizer	LS	LS	LS	30000.00	30000.00	30000.00	90000.00
23	Application of manure & fertilizer	75	290	18524	71626.13	71626.13	71626.13	214878.40
24	III weeding	ha	2866.36	12	34396.32	17198.16	17198.16	68792.64
25	Additional weeding, if found necessary (I) 1st year, (2) 2nd year		(1)1433.18 (2)1074.74	12	17198.16	12896.88		30095.04
26	Soil working around the seedlings.	100 nos	290	18524	53719.60	53719.60		107439.20
27	Contour trenches	10m3	1725	500	86250.00			86250.00
28	Fire line creation and fire tracing including internal fireline	km	11600	8 km	92800.00	92800.00	92800.00	278400.00
29	Engaging man mazdoor	mm/day	630		189000.00	189000.00	189000.00	567000.00
30	Current VDA	mm/day	175	4435.79 mm 1372.93 mm 1128.55 mm	776263.25	240262.75	197496.25	1214022.25
31	Installation of signages	LS	LS	0	30000.00			30000.00
32	Cost of digging borewell and installation of pump set in Sainik school campus	LS	LS	1 no	200000.00			200000.00
33	Overhead charges, purchase of necessary office accessories, expenses towards developing database, other contingencies etc.	LS	LS	LS	100000.00	50000.00	25000.00	175000.00
	Total				**4074391.79**	**956705.71**	**768777.10**	**5799874.60**
	Total (as per FSR)				2062641.79	638413.71	524777.10	**3225832.60**

34	50% enhancement on all items of work except Sl.Nos. 13,14,15,21,22,27,29,31,32,33				3093962.684	957620.567	787165.655	4838748.91
35	Total for Sl.Nos. 13,14,15,21,22,27,29,31,32,33				2011750.00	318292.00	244000.00	2574042.00
36	Total				5105712.68	1275912.57	1031165.66	7412790.91
37	Total of LS Provision				860000.00	125000.00	55000.00	1040000.00
38	After excluding lumpsum provision (Sl. Nos.36-37)				4245712.68	1150912.57	976165.66	6372790.91
39	Contractor's profit (10 % Item No. 38)				424571.2684	115091.257	97616.5655	637279.09
	Grand Total (Sl. Nos. 36 +39)				**5530283.95**	**1391003.82**	**1128782.22**	**8050070.00**
	Rounded to				**5530000.00**	**1391000.00**	**1129000.00**	**8050000.00**

Range Officer (Social Forestry), Thiruvananthapuram

Assistant Conservator of Forests (Social Forestry), Thiruvananthapuram

Principal Chief Conservator of Forests (Social Forestry)

GOVERNMENT OF KERALA

Abstract

Forest and Wild life department - Implementation of the Scheme for Compensatory Afforestation in lieu of tree felling for Four laning of Thiruvananthapuram- Mukkola NH-47 Bypass- Administrative Sanction accorded- Orders issued

FOREST & WILDLIFE (E) DEPARTMENT

G.O.(Rt)No. 28/2016/F&WLD Dated,Thiruvananthapuram,25/01/2016

Read:1) Minutes of the meeting held by Chief Secretary on 15.10.2015

2) Letter No: SW3-49228 /15 dated 12.11.2015 from the Principal Chief Conservator of Forests(D&PFM)

ORDER

The meeting held on 15/10/2015 under the Chairmanship of Chief Secretary directed Principal Chief Conservator of Forests (Social Forestry) to prepare a scheme for Compensatory Afforestation in Kazhakkootom Sainik School Campus, University Campus and in the land available near Green Field Stadium in lieu of felling of around 4200 trees required for the work of four laning of Thiruvananthapuram - Kazhakkootom Mukkola National Highway Bypass.

Accordingly, Principal Chief Conservator of Forest has submitted a scheme for Compensatory Afforestation of 30,000 – 50,000 trees, along with cost of maintenance for the next 3 years in lieu of trees felling for implementation of the project and has requested administrative sanction for implementing the scheme.

Government after examining the matter in detail are pleased to approve the scheme of Compensatory Afforestation along with the financial requirement which comes to the tune of Rs. 110 lakhs, subject to the condition that the funds for the completion for the scheme will be sanctioned by National Highway Authority of India.

Administrative Sanction is also accorded for the implementation of the aforesaid scheme.

By order of the Governor
REMA P NAIR
DEPUTY SECRETARY

To

- The Principal Accountant General (Audit) Kerala, Thiruvananthapuram

Annexure VIII

Environmental Management Plan Budgetary Provision

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018

Vizhinjam International Deepwater Multipurpose Seaport
Environmental Management Plan Budgetary Provision

Annexure VIII

Environmental Management Plan		Commitment in EIA (in Crores)
1	Cost of Contractors EMP for all planned EMP implementation measures (Action plan report)	1.00
4	Cost of Capacity building- Training and Institutional strengthening (Training workshop)	0.20
5	Compensatory afforestation for the green cover lost for the port and its associated facilities (2500 plants per Ha for 25 Ha area)	1.25
6	Air quality monitoring at sensitive locations	0.252
7	Water quality monitoring at major water bodies	0.054
8	Noise monitoring at sensitive locations	0.009
9	Soil quality monitoring at sensitive locations	0.002
10	Marine water quality and sediment and marine biology	1.08
11	Shoreline changes	0.30
14	Cost of Median planting with a suitable species of creepers and metallic wire mesh fencing along the road (2000 m long median planting)	0.83
15	Solid waste management (sector wise)-Collection disposal system	2.50
16	Storm water Management	5.00
17	Marine Life Protection out of Oil Spill(Provision for scavenger boat)One tugboat with booms and skimmer and dust exhausting equipment	20.00
18	Cost of scavenger boat including manpower(Cost of boat)	0.20
19	Dust Sweeper (2 nos)	0.60
20	Air Pollution Control (Four water tankers for wetting of road surface and springing system)	1.00
21	Water and waste water treatment plants	4.00
22	Battery of toilets with bimonthly maintenance provision	1.00
23	Desilting and strengthen of Streams	0.50
24	Enhancement of water bodies (ponds along road & rail)	0.10
25	Enhancement of religious structures (Temple)	0.05
26	Cultural property rehabilitation cost for sacred grove	0.01
	TOTAL	**39.937 (Rounded off to 40 Crores)**

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Environmental Management Plan Budgetary Provision		

Actual Expenditure:

Activity	Expenditure in Crores (INR)
Shoreline Monitoring	1.02
Turbidity Monitoring	0.18
Air, Noise, Surface Water, Ground Water & Marine Water Monitoring	0.25
Continuous Ambient Air Quality Measurement Unit	0.47
Modelling Studies	0.09
Study on shoreline using Satellite Images	0.01
Comprehensive Shoreline Monitoring Programme.	0.06
Water Sprinkling for dust suppression	0.21
Hydrogeological study by KSREC (Kerala State Remote Sensing and Environment Centre)	0.12
Consultancy service charges for Strom water Management studies	0.05
Total	**2.46**

Annexure IX

Organizational Structure-EMP Implementation

Annexure – IX

Environment Health, Safety & CSR Organizational Structure

Name	Designation	Experience	Qualification	Organization
Ajit. S	Chief Project Coordinator & Head (EHS & CSR)	25 Years' experience in EIA studies, Env. monitoring	B Tech (Civil Engg.); M Tech (Env.Engg.)	VISL
Anil Balakrishnan	Head – CSR	19 Years	MSW, Phd.	AVPPL
Y D Manmohan	Environment Specialist	28 Years	PG in Env. Engg.	STUP
Sebastian Britto	Project Officer	20 Years	MA , Economics	AVPPL
Stephen Vinod	Community Mobilizer	12 Years	BA, Economics	AVPPL
George Zen	Community Mobilizer	31 Years	BA, Sociology	AVPPL
Maya Mohan	Community Mobilizer	5 Years	MSW	AVPPL
Mr. Jithin J Kumar	Community Mobilizer	4 Year	MBA	AVPPL
Mrs. Limna B	Sr. Assistant	10 Years	ITI Civil	AVPPL
Hebin C	Head – Environment	11 Years	MS, Oceanography & Coastal area studies.	AVPPL
Harsh Yadav	Deputy Manager –Environment	7 Years	B Tech (Chem. Engg.); M tech in Environment process design	AVPPL
Amrendra Sinha	Head – Safety	17 Years	Diploma in Industrial Safety and Fire Safety	HOWE
Shaji Joseph	Safety Executive	8 Years	Diploma in mechanical & Diploma in fire and safety	HOWE

Annexure X

Details of Labour Camp

Annexure X

Details of Labour Camp

Location of the Labour Camp

Currently at port two main contractors are working, both the labour contractors Ms/ AFCONS and M/s B&R have constructed labour camp for accommodation of workers at Mukkola-Vizhinjam, Kerala. The location of the camp is such that, Mukkola, the nearby small town is situated at walkable distance from the camp. Also, the surrounding greenery presents a comfortable environment to the inhabitants during all weather conditions.

Location of the labour camp of both contractors

Facilities Inside the Camp

Welfare for the workmen

Workmen are provided with concrete floor, beds and cots. Adequate lighting and ventilation is ensured in each room. Workmen in the colony are provided with potable drinking water. The drinking water tanks are cleaned at frequent intervals and water is tested once in a quarter through authorized laboratory. Individual kitchen is provided by both the contractors. Cooking gas is provided by both the contractors for their workers in kitchen and a separate dining room is also made available near to the kitchen. Adequate number of toilets, bathing and cloth washing facility is also ensured at the camp of both AFCONS and B&R.

	
Inside room	Drinking water at M/s AFCONS
	
Living Block of Workmen at labour camp of M/s B&R	Drinking water at labour camp of M/s B&R
	
Separate kitchens for individual contractors of M/s AFCONS	Cooking gas provided in the kitchen of M/s AFCONS
	
Storage Racks in Kitchen of M/s B&R	Cooking gas provided in the kitchen of M/s B&R


Dining facility


Toilet and washing facility at labour camp of M/s AFCONS


Toilet and washing facility at labour camp of M/s B&R

Housekeeping arrangement

Dedicated cleaning staff is deployed for daily housekeeping in both the camps. Brooming around the camp premises, collection of waste in colour coded dust bins, daily disposal of collected food waste etc. are ensured during housekeeping. Bleaching powder is sprinkled around the camp premises as and when required. The waste water from kitchen, bathroom and washing facilities are transferred through closed conduits to the soak pit. The septic tank waste is disposed through Govt./ authorized agency at regular intervals. Also the STP is under construction at both the labour camps and once operational the treated water will be used for sprinkling purpose within the port premises.

Daily cleaning by cleaning staff at labour camp of M/s B&R

Daily cleaning by cleaning staff at labour camp of M/s AFCONS

Housekeeping poster displayed inside the Labour Camp of M/s B&R

COLOUR CODED DUST BINS INSIDE THE CAMP of M/s AFCONS

Health, Safety and Environment Management

Adequate number of **colour coded dust bins** are kept inside the camp premises of both the contractors for collection and segregation of waste. Information posters / signage's are displayed throughout the camp regarding health, hygiene, first aid, safety, environment etc by both the contractors. The posters are displayed in different languages for understanding of workmen from diverse locations. For mosquito control, chemical spraying and fogging is done. Adequate fire extinguishers are provided around the camps, giving due consideration to the kitchen and diesel generator. First aid box is readily available inside the camps. The camp supervisors are trained for first aid as well as ensure security and welfare of workmen. In addition, the camps of both the contractors are surrounded by fencing with single entry gate controlled by security guard at all times to prevent entry of intruders and stray animals. Health camp is also organized for the workers periodically.

<table>
<tr>
<td> 
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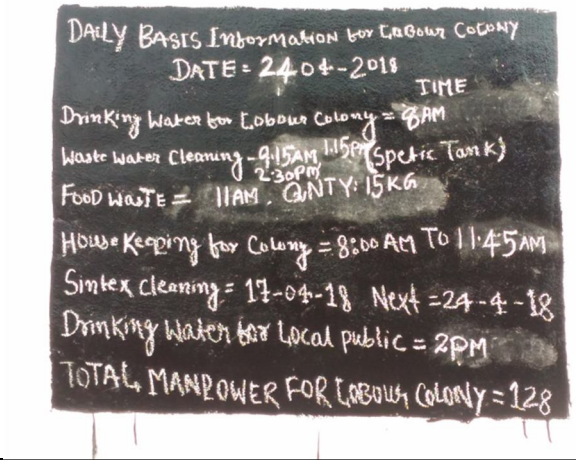
<tr>
<td>Health poster inside the labour camp of AFCONS</td>
<td>Fogging for mosquitoe control in the labour camp of M/s AFCONS</td>
</tr>
<tr>
<td> 
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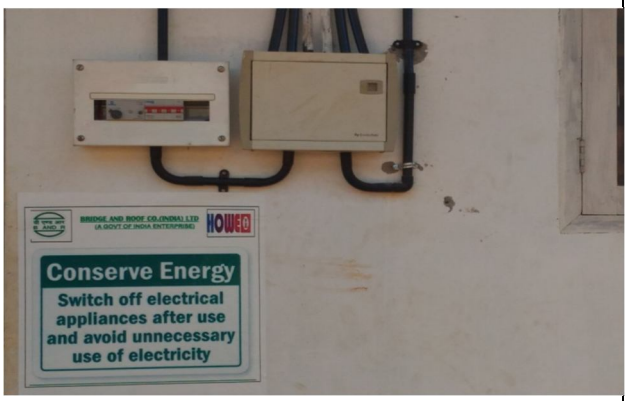
<td> 
</td>
</tr>
<tr>
<td>Display Board inside the labour camp of</td>
<td>Poster inside the labour camp of M/s B&R</td>
</tr>
</table>

adani	Adani Vizhinjam Port Private Ltd	From : October 2017 To : March 2018
Vizhinjam International Deepwater Multipurpose Seaport Details of Labour Camp.		

M/s B&R	
	
Camp supervisor with first aid box in his table at labour camp of M/s AFCONS	Camp supervisor at labour camp of M/s B&R
	
Fire extinguisher inside the camp of M/s AFCONS	Fire extinguisher inside the camp of M/s B&R
	
Security guard deployed at the gate of labour camp - M/s AFCONS	Security guard deployed at the gate of labour camp - M/s B&R

Gardening inside the Camp

The soil inside both the camp premises is naturally rich in nutrients. Gardening and farming is done inside the camps with the help of workmen from initiative of the camp supervisors. Banana tree, tapioca, chilly, pumpkin etc. are so far planted and growing healthy. The flowering plants grown in between the buildings add beauty to our camp.

Gardening inside the camp of M/s AFCONS

Gardening inside the camp of M/s B&R

Annexure XI

Environment Monitoring Report

(October 2017 – March 2018)

Annexure XI

HALF YEARLY ENVIRONMENT MONITORING REPORT

For the period

October 2017 to March 2018

Adani Vizhinjam Port Pvt. Ltd.

Vizhinjam, Kerala

CONTENET

CHAPTER 1

Introduction

Ashwamedh Engineers and Consultants was established in May 1986. The company is engaged in providing Environmental pollution testing, food and agriculture testing and Consultancy Services. Ashwamedh's affiliates are established all over India and overseas. Ashwamedh has steadily achieved growth up to such an extent that, it has become India's foremost analytical laboratory with several branch offices. The well-equipped laboratory and office set up of about 28000 sq ft is at Nashik, Maharashtra. The strength of organization is the years of hard work, dedication and contribution made by our staffs who are experts in their respective fields and they produce innovative ideas for the growth of the organization.

Ashwamedh has made itself capable of testing of water, waste water, air, food, noise monitoring, hazardous and non-hazardous waste testing, fuel and agriculture testing. Ashwamedh have a state-of-art Laboratory set-up for Chemical, Mechanical and Microbiological Analysis at Nashik. Ashwamedh's Laboratory is accredited by NABL in accordance with ISO/IEC 17025:2005 in the Chemical, Biological and Mechanical Testing fields (Certificate numbers: T-5509). It is recognized by the Ministry of Environment, Forests & Climate Change, Govt. of India, New Delhi under Environment (Protection) Act, 1986. They are also ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007 certified organization.

Laboratory is recognized by Bureau of Indian Standard for Packaged Drinking Water and Packaged Natural Mineral Water also recognised by APEDA. Laboratory is approved by Food Safety & Standards Authority of India (FSSAI) for food testing also approved by AGMARK and State Agriculture Department.

Ashwamedh Engineers and Consultants (AEC) engaged by Adani Vizhinjam Port Pvt. Ltd. (AVPPL) for the Post EIA Environmental Monitoring as per Environmental Monitoring Plan mentioned in EIA and EC. AVPPL issued service order no. 5700182233 dated: 31.05.2016. This mentions the matrix, parameters and

frequency of environmental monitoring. AEC carried out said environmental monitoring strictly as per above mention service order. As per service order Ambient Air Monitoring (twice in a week), Ambient Noise Monitoring (fortnight), Marine Ecological Survey including marine water, sediment, phytoplankton and zooplankton analysis (monthly), Ground Water and Surface Water Analysis (monthly), Soil Analysis (yearly).

AEC is submitting monthly consolidated report of Environmental Monitoring which includes details of sampling locations, methodology used, analytical results and summary of reports. The monthly environmental monitoring report serves the information about the present environmental status as per terms and condition mentioned in service order.

CHAPTER 2

Quality Assurance /Quality Control Procedure

The quality assurance and quality control plan include following elements:

1. Sample collection, preservation and transportation of sample
2. Chain of custody
3. Laboratory Analysis
4. Data evaluation and validation

1. Sample collection, preservation and transportation of samples:

The Team leader ensures that selected members of the study team meet all the selection criteria identified. Prior to the starting of the study, individual team members were put to test in the laboratory for their competency in carrying out typical environmental sampling/monitoring for different parameters as per the requirements of the project.

The team leader has ensured that the selected procedures are documented and the study team members are familiar with the sampling and analytical procedures. Before commencement of work, the team leader has checked for availability of all the items required for sampling at site and in the laboratory. In case of any missing items, suitable alternate arrangements have been made and required materials were procured.

Precautions are taken to protect the samples, the material being sampled, the sampling instruments and containers for samples from contamination. Samples are sufficient in volume and frequency is decided based on scope of work. Samples are collected, packed and transported prior to analysis in a manner that safeguards against change in the particular constituents or properties to be examined.

For the collection of samples appropriate containers are used with respective sample matrix and parameters analysed as per the method reference.

Labelling of samples is done at site only and it includes the name of location, date of sample collection. Sampling sheet is filled at site with required information. The sample is sent along with the sampling sheet to laboratory for further analysis.
For the preservation of sample appropriate preservation techniques w.r.t. parameters analysed is followed and samples are transported with due care to laboratory.

2. Chain of Custody:

After receiving the samples in the laboratory, first Assigning Sample ID is a very systematic and methodical way of representing samples identification as Sample ID is a Permanent Identification Number of a sample and it maintains traceability and transparency throughout the process.

It is the format for communication between Sample Receipt Department and the Laboratory. Laboratory also communicates to the Sample Receipt Department. It gives all details of sample except its company name. It includes parameters to be analysed, method reference for each parameter analysed, units in which the analytical results to be expressed, results of each parameter analysed, date at which the analysis was started and date at which the analysis got completed.

After completion of analysis, analytical values duly filled in by respective analyst with the help of test data in respective report format. This draft report is verified and approved by Technical Manager. Final reports are prepared and authorised by Technical Manager and sent to client.

3. Laboratory Analysis:

As per the scope of work, all physiochemical and biological analysis carried out at our permanent facility at Nashik, Maharashtra. For the sampling and analysis of samples standard reference methods are used.

4. Data evaluation and validation:

For the quality control and validation laboratory follow the following procedures:

1. Participation in Inter-Laboratory Comparison (ILC) with NABL accredited laboratories.
2. The results obtained from all laboratories are recorded and reviewed for performance by Quality Manager and acceptance criteria is satisfactory ≤ 2.
3. The laboratory also participates in Proficiency testing (PT) programmes conducted by NABL/CPCB/other Proficiency testing (PT) providers depending on the availability of the programme.
4. The results received from nodal laboratory are recorded and reviewed for performance.
5. Replicate testing is done on received samples in a planned manner as per schedule. Replicate testing is done by same/different analysts or using same/different methods.
6. Reviewing the results of replicate testing for performance evaluation is done by Quality Manager.
7. Acceptance criteria in case of replicate/duplicate testing is </20 % relative standard deviation.
8. Testing of retained samples is carried out, by allotting a new sample ID and sending it to laboratory for retesting done by same/different analyst or using same/different methods.
9. Reviewing the results of retesting for performance evaluation is done by Quality Manager.
10. Acceptance criteria in case of retesting is </20 % relative standard deviation.
11. Correlation of results for different characteristics like TDS/EC ratio. Anion/cation balance, COD/BOD correlation is carried out.
12. The quality control data is analysed and where they are found to be outside predefined criteria, planned action is taken to correct the problem and to prevent incorrect results from being reported.

Table 2.1 Check list format for sampling

Item	Yes or No	If No, reason and Justification for acceptance
Was the sampling point correctly located?	Yes	
Permanent facility available?	Yes	
Was the correct sample used?	Yes	
Were the proper types of sample containers used?	Yes	
Were the replicates or multiple samples	Yes	

Item	Yes or No	If No, reason and Justification for acceptance
taken as required?		
Were adequate quantities of samples taken?	Yes	
Were the sample containers properly labelled?	Yes	
Were the preservatives added and sample containers sealed as required?	Yes	
Were the sealed sample containers maintained at required storage condition?	Yes	
Checked by: Team In-charge	Yes	

Note: It is not necessary that this form be filled each sample/sampling point. It is sufficient if the deviations if any are recorded in the log books.

Table 2.2 Check list for sample Integrity

Item	Yes or No	If No, reason and Justification for acceptance
Is the chain of custody record attached?	Yes	
Is the chain of custody record filled in properly	Yes	
Is the sample received within the holding time?	Yes	
Is the sample seal on sample containers intact?	Yes	
Is the sample received in proper storage condition?	Yes	
Is the sample quantity adequate for required analysis?	Yes	
Checked By: Team In - charge		

Note: It is not necessary that this form be filled each sample/sampling point. It is sufficient if the deviations if any are recorded in the log books.

Table 2.3 Check list format for analysis

Item	Yes or No	If No, reason and Justification for acceptance
Was the correct method used for the analysis?	Yes	
Were the correct instruments, equipment and apparatus used for the analysis?	Yes	
Was the competence of the analyst deployed for the analysis verified?	Yes	
Were the instruments, equipment and apparatus used pre-calibrated as required?	Yes	
Was the sample correctly and adequately identified and described in the analysis logbook?	Yes	
Were all the raw data properly recorded?	Yes	
Were the correct equations and units used?	Yes	
Checked By: Lab Manager		

Note: It is not necessary that this form be filled each sample/sampling point. It is sufficient if the deviations if any are recorded in the log books.

Table 2.4 Check list format for quality check in the field

Parameters	Comments (Yes/No)	Remarks
Sample bottle labelled?	Yes	
Sample container rinsed with D.D. water?	Yes	
Field equipment blanks are identified	Yes	
Is the preservative has been added after sampling or preserved as per sampling/ Test method?	Yes	
Are proper storage conditions are maintained?	Yes	
The sample quantity is adequate?	Yes	
Is sample properly identified?	Yes	
Is proper type of container used?	Yes	
Checked By: Lab Manager		

Note: It is not necessary that this form be filled each sample/sampling point. It is sufficient if the deviations if any are recorded in the log books.

Table 2.5 Check list format for quality check in the lab

Parameters	Comments (Yes/No)	Remarks
Is the sample details entered into Raw data register?	Yes	
Sample quantity measured?	Yes	
Glassware is calibrated?	Yes	
Balance/equipment is calibrated?	Yes	
Data entered in the analyst work book or not?	Yes	

Note: It is not necessary that this form be filled each sample/sampling point. It is sufficient if the deviations if any are recorded in the log books.

CHAPTER 3

Ambient Air Quality Monitoring

1. Ambient Air Quality Monitoring location details

This chapter describes the sampling location, methodology adopted for monitoring ambient air quality and analysis of Ambient Air Quality results. The prime objective of the environment monitoring with respect to ambient air quality is to establish the present air quality and its conformity to ambient air quality standards. Ambient air quality monitoring was carried out at five locations including Venganoor, Proposed Port Estate Area, Port Site, Chani and Balaramapuram during October 2017 to March 2018.

Table 3.1 Ambient Air Quality Monitoring Locations

Sr. No.	Location	Latitude	Longitude
1.	Venganoor	8^0,23',55.10" N	77^0,00',11.30" E
2.	Proposed Port Estate Area	8^0,22',41.47" N	77^0,01',02.94" E
3.	Port Site	8^0,22',06.03" N	77^0,00',17.03" E
4.	Chani	8^0,20',56.86" N	77^0,03',16.19" E
5.	Balaramapuram	8^0,25',37.60" N	77^0,02',43.80" E

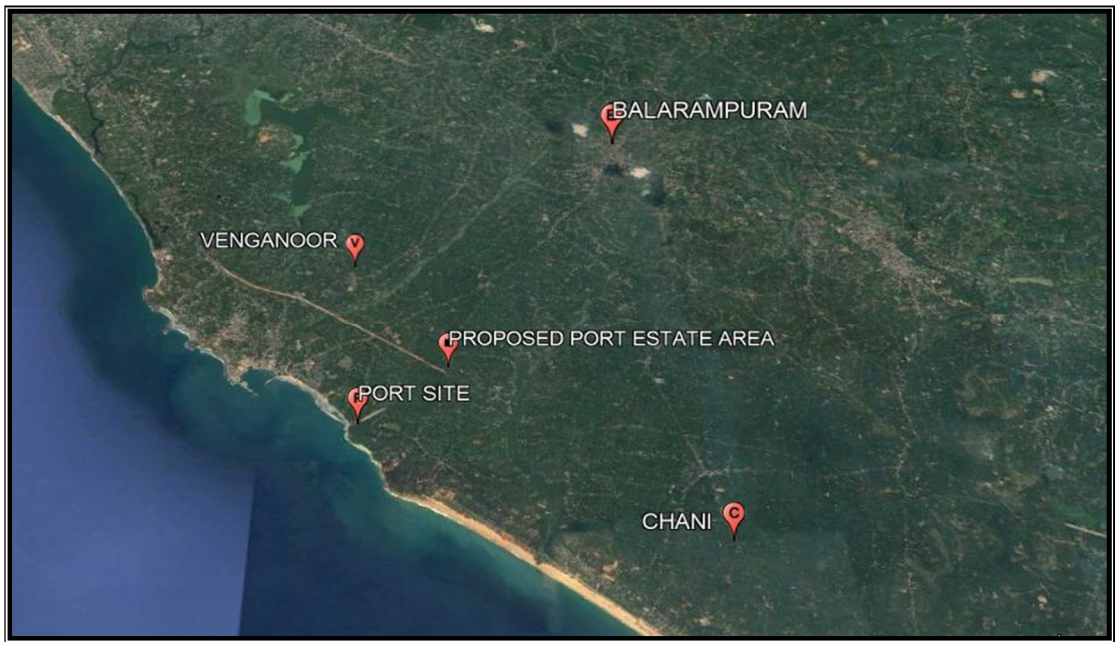


Figure 3.1 Google earth view of AAQM stations

2. Methodology of Sampling and Analysis

Table 3.2 Ambient Air Quality Monitoring Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
1.	Particulate Matter (size less than 10 µm) or PM_{10}	µg/m^3	2	CPCB Guidelines, Volume I,36/2012-13, Page no.11 WI/SAP-AA/5/1,Issue no.: 03 Issue date: 01.04.2014 (Gravimetric Method)
2.	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$	µg/m^3	0.4	CPCB Guidelines, Volume I,36/2012-13, Page no. 15 and Instrument Manufacturer Operating Manual WI/SAP-AA/5/1,Issue no.: 03 Issue date: 01.04.2014 (Gravimetric Method)
3.	Sulphur Dioxide (SO_2)	µg/m^3	4.0	CPCB Guidelines, Volume I, 36/2012-13, Page no.1, WI/SAP-AA/5/2, Issue no.: 03 Issue date: 01.04.2014 (Improved West & Gaeke Method)
4.	Nitrogen Dioxide (NO_2)	µg/m^3	3.0	CPCB Guidelines, Volume I, 36/2012-13, Page no.7, WI/SAP-AA/5/3, Issue no.: 03 Issue date: 01.04.2014 (Modified Jacob & Hochheiser Sodium Arsenite Method)
5.	Carbon Monoxide (CO)	mg/m^3	0.5	By portable CO meter
6.	Hydrocarbon (HC)	ppm	1.0	By portable HC meter

3. National Ambient Air Quality Standards

Table 3.3 National Ambient Air Quality Standards Dated 16th November 2009

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air	
			Industrial, Residential, Rural & other areas	Ecologically Sensitive Areas
1.	Sulphur dioxide (SO_2), µg/m^3	Annual	50	20
		24 h	80	80
2.	Nitrogen Dioxide (NO_2), µg/ m^3	Annual	40	30
		24 h	80	80
3.	Particulate matter (size less than 10µm) or PM_{10}, µg/ m^3	Annual	60	60
		24 h	100	100
4.	Particulate matter (size less than 2.5µm) or $PM_{2.5}$, µg/ m^3	Annual	40	40
		24 h	60	60
5.	Carbon Monoxide(CO), µg/m^3	8 h	02	02
		1 h	04	04
6.	Hydrocarbon (HC), ppm	-	-	-

4. Ambient Air Quality Monitoring Results for the period October 2017 to March 2018

Table 3.4 - Location: Venganoor

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
02.10.2017	54	15	5.04	6.06	BDL	BDL
05.10.2017	73	28	BDL	3.03	BDL	BDL
09.10.2017	68	22	BDL	3.92	BDL	BDL
12.10.2017	51	13	4.51	3.04	BDL	BDL
16.10.2017	49	15	BDL	3.79	BDL	BDL
19.10.2017	52	16	BDL	3.62	BDL	BDL
23.10.2017	88	22	4.21	3.62	BDL	BDL
27.10.2017	77	19	BDL	4.07	BDL	BDL
30.10.2017	71	18	BDL	4.44	BDL	BDL
02.11.2017	48	11	BDL	3.98	BDL	BDL
06.11.2017	43	9	BDL	4.86	BDL	BDL
09.11.2017	53	18	4.10	5.41	BDL	BDL
13.11.2017	88	27	4.22	4.29	BDL	BDL
16.11.2017	77	22	4.13	4.90	BDL	BDL
20.11.2017	50	14	BDL	4.20	BDL	BDL
23.11.2017	67	15	BDL	3.42	BDL	BDL
27.11.2017	73	19	BDL	3.92	BDL	BDL
04.12.2017	79	20	BDL	4.58	BDL	BDL
07.12.2017	51	14	BDL	4.45	BDL	BDL
11.12.2017	86	27	BDL	5.89	BDL	BDL
14.12.2017	80	25	BDL	4.21	BDL	BDL
18.12.2017	76	23	4.62	5.62	BDL	BDL
21.12.2017	69	20	BDL	5.43	BDL	BDL
25.12.2017	57	16	4.13	4.86	BDL	BDL
28.12.2017	68	13	BDL	5.30	BDL	BDL
01.01.2018	92	33	4.20	5.79	BDL	BDL
04.01.2018	77	22	BDL	BDL	BDL	BDL
08.01.2018	82	28	BDL	BDL	BDL	BDL
11.01.2018	90	31	5.20	4.98	BDL	BDL
15.01.2018	86	30	BDL	6.46	BDL	BDL
18.01.2018	78	26	BDL	5.80	BDL	BDL
22.01.2018	94	35	5.80	7.87	BDL	BDL
25.01.2018	84	29	4.20	8.20	BDL	BDL
29.01.2018	80	27	4.70	8.60	BDL	BDL
01.02.2018	80	31	BDL	4.45	BDL	BDL
05.02.2018	68	20	4.20	4.90	BDL	BDL
08.02.2018	71	22	BDL	4.50	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
12.02.2018	63	18	4.30	5.18	BDL	BDL
15.02.2018	75	26	4.40	BDL	BDL	BDL
19.02.2018	70	23	BDL	3.86	BDL	BDL
22.02.2018	83	32	4.10	4.35	BDL	BDL
26.02.2018	72	23	4.70	5.82	BDL	BDL
01.03.2018	56	12	4.47	6.49	BDL	BDL
05.03.2018	80	23	4.73	5.79	BDL	BDL
08.03.2018	76	16	4.82	5.23	BDL	BDL
12.03.2018	63	13	5.14	6.29	BDL	BDL
15.03.2018	70	14	4.12	3.76	BDL	BDL
19.03.2018	68	18	4.51	3.82	BDL	BDL
22.03.2018	60	15	4.62	4.67	BDL	BDL
26.03.2018	58	13	4.92	3.12	BDL	BDL
29.03.2018	55	12	5.12	5.86	BDL	BDL
NAAQS 2009	**100**	**60**	**80**	**80**	**4**	**-**

Table 3.5 - Location: Proposed Port Estate Area

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
02.10.2017	51	16	4.37	5.20	BDL	BDL
05.10.2017	76	25	BDL	3.47	BDL	BDL
09.10.2017	41	12	4.22	3.04	BDL	BDL
12.10.2017	59	15	BDL	BDL	BDL	BDL
16.10.2017	46	13	BDL	4.31	BDL	BDL
19.10.2017	48	14	BDL	3.46	BDL	BDL
23.10.2017	52	15	4.65	3.04	BDL	BDL
27.10.2017	58	19	BDL	3.51	BDL	BDL
30.10.2017	50	14	BDL	5.94	BDL	BDL
02.11.2017	52	13	4.17	4.41	BDL	BDL
06.11.2017	43	10	BDL	4.24	BDL	BDL
09.11.2017	58	16	BDL	5.84	BDL	BDL
13.11.2017	79	26	BDL	4.49	BDL	BDL
16.11.2017	80	28	4.26	5.34	BDL	BDL
20.11.2017	48	11	BDL	5.57	BDL	BDL
23.11.2017	61	21	4.10	5.42	BDL	BDL
27.11.2017	85	25	BDL	4.12	BDL	BDL
04.12.2017	68	21	BDL	4.54	BDL	BDL
07.12.2017	79	25	BDL	4.58	BDL	BDL
11.12.2017	70	23	BDL	4.59	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
14.12.2017	59	18	BDL	5.12	BDL	BDL
18.12.2017	61	20	4.82	4.91	BDL	BDL
21.12.2017	67	19	BDL	4.57	BDL	BDL
25.12.2017	58	15	4.79	5.82	BDL	BDL
28.12.2017	63	16	BDL	4.67	BDL	BDL
01.01.2018	66	17	4.60	5.97	BDL	BDL
04.01.2018	60	12	BDL	5.13	BDL	BDL
08.01.2018	79	22	BDL	BDL	BDL	BDL
11.01.2018	83	25	4.10	BDL	BDL	BDL
15.01.2018	85	28	BDL	5.79	BDL	BDL
18.01.2018	76	20	BDL	6.23	BDL	BDL
22.01.2018	70	18	BDL	5.79	BDL	BDL
25.01.2018	64	15	4.60	7.80	BDL	BDL
29.01.2018	61	13	4.20	8.20	BDL	BDL
01.02.2018	80	28	4.60	5.14	BDL	BDL
05.02.2018	90	33	4.10	4.92	BDL	BDL
08.02.2018	83	29	BDL	5.42	BDL	BDL
12.02.2018	78	23	4.30	5.11	BDL	BDL
15.02.2018	86	30	4.20	3.64	BDL	BDL
19.02.2018	73	22	BDL	5.68	BDL	BDL
22.02.2018	69	20	4.60	5.72	BDL	BDL
26.02.2018	64	18	4.30	5.82	BDL	BDL
01.03.2018	56	14	4.3	6.24	BDL	BDL
05.03.2018	52	12	4.52	5.34	BDL	BDL
08.03.2018	84	28	4.77	6.41	BDL	BDL
12.03.2018	54	13	4.77	5.65	BDL	BDL
15.03.2018	64	19	5.14	6.11	BDL	BDL
19.03.2018	83	26	6.22	6.52	BDL	BDL
22.03.2018	78	24	4.12	5.17	BDL	BDL
26.03.2018	68	20	5.72	3.89	BDL	BDL
29.03.2018	81	25	4.68	5.46	BDL	BDL
NAAQS 2009	**100**	**60**	**80**	**80**	**4**	-

Table 3.6 - Location: Port Site

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
02.10.2017	51	15	4.05	4.99	BDL	BDL
05.10.2017	83	30	BDL	3.48	BDL	BDL
09.10.2017	85	32	4.68	3.03	BDL	BDL
12.10.2017	52	17	BDL	3.46	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
16.10.2017	56	18	BDL	3.47	BDL	BDL
19.10.2017	50	14	BDL	3.00	BDL	BDL
23.10.2017	82	31	4.77	3.46	BDL	BDL
27.10.2017	66	22	5.10	5.61	BDL	BDL
30.10.2017	84	21	BDL	3.94	BDL	BDL
02.11.2017	48	13	4.16	3.90	BDL	BDL
06.11.2017	70	27	4.20	5.00	BDL	BDL
09.11.2017	78	27	BDL	5.10	BDL	BDL
13.11.2017	82	32	4.44	5.11	BDL	BDL
16.11.2017	87	38	4.31	5.49	BDL	BDL
20.11.2017	66	23	BDL	4.02	BDL	BDL
23.11.2017	73	25	BDL	4.48	BDL	BDL
27.11.2017	61	20	BDL	4.25	BDL	BDL
04.12.2017	78	23	BDL	4.05	BDL	BDL
07.12.2017	56	16	BDL	4.45	BDL	BDL
11.12.2017	88	30	BDL	5.86	BDL	BDL
14.12.2017	82	25	BDL	4.63	BDL	BDL
18.12.2017	77	22	4.36	5.79	BDL	BDL
21.12.2017	73	20	BDL	4.37	BDL	BDL
25.12.2017	80	25	4.59	4.82	BDL	BDL
28.12.2017	64	19	BDL	5.10	BDL	BDL
01.01.2018	76	18	4.30	5.69	BDL	BDL
04.01.2018	96	30	BDL	4.57	BDL	BDL
08.01.2018	92	25	BDL	4.55	BDL	BDL
11.01.2018	91	23	BDL	5.39	BDL	BDL
15.01.2018	85	23	4.50	5.75	BDL	BDL
18.01.2018	93	26	BDL	6.23	BDL	BDL
22.01.2018	94	28	BDL	6.23	BDL	BDL
25.01.2018	83	21	4.20	7.90	BDL	BDL
29.01.2018	95	30	4.40	8.20	BDL	BDL
01.02.2018	97	31	4.50	5.62	BDL	BDL
05.02.2018	95	30	4.60	6.21	BDL	BDL
08.02.2018	98	32	BDL	5.30	BDL	BDL
12.02.2018	92	30	4.80	4.52	BDL	BDL
15.02.2018	96	31	4.90	4.82	BDL	BDL
19.02.2018	90	29	5.10	4.51	BDL	BDL
22.02.2018	88	26	4.80	5.22	BDL	BDL
26.02.2018	91	30	5.30	5.31	BDL	BDL
01.03.2018	96	34	4.55	6.89	BDL	BDL
05.03.2018	87	29	4.37	7.31	BDL	BDL
08.03.2018	98	35	5.44	5.91	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
12.03.2018	82	28	5.67	6.12	BDL	BDL
15.03.2018	78	27	4.33	6.73	BDL	BDL
19.03.2018	86	29	4.28	7.64	BDL	BDL
22.03.2018	90	32	5.67	5.78	BDL	BDL
26.03.2018	92	31	4.57	7.82	BDL	BDL
29.03.2018	88	30	5.34	6.67	BDL	BDL
NAAQS 2009	**100**	**60**	**80**	**80**	**4**	-

Table 3.7 - Location: Chani

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
02.10.2017	55	15	4.81	5.30	BDL	BDL
05.10.2017	79	23	BDL	BDL	BDL	BDL
09.10.2017	80	25	4.42	3.47	BDL	BDL
12.10.2017	52	12	BDL	3.74	BDL	BDL
16.10.2017	58	17	BDL	3.46	BDL	BDL
19.10.2017	45	11	BDL	3.90	BDL	BDL
23.10.2017	70	24	BDL	3.03	BDL	BDL
27.10.2017	83	21	4.29	4.84	BDL	BDL
30.10.2017	77	29	4.82	4.90	BDL	BDL
02.11.2017	48	10	4.20	4.50	BDL	BDL
06.11.2017	68	20	BDL	4.10	BDL	BDL
09.11.2017	89	29	4.41	5.01	BDL	BDL
13.11.2017	71	24	BDL	4.00	BDL	BDL
16.11.2017	79	25	4.14	4.46	BDL	BDL
20.11.2017	50	18	BDL	4.61	BDL	BDL
23.11.2017	66	14	BDL	4.90	BDL	BDL
27.11.2017	75	22	BDL	3.80	BDL	BDL
04.12.2017	78	25	BDL	4.03	BDL	BDL
07.12.2017	73	20	BDL	4.90	BDL	BDL
11.12.2017	91	29	BDL	6.12	BDL	BDL
14.12.2017	83	27	BDL	5.13	BDL	BDL
18.12.2017	77	24	4.42	5.36	BDL	BDL
21.12.2017	69	19	BDL	4.82	BDL	BDL
25.12.2017	85	28	4.28	4.93	BDL	BDL
28.12.2017	64	15	BDL	4.26	BDL	BDL
01.01.2018	86	25	4.40	5.34	BDL	BDL
04.01.2018	82	22	BDL	4.90	BDL	BDL
08.01.2018	79	20	BDL	5.79	BDL	BDL
11.01.2018	63	17	4.70	5.39	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
15.01.2018	80	20	BDL	6.23	BDL	BDL
18.01.2018	91	26	BDL	6.23	BDL	BDL
22.01.2018	84	23	BDL	6.25	BDL	BDL
25.01.2018	88	24	4.50	8.50	BDL	BDL
29.01.2018	76	19	4.10	7.60	BDL	BDL
01.02.2018	92	34	4.30	6.51	BDL	BDL
05.02.2018	82	27	4.80	6.21	BDL	BDL
08.02.2018	86	30	BDL	4.62	BDL	BDL
12.02.2018	78	25	4.30	7.52	BDL	BDL
15.02.2018	75	23	4.10	6.92	BDL	BDL
19.02.2018	80	28	BDL	5.42	BDL	BDL
22.02.2018	74	22	4.50	6.83	BDL	BDL
26.02.2018	70	20	4.20	7.82	BDL	BDL
01.03.2018	50	12	4.33	7.45	BDL	BDL
05.03.2018	67	25	4.94	5.34	BDL	BDL
08.03.2018	70	26	5.7	6.98	BDL	BDL
12.03.2018	62	23	4.55	7.12	BDL	BDL
15.03.2018	78	27	4.27	6.73	BDL	BDL
19.03.2018	60	22	4.91	6.1	BDL	BDL
22.03.2018	64	23	4.63	7.92	BDL	BDL
26.03.2018	80	28	5.12	7.35	BDL	BDL
29.03.2018	62	21	4.77	6.92	BDL	BDL
NAAQS 2009	**100**	**60**	**80**	**80**	**4**	-

Table 3.8 - Location: Balaramapuram

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
02.10.2017	53	20	4.50	5.35	BDL	BDL
05.10.2017	82	34	BDL	4.18	BDL	BDL
09.10.2017	78	32	4.63	3.09	BDL	BDL
12.10.2017	52	18	BDL	3.36	BDL	BDL
16.10.2017	49	15	BDL	3.95	BDL	BDL
19.10.2017	50	17	BDL	3.86	BDL	BDL
23.10.2017	72	18	BDL	3.91	BDL	BDL
27.10.2017	80	30	5.21	5.81	BDL	BDL
30.10.2017	84	36	BDL	4.32	BDL	BDL
02.11.2017	84	36	4.21	4.63	BDL	BDL
06.11.2017	86	40	4.17	4.54	BDL	BDL
09.11.2017	75	20	BDL	6.50	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
13.11.2017	68	18	BDL	4.63	BDL	BDL
16.11.2017	80	24	4.33	5.44	BDL	BDL
20.11.2017	63	20	BDL	4.42	BDL	BDL
23.11.2017	58	17	BDL	4.13	BDL	BDL
27.11.2017	69	22	BDL	3.82	BDL	BDL
04.12.2017	80	22	BDL	4.56	BDL	BDL
07.12.2017	95	25	BDL	4.90	BDL	BDL
11.12.2017	83	28	BDL	6.72	BDL	BDL
14.12.2017	78	18	BDL	5.13	BDL	BDL
18.12.2017	75	16	4.21	4.28	BDL	BDL
21.12.2017	81	19	BDL	5.22	BDL	BDL
25.12.2017	72	15	BDL	4.92	BDL	BDL
28.12.2017	68	13	4.11	5.30	BDL	BDL
01.01.2018	92	33	4.20	5.79	BDL	BDL
04.01.2018	77	22	BDL	BDL	BDL	BDL
08.01.2018	82	28	BDL	BDL	BDL	BDL
11.01.2018	90	31	5.20	4.98	BDL	BDL
15.01.2018	86	30	BDL	6.46	BDL	BDL
18.01.2018	78	26	BDL	5.80	BDL	BDL
22.01.2018	94	35	5.80	7.87	BDL	BDL
25.01.2018	84	29	4.20	8.20	BDL	BDL
29.01.2018	80	27	4.70	8.60	BDL	BDL
01.02.2018	87	32	4.30	8.61	BDL	BDL
05.02.2018	81	29	BDL	8.34	BDL	BDL
08.02.2018	78	28	4.10	8.12	BDL	BDL
12.02.2018	64	21	4.50	9.12	BDL	BDL
15.02.2018	83	27	BDL	7.48	0.610	BDL
19.02.2018	90	34	BDL	8.51	BDL	BDL
22.02.2018	76	25	4.60	7.62	BDL	BDL
26.02.2018	85	33	BDL	8.26	BDL	BDL
01.03.2018	90	32	4.65	7.82	BDL	BDL
05.03.2018	82	28	5.36	6.28	BDL	BDL
08.03.2018	87	30	5.99	6.76	BDL	BDL
12.03.2018	81	27	5.42	6.98	BDL	BDL
15.03.2018	78	25	6.12	9.10	BDL	BDL
19.03.2018	70	22	5.42	8.61	BDL	BDL
22.03.2018	68	20	5.83	8.42	BDL	BDL
26.03.2018	76	24	6.1	9.24	BDL	BDL
29.03.2018	80	26	4.31	9.65	BDL	BDL

Date	Parameters					
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	HC
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	ppm
NAAQS 2009	100	60	80	80	4	-

5. Graphical representation of Ambient Air monitoring results for the period October 2017 to March 2018

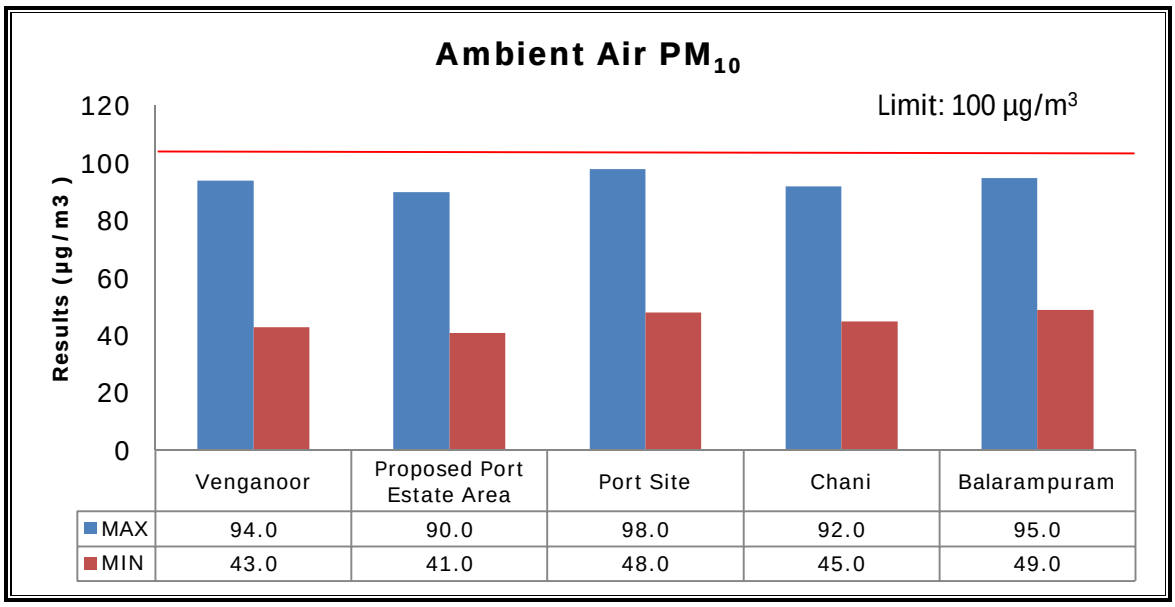


Figure 3.2: Particulate matter (size less than 10µm) (PM_{10})

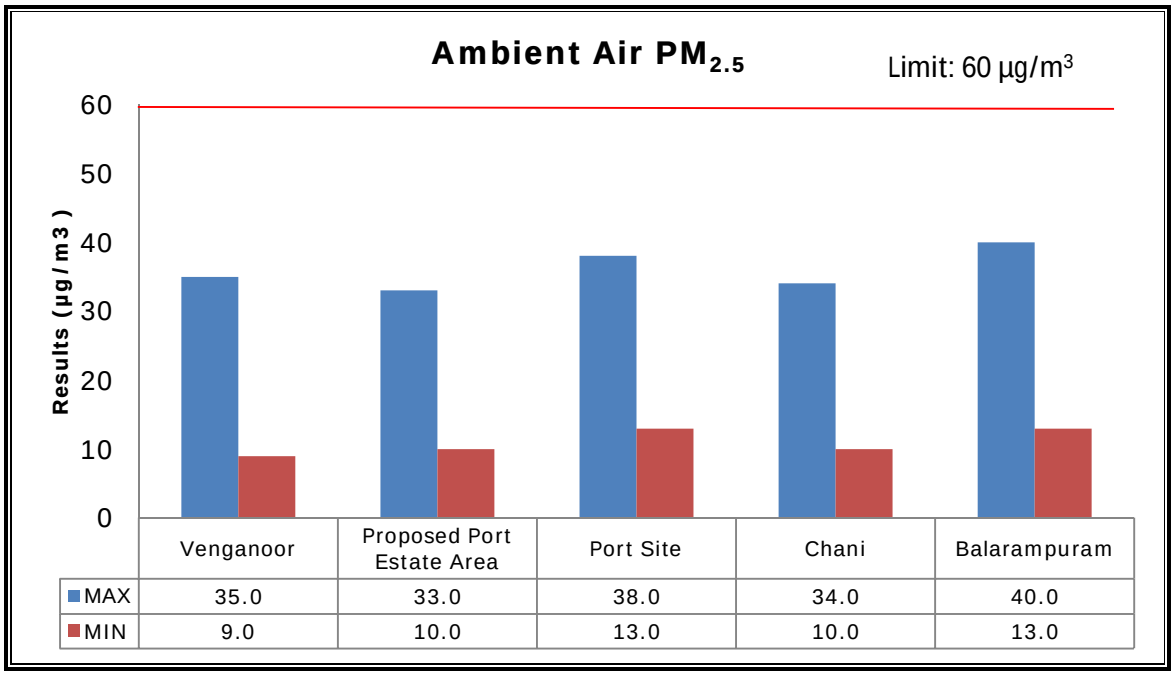
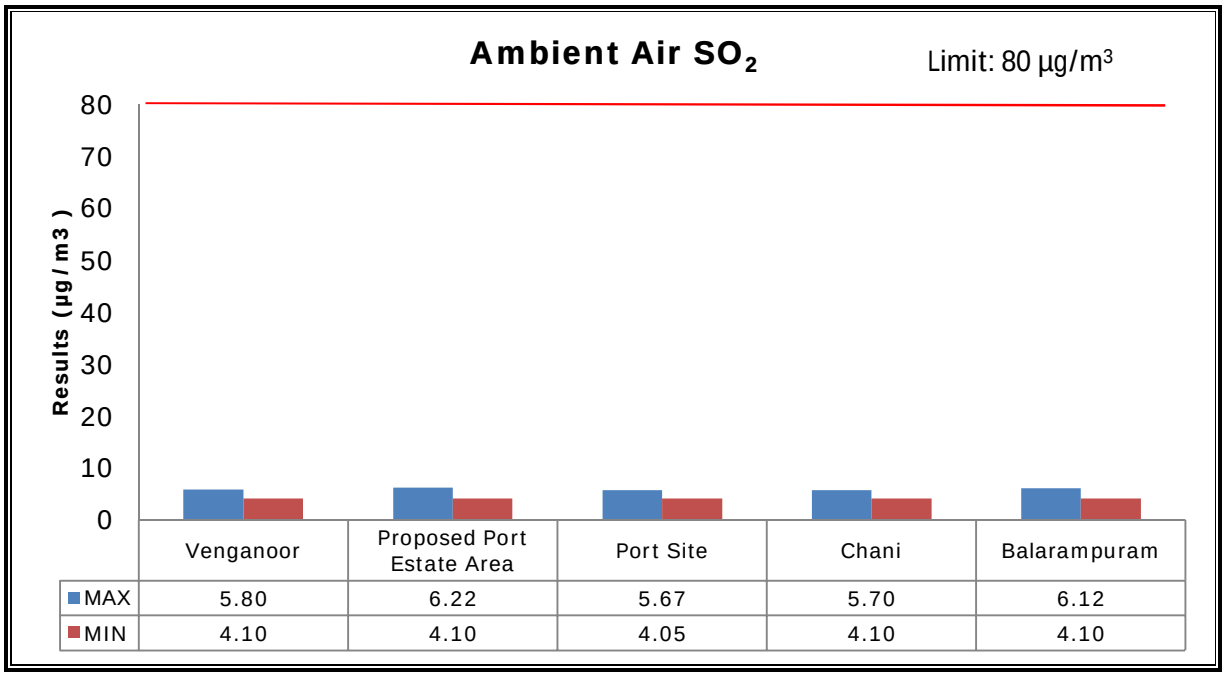
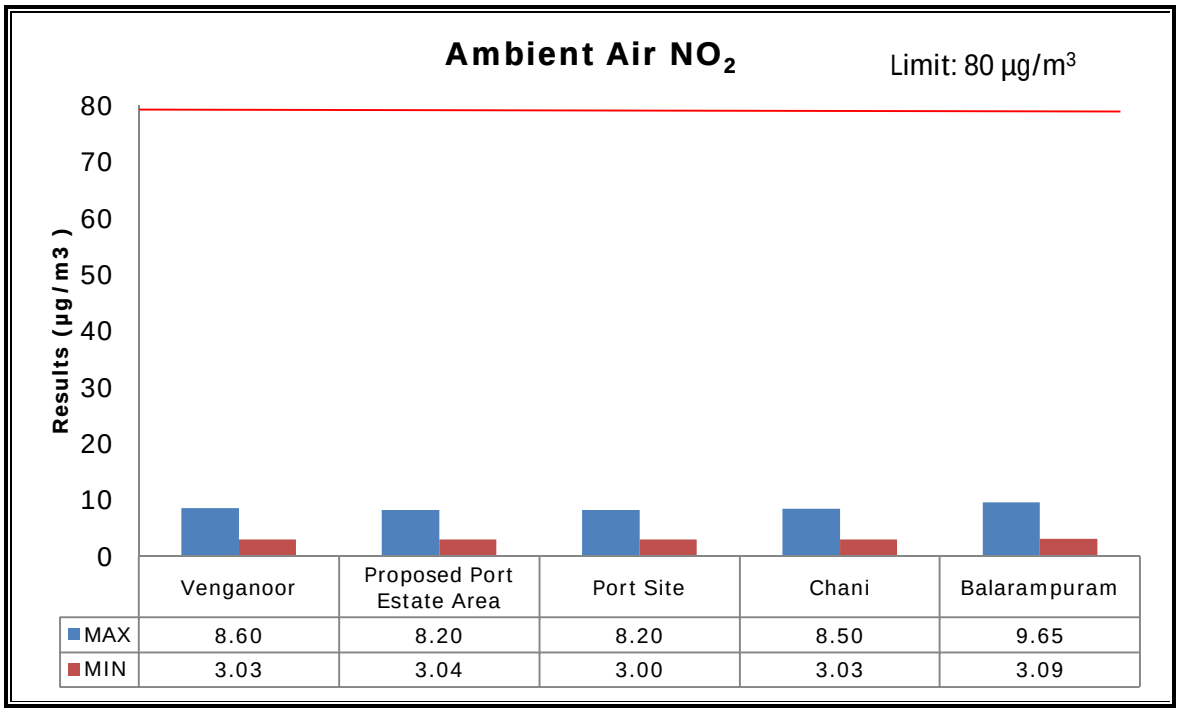


Figure 3.3: Particulate matter (size less than 2.5µm) ($PM_{2.5}$)



	Venganoor	Proposed Port Estate Area	Port Site	Chani	Balarampuram
MAX	5.80	6.22	5.67	5.70	6.12
MIN	4.10	4.10	4.05	4.10	4.10

Figure 3.4: Sulphur dioxide (SO_2)



	Venganoor	Proposed Port Estate Area	Port Site	Chani	Balarampuram
MAX	8.60	8.20	8.20	8.50	9.65
MIN	3.03	3.04	3.00	3.03	3.09

Figure 3.5: Nitrogen Dioxide (NO_2)

6. Summary - Ambient Air Quality

During the period October 2017 to March 2018, at the location **Venganoor**, the concentration of PM_{10} was observed in the range between 43 - 94 µg/m^3, $PM_{2.5}$ was observed in the range between 9 - 35 µg/m^3, SO_2 was observed in the range between 4.10 - 5.80 µg/m^3, NO_2 was observed in the range between 3.03 - 8.60 µg/m^3, CO and HC were observed below the detection limit for all six months. All the results were within the limits during compliance period.

At the location **Proposed Port Colony**, concentration of PM_{10} was observed in the range between 41 - 90 µg/m^3, $PM_{2.5}$ was observed in the range between 10 - 33 µg/m^3, SO_2 was observed in the range between 4.10 - 6.22 µg/m^3, NO_2 was observed in the range between 3.04 – 8.20 µg/m^3, CO and HC were observed below the detection limit for all six months. All the results were within the limits during the compliance period.

At the location **Port site**, concentration of PM_{10} was observed in the range between 48 - 98 µg/m^3, $PM_{2.5}$ was observed in the range between 13 - 38 µg/m^3, SO_2 was observed in the range between 4.05 – 5.67 µg/m^3, NO_2 was observed in the range between 3.00 – 8.20 µg/m^3, CO and HC were observed below the detection limit for all six months. All the results were within the limits during the compliance period.

At the location **Chani**, concentration of PM_{10} was observed in the range between 45 - 92 µg/m^3, $PM_{2.5}$ was observed in the range between 10 - 34 µg/m^3, SO_2 was observed in the range between 4.10 – 5.70 µg/m^3, NO_2 was observed in the range between 3.03 – 8.50 µg/m^3, CO and HC were observed below the detection limit for all six months. All the results were within the limits during the compliance period.

At the location **Balaramapuram**, concentration of PM_{10} was observed in the range between 49 - 95 µg/m^3, $PM_{2.5}$ was observed in the range between 13 - 40 µg/m^3, SO_2 was observed in the range between 4.10 - 6.12 µg/m^3, NO_2 was observed in the range between 3.09 – 9.65 µg/m^3, CO and HC were observed below the detection

limit for all six months. All the results were within the limits during the compliance period.

The obtained results were compared with National Ambient Air Quality Standards, 2009. The results were well within the limit on all monitoring days at all 5 locations during the compliance period.

CHAPTER 4

Ambient Noise Monitoring

1. Ambient Noise Monitoring location details

This chapter describes the sampling location, methodology adopted for monitoring ambient noise and analysis of monitored results. Ambient Noise Monitoring during October 2017 to March 2018 was carried out at Venganoor, Proposed Port Estate Area, Port Site, Chani and Balaramapuram. Classification of locations as per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) are as below:

Table 4.1: Ambient Noise Monitoring Stations details

Sr. No.	Location	Area Type	Latitude	Longitude
1.	Port Site	Industrial	8^0,22',06.03" N	77^0,00',17.03" E
2.	Balaramapuram	Commercial	8^0,25',37.60" N	77^0,02',43.80" E
3.	Proposed Port Estate Area	Residential	8^0,22',41.47" N	77^0,01',02.94" E
4.	Chani	Residential	8^0,20',56.86" N	77^0,03',16.19" E
5.	Venganoor	Residential	8^0,23',55.10" N	77^0,00',11.30" E

Figure 4.1 Google earth view of Ambient Noise Monitoring Stations

2. Methodology of Sampling

Ambient Noise Monitoring is being carried out as per IS 9876: 1981, CPCB Protocol for Ambient Level Noise Monitoring, July 2015 & Manufacturer Manual, WI/S/5/35 & 36, Issue No.3, Issue date 01.09.2016

3. Ambient Noise Standards

As per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1))

Table 4.2: Ambient Noise Standard

Area Code	Area Type	Limits in dB (A) Leq	
		Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45

4. Ambient Noise Monitoring Results for the period October 2017 to March 2018

Table 4.3 – Location : Port Site (Industrial)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-17	05.10.2017	80.2	74.9	39.5	40.0	53.8	47.2
	26.10.2017	75.4	65.6	40.3	42.2	50.2	48.9
Nov-17	09.11.2017	87.9	87.8	31.3	38.5	60.1	53.8
	23.11.2017	87.8	78.8	34.2	54.4	62.6	56.7
Dec-17	07.12.2017	89.5	87.9	37.9	38.9	66.1	58.4
	21.12.2017	93.1	70.2	36.7	36.9	64.1	43.1
Jan-18	04.01.2018	87.9	81.9	38.0	33.7	60.1	54.1
	25.01.2018	87.7	76.1	44.6	41.5	63.2	55.4
Feb-18	08.02.2018	90.9	79.4	40.8	40.3	62.2	52.8
	22.02.2018	93.3	81.6	42.9	43.5	65.1	55.0
Mar-18	08.03.2018	89.8	86.5	45.4	39.3	65.3	56.5
	22.03.2018	89.4	77.7	35.9	38.2	65.4	54.3
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						75	70

Table 4.4 - Location: Balaramapuram (Commercial)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-17	09.10.2017	87.8	78.8	34.2	54.4	62.6	56.7
	30.10.2017	86.2	86.1	34.3	37.9	58.1	56.4
Nov-17	13.11.2017	88.5	69.4	37.0	38.3	58.5	45.4
	27.11.2017	87.8	86.2	40.2	37.6	57.3	56.0
Dec-17	11.12.2017	86.4	83.7	40.1	36.4	62.1	51.0
	25.12.2017	88.5	80.9	34.4	35.3	63.3	49.0
Jan-18	08.01.2018	87.1	86.1	36.1	37.9	59.8	56.4
	29.01.2018	83.9	77.6	38.4	39.1	60.0	54.1
Feb-18	12.02.2018	89.7	71.9	27.3	35.5	60.1	48.4
	26.02.2018	90.6	72.3	40.3	37.3	62.4	54.6
Mar-18	12.03.2018	81.4	77.9	39.7	38.7	57.8	49.4
	26.03.2018	84.0	72.8	37.4	35.9	58.5	46.5
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						65	55

Table 4.5 - Location: Proposed Port Estate Area (Residential)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-17	06.10.2017	85.3	72.9	43.0	42.9	53.9	44.3
	27.10.2017	82.9	70.1	42.2	44.5	57.5	49.7
Nov-17	10.11.2017	87.9	73.1	37.6	43.5	58.2	47.7
	24.11.2017	86.2	86.1	34.3	37.9	54.1	45.4
Dec-17	08.12.2017	87.0	83.5	44.4	45.4	57.2	48.9
	22.12.2017	86.5	76.1	41.7	51.7	56.6	50.1
Jan-18	05.01.2018	77.4	77.0	39.7	33.1	57.1	54.7
	26.01.2018	86.4	66.1	35.1	43.7	57.1	50.4
Feb-18	09.02.2018	82.9	70.1	42.2	44.5	57.5	49.7
	23.02.2018	76.2	75.6	37.3	39.1	60.2	52.4
Mar-18	09.03.2018	76.0	72.3	35.0	37.2	52.8	43.3
	23.03.2018	82.4	74.4	37.5	35.9	55.0	44.4
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

Table 4.6 - Location: Chani (Residential)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-17	07.10.2017	82.7	77.0	40.4	38.4	52.4	43.9
	28.10.2017	84.5	84.5	42.0	42.1	52.0	43.1
Nov-17	11.11.2017	88.4	77.0	58.7	39.3	56.2	47.6
	25.11.2017	87.4	79.4	40.7	40.5	53.8	43.8
Dec-17	09.12.2017	84.4	83.6	37.7	38.0	58.4	51.2
	23.12.2017	84.1	77.7	41.8	43.3	56.3	48.7
Jan-18	06.01.2018	82.7	81.7	33.4	38.0	56.9	55.6
	27.01.2018	83.6	66.1	33.9	42.2	54.0	47.4
Feb-18	10.02.2018	86.4	71.3	35.1	37.0	57.7	48.5
	24.02.2018	84.4	71.8	37.8	38.9	58.0	49.5
Mar-18	10.03.2018	81.1	67.8	37.5	31.0	56.0	45.6
	24.03.2018	86.7	74.4	31.3	39.8	58.0	46.0
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

Table 4.7 - Location: Venganoor (Residential)

Month	Date	L_{max} Day time	L_{max} Night time	L_{min} Day time	L_{min} Night time	L_{eq} Day time	L_{eq} Night time
		dB (A)					
Oct-17	08.10.2017	80.5	80.5	31.8	37.7	52.7	42.7
	29.10.2017	82.9	87.6	41.5	38.9	54.3	42.3
Nov-17	12.11.2017	85.5	79.9	35.1	38.6	56.6	46.3
	26.11.2017	87.1	79.9	36.0	38.6	54.2	44.5
Dec-17	10.12.2017	85.3	83.5	31.8	37.1	58.2	49.8
	24.12.2017	81.8	79.0	37.9	39.1	54.3	44.2
Jan-18	07.01.2018	83.2	73.4	30.1	36.0	56.0	50.1
	28.01.2018	75.8	68.5	42.4	34.2	48.0	43.5
Feb-18	11.02.2018	75.9	68.3	36.2	36.7	50.4	45.5
	25.02.2018	81.2	75.9	43.8	37.7	57.1	48.5
Mar-18	11.03.2018	78.9	63.8	34.7	34.8	51.0	43.4
	25.03.2018	81.4	72.2	35.6	36.1	54.5	43.4
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

5. Summary of Half Yearly Results of Ambient Noise Monitoring

Table 4.8: Half Yearly Results

Parameter		Port Site	Balaramapuram	Proposed Port Estate Area	Chani	Venganoor
		Industrial	Commercial	Residential	Residential	Residential
		Day Time (75) Night Time (70)	Day Time (65) Night Time (55)	Day Time (55) Night Time (45)	Day Time (55) Night Time (45)	Day Time (55) Night Time (45)
Leq Day time dB (A)	Max	66.1	63.3	60.2	58.4	58.2
	Min	50.2	57.3	52.8	52.0	48.0
Leq Night time dB (A)	Max	58.4	56.7	54.7	55.6	50.1
	Min	43.1	45.4	43.3	43.1	42.3

6. Graphical representation of Ambient Noise Monitoring results for the period October 2017 to March 2018

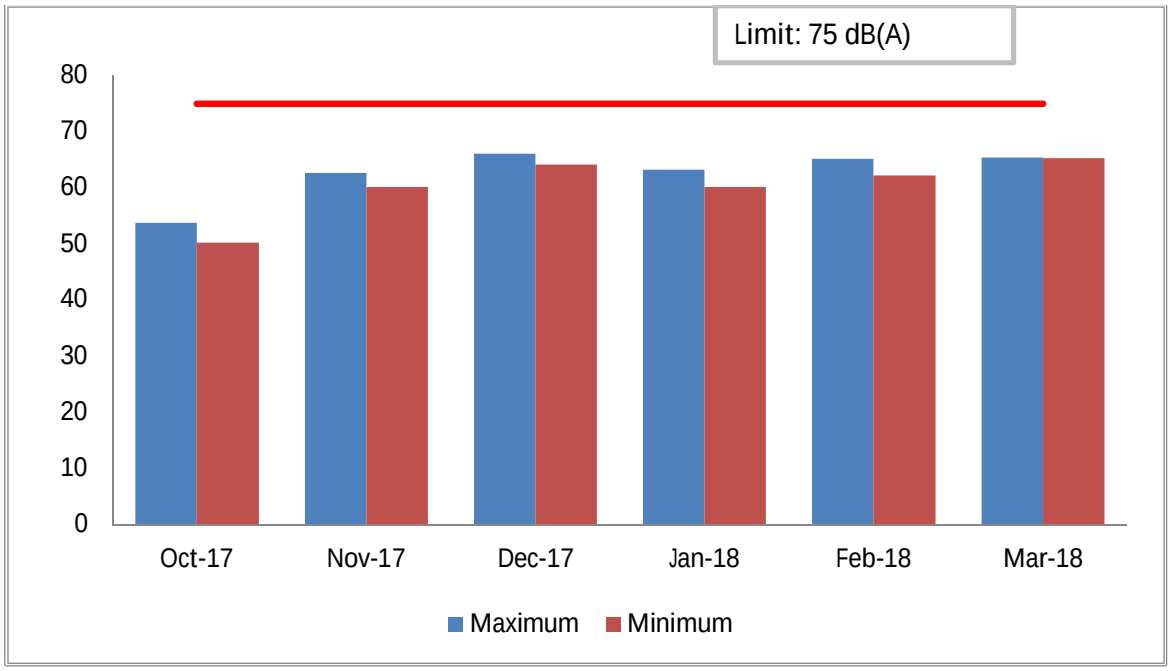


Figure 4.2 Industrial Area Noise Level at day time

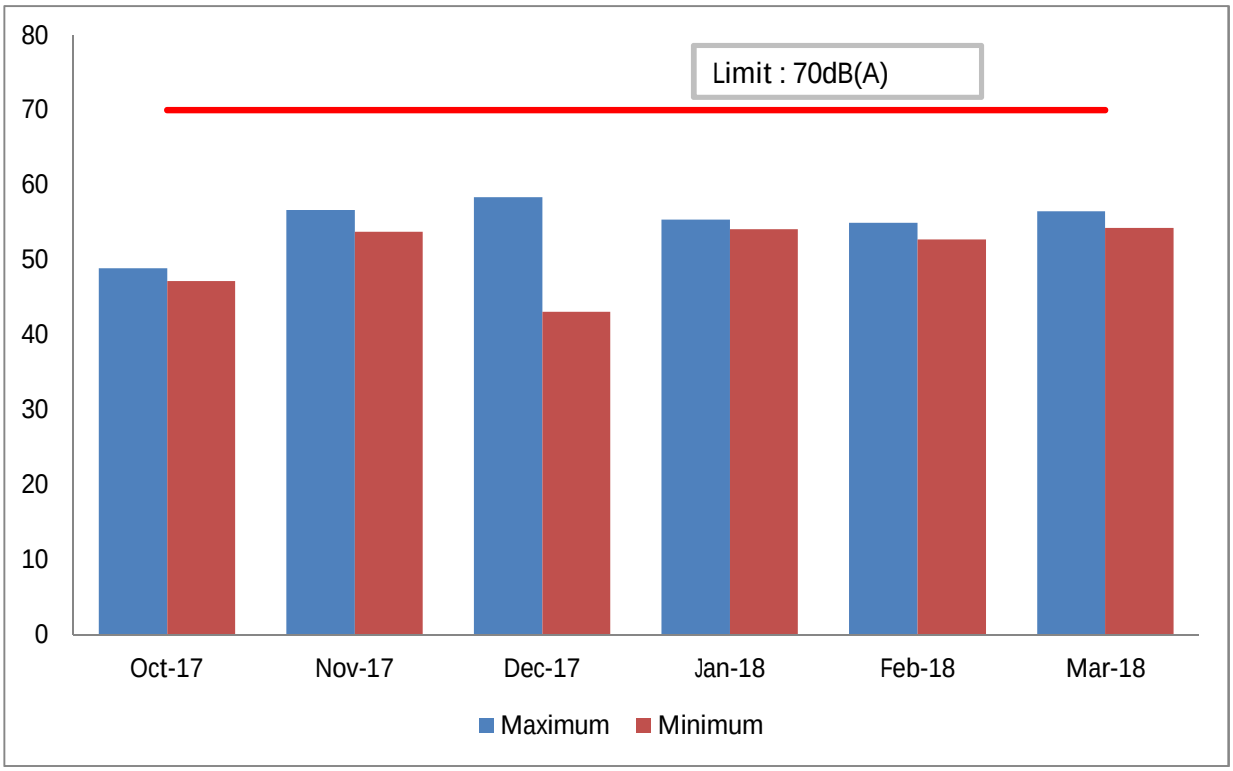


Figure 4.3 Industrial Area Noise Level at night time

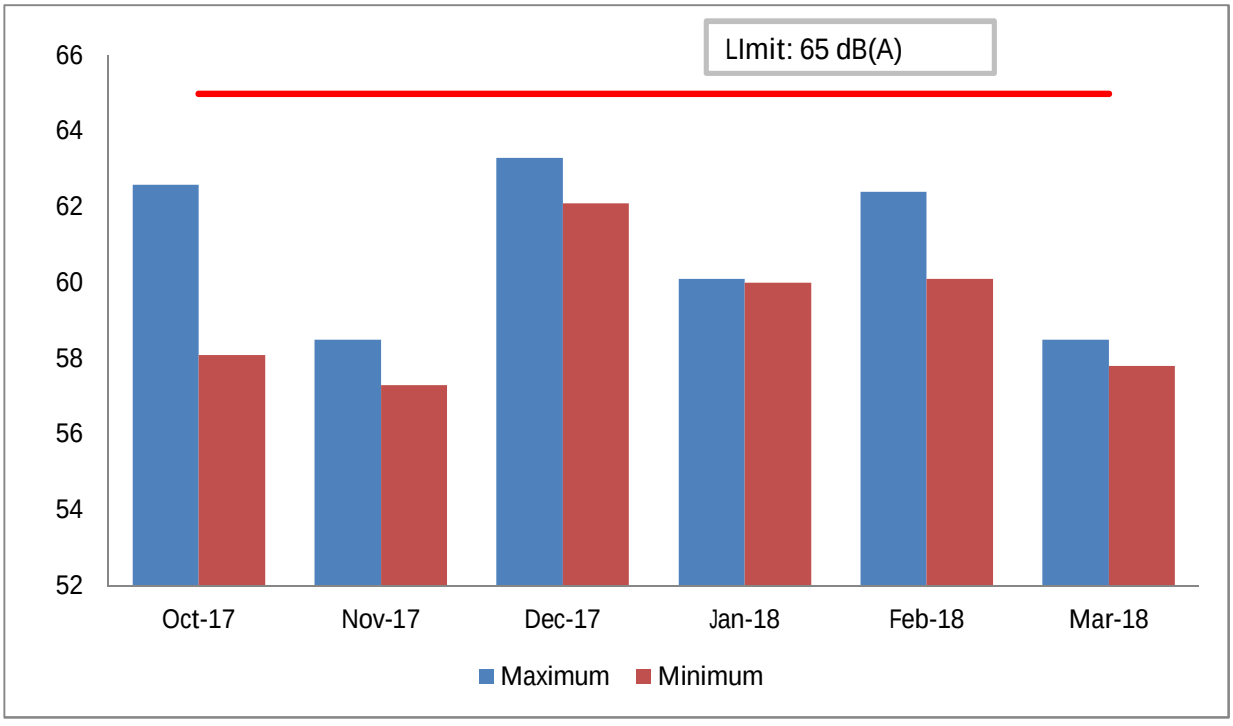


Figure 4.4 Commercial Area Noise Level at day time

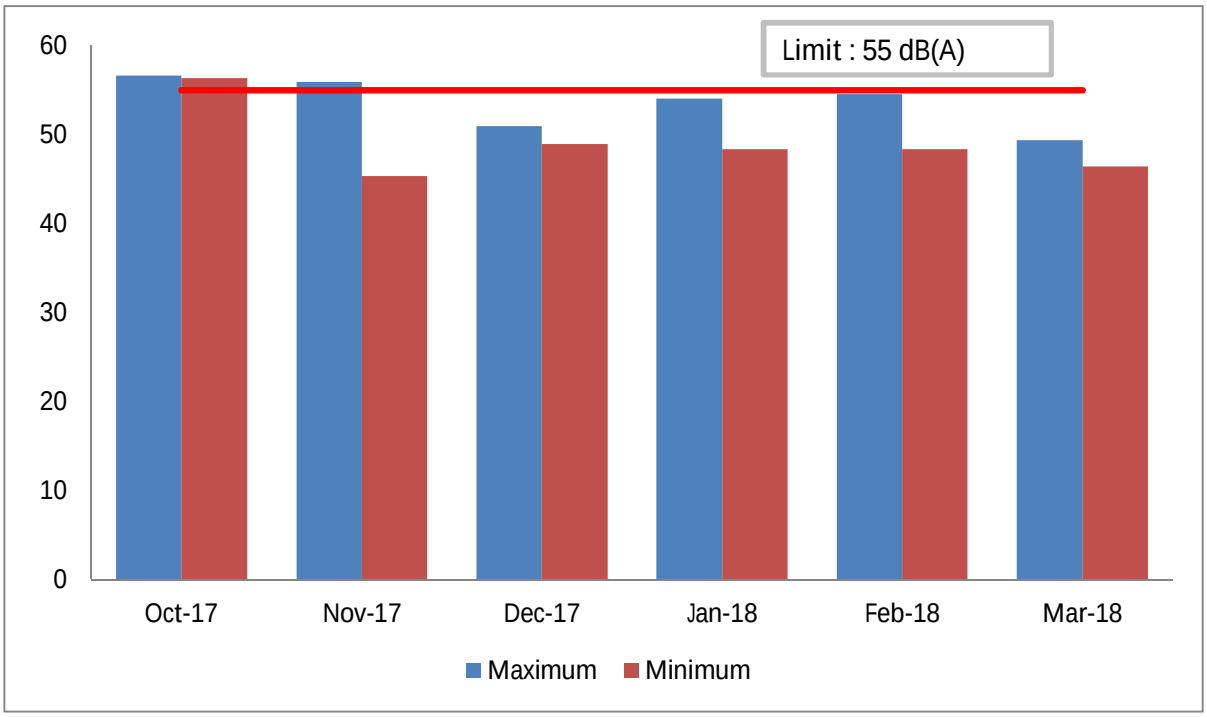


Figure 4.5 Commercial Area Noise Level at night time

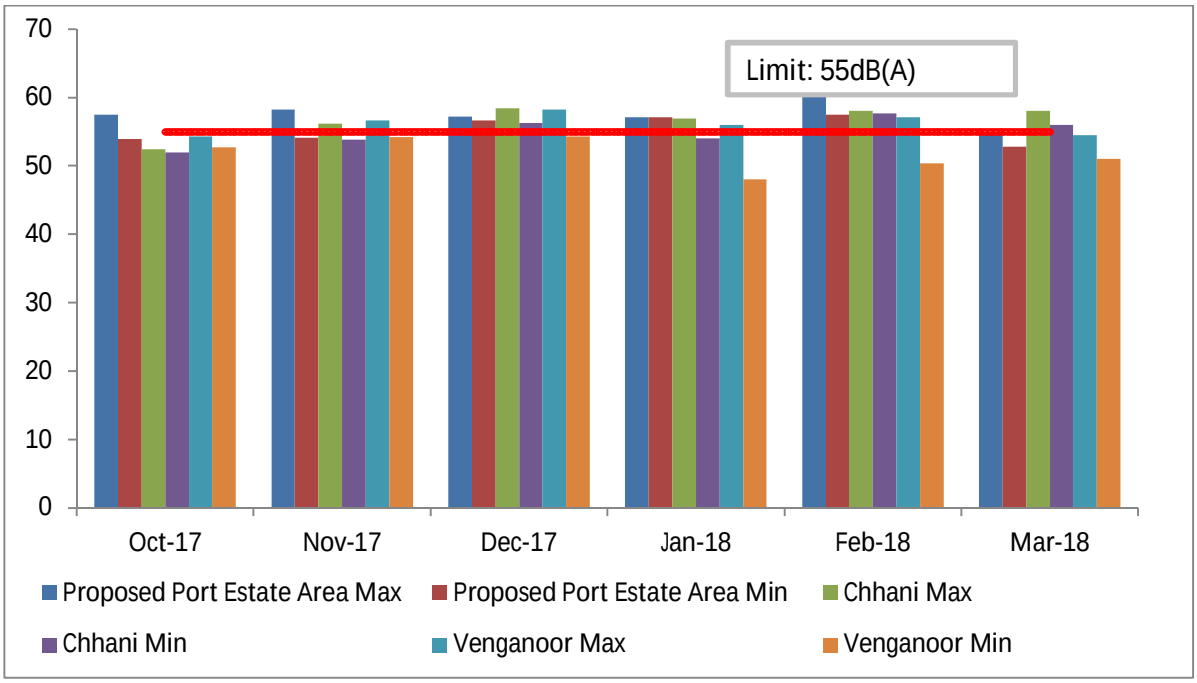


Figure 4.6 Residential Area Noise Level at day time

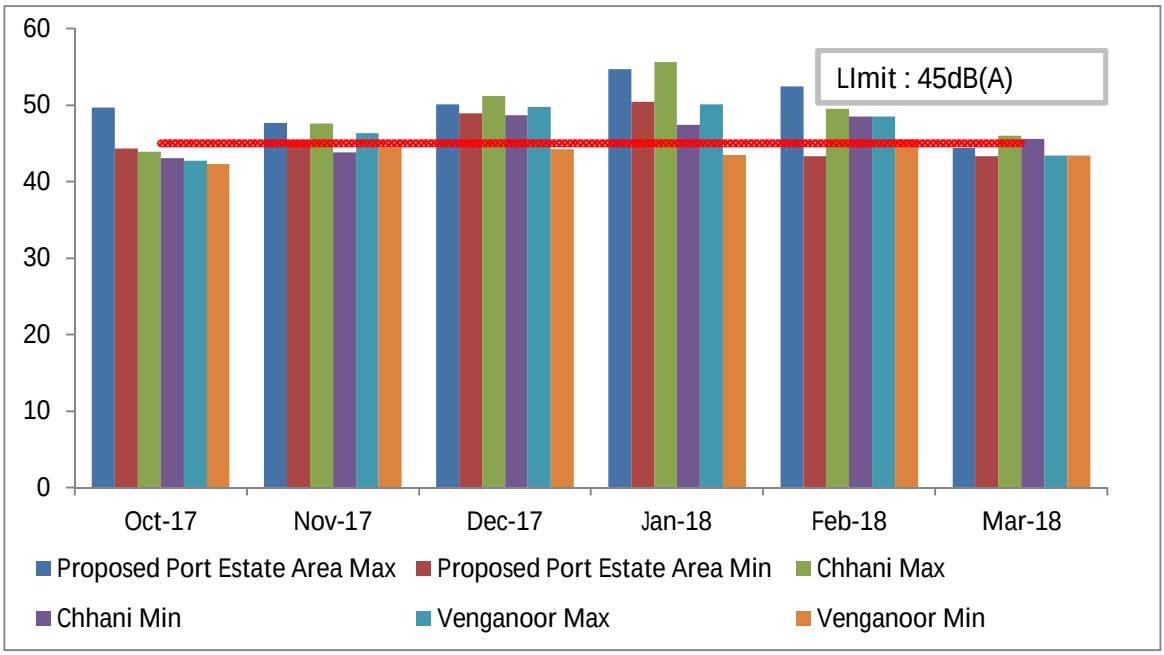


Figure 4.7 Residential Area Noise Level at night time

7. Summary - Ambient Noise Monitoring

During the period October 2017 to March 2018, average noise level observed at industrial area i.e. at Port Site were observed to be within limits during both day and night time. .

At commercial area i.e. Balaramapuram noise level were observed to be within limits during day time, during night time the noise reading were within limits most of the time except October when the night time noise reading was recorded slightly higher than the limit.

At residential areas i.e. at Proposed Port Estate Area, Chani and Venganoor during both day and night time the noise reading were recorded to be slightly higher than the limits this is due to noise generation from nearby temple during festivals as well as the road adjoining the monitoring location.

CHAPTER 5

Marine water and Sediment Analysis

1. Marine Water and Sediment Sampling location details:

This chapter describes the sampling location, methodology adopted for analysis and the analysis of monitored data for Marine Water and Sediment. Sampling and analysis of marine water at high tide and low tide during October 2017 to March 2018 is carried out at different locations such as; Near Kovalam Beach, Proposed Dredge Material Disposal Site, South of Break Water, Port Basin, Inner Approach Channel and Kovalam Beach. Location details are as below:

Table 5.1 Marine Water and Sediment sampling locations details

Sr. No.	Location	Latitude	Longitude
1.	Near Kovalam Beach	8^0,22',28.20" N	76^0,58',48.70" E
2.	Proposed Dredge Material Disposal Site	8^0,21',54.40" N	76^0,59',27.90" E
3.	South of Break Water	8^0,22',03.20" N	76^0,59',46.50" E
4.	Port Basin	8^0,22',00.00" N	77^0,00',03.30" E
5.	Inner Approach Channel	8^0,21',05.90" N	77^0,00',40.70" E
6.	Kovalam Beach	8^0,23',03.61" N	76°,58',37.62" E

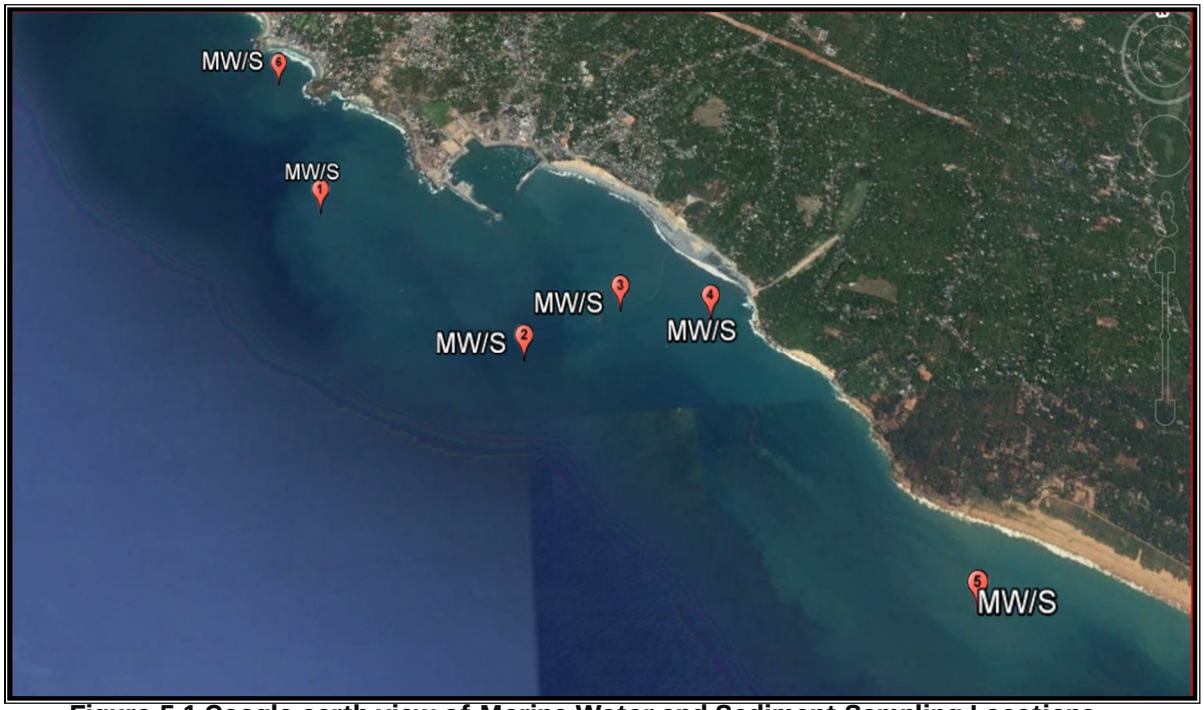


Figure 5.1 Google earth view of Marine Water and Sediment Sampling Locations

2. Methodology of Sampling and Analysis

Table 5.2 Sampling and Analysis Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Marine Water Analysis				
1.	pH Value	-	**1**	IS 3025(Part 11):1983, Reaffirmed 2006
2.	Dissolved Oxygen	mg/L	**0.05**	IS 3025 (Part 38): 1989, Reaffirmed 2009
3.	Colour and Odour	**-**	**Qualitative**	-
4.	Floating Materials – Oil, Grease and Scum (Including Petroleum Products)	mg/L	**0.005**	APHA,22 nd Ed.,2012,5520-B, 5-40 Clause 6 of IS: 3025 (Part 39): 1991, Amds.2, Sept 2013
5.	Faecal Coliforms	MPN Index /100ml	**1.8**	APHA, 22nd Ed., 2012,9221-E,9-74
6.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	**1**	IS 3025(Part 44): 1993, Reaffirmed 2009,Amds.1
7.	Phytoplanktons	No./100ml	**ND**	APHA, 22nd Ed., 2012
8.	Zooplanktons	No./100ml	**ND**	Microscopy APHA, 22nd Ed.,
Sediment Analysis				
1.	Texture	-	**Qualitative**	WI/SAP-Soil/5/03, WL II, Page No.7
2.	Organic Matter	%	**0.043**	FAO 1976, Sec. III,3, Page no.73
3.	Total Phosphorus (as P)	mg/kg	**5**	WLII, B-10a,Page no. 16
4.	Aluminium (as Al)	mg/kg	**1**	USEPA / SW 846/ 6010 C
5.	Chromium (as Cr)	mg/kg	**1**	USEPA / SW 846/ 6010 C
6.	Copper (as Cu)	mg/kg	**0.08**	USEPA / SW 846/ 6010 C
7.	Iron (as Fe)	mg/kg	**1**	USEPA / SW 846/ 6010 C
8.	Lead (as Pb)	mg/kg	**0.1**	USEPA / SW 846/ 6010 C
9.	Manganese (as Mn)	mg/kg	**0.5**	USEPA / SW 846/ 6010 C
10.	Mercury (as Hg)	mg/kg	**0.01**	USEPA / SW 846/ 6010 C
11.	Zinc (as Zn)	mg/kg	**0.5**	USEPA / SW 846/ 6010 C
12.	Nickel (as Ni)	mg/kg	**0.1**	USEPA / SW 846/ 6010 C
13.	Benthic Organism	/m^2	**ND**	APHA, 22nd Ed., 2012
Note: **ND:** Not Detected				

3. Marine Water Analysis Result for the period October 2017 to March 2018

Table 5.4: Marine Water Analysis Results

Sr. No.	Parameter	Limits as per E(P)A Rules, 1986	Month		Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
1	pH	6.5-9.0	Oct-17	High tide	8.04	7.71	7.87	7.90	6.86	7.84
				Low tide	7.77	7.75	7.82	7.84	7.02	8.05
			Nov-17	High tide	7.81	7.90	7.86	7.93	7.96	7.92
				Low tide	7.94	7.85	7.93	7.98	7.97	7.91
			Dec-17	High tide	7.80	7.81	7.84	8.26	8.27	7.93
				Low tide	7.91	7.95	8.13	8.20	7.92	8.21
			Jan-18	High tide	7.04	7.64	7.71	7.74	7.45	7.67
				Low tide	7.70	7.70	7.69	7.63	7.65	7.67
			Feb-18	High tide	7.78	7.77	7.88	7.82	7.77	7.83
				Low tide	7.70	7.77	7.84	7.79	7.80	7.70
			Mar-18	High tide	7.71	7.73	7.74	7.79	7.83	7.76
				Low tide	7.77	7.72	7.76	7.79	7.77	7.80
2	Dissolved Oxygen (mg/L)	3.0 mg/L or 40 % saturation value, whichever is higher	Oct-17	High tide	6.40	6.20	6.00	6.10	6.30	6.10
				Low tide	5.80	5.70	5.80	5.90	6.00	5.90
			Nov-17	High tide	6.20	6.00	6.20	6.30	6.10	6.00
				Low tide	5.60	5.80	5.70	5.60	5.70	5.80
			Dec-17	High tide	6.10	5.90	6.10	6.40	6.20	6.20
				Low tide	5.70	5.60	5.60	6.00	5.90	6.00

Sr. No.	Parameter	Limits as per E(P)A Rules, 1986	Month		Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
			Jan-18	High tide	5.90	6.00	5.90	6.20	6.00	6.10
				Low tide	5.60	5.80	5.50	6.10	5.70	5.90
			Feb-18	High tide	5.80	5.70	6.10	6.10	5.80	5.90
				Low tide	5.30	5.40	5.90	5.60	5.40	5.60
			Mar-18	High tide	5.60	5.50	5.80	5.60	5.40	5.70
				Low tide	5.10	5.10	5.60	5.20	5.00	5.50
3	Colour and Odour	No visible colour or offensive odour	**Oct-17**	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
			Nov-17	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
			Dec-17	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour

Sr. No.	Parameter	Limits as per E(P)A Rules, 1986	Month		Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
			Jan-18	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
			Feb-18	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
			Mar-18	High tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour
				Low tide	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour	No visible colour or offensive odour

Sr. No.	Parameter	Limits as per E(P)A Rules, 1986	Month		Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
4	Floating Materials (Oil, Grease and Scum) (Including Petroleum Products) (mg/L)	Max. 10	**Oct-17**	High tide	BDL	BDL	BDL	BDL	BDL	BDL
				Low tide	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-17	High tide	<1	<1	<1	<1	<1	<1
				Low tide	<1	<1	<1	<1	<1	<1
			Dec-17	High tide	<1	<1	<1	<1	<1	BDL
				Low tide	<1	<1	<1	<1	<1	BDL
			Jan-18	High tide	BDL	BDL	BDL	BDL	BDL	BDL
				Low tide	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-18	High tide	BDL	BDL	BDL	BDL	BDL	BDL
				Low tide	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-18	High tide	BDL	BDL	BDL	BDL	BDL	BDL
				Low tide	BDL	BDL	BDL	BDL	<1	BDL
5	Faecal Coliforms (/100 ml)	Max. 500	**Oct-17**	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
			Nov-17	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
			Dec-17	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
			Jan-18	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
			Feb-18	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8

Sr. No.	Parameter	Limits as per E(P)A Rules, 1986	Month		Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break Water	Port Basin	Inner Approach Channel	Kovalam Beach
			Mar-18	High tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
				Low tide	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
6	Biochemical Oxygen Demand (3 days, 27°C) (mg/L)	Max. 5	**Oct-17**	High tide	2.60	5.60	5.50	5.80	6.10	3.90
				Low tide	3.80	6.50	5.70	6.20	7.20	4.20
			Nov-17	High tide	4.10	5.80	5.30	5.30	5.10	4.20
				Low tide	4.50	6.30	5.90	6.10	5.40	4.40
			Dec-17	High tide	4.20	6.10	6.00	4.10	5.10	3.20
				Low tide	4.70	6.80	6.20	5.80	6.20	4.10
			Jan-18	High tide	4.50	5.50	5.20	5.40	5.30	4.10
				Low tide	5.00	5.70	5.80	5.70	5.60	4.30
			Feb-18	High tide	4.60	6.00	5.70	5.70	5.50	4.60
				Low tide	5.20	6.40	6.10	5.90	5.90	4.70
			Mar-18	High tide	4.90	5.10	6.00	6.10	6.00	4.80
				Low tide	5.40	6.10	6.40	6.40	6.40	4.90

4. Graphical representation of Marine water analysis results for the period October 2017 to March 2018

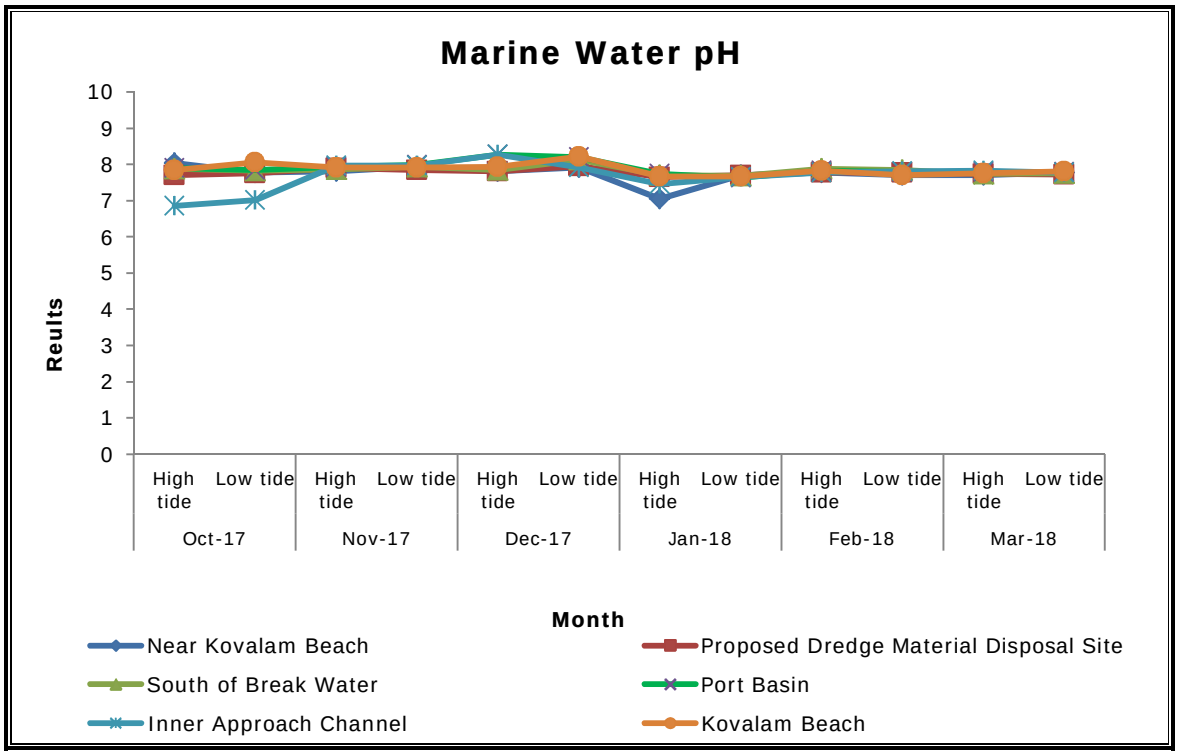


Figure 5.2: Marine Water Analysis for pH

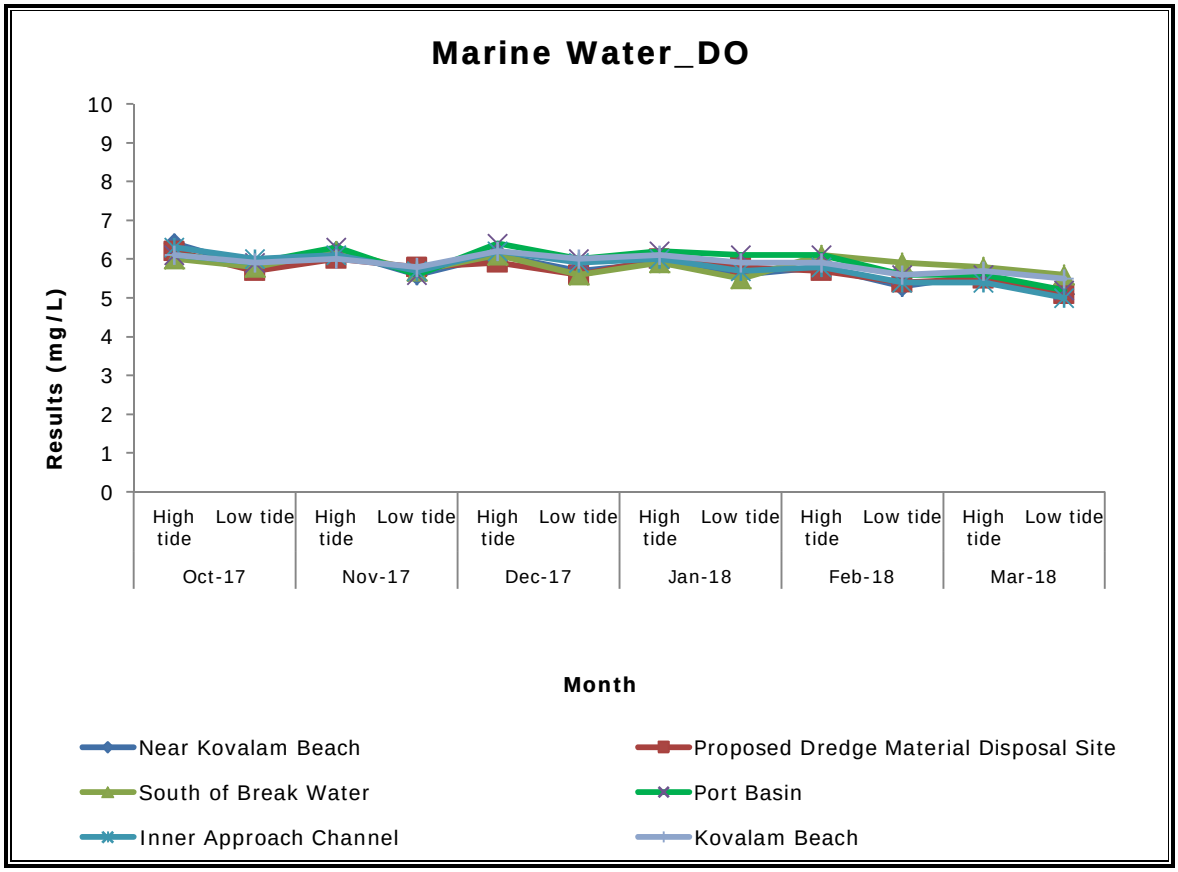


Figure 5.3: Marine Water Analysis for Dissolved Oxygen

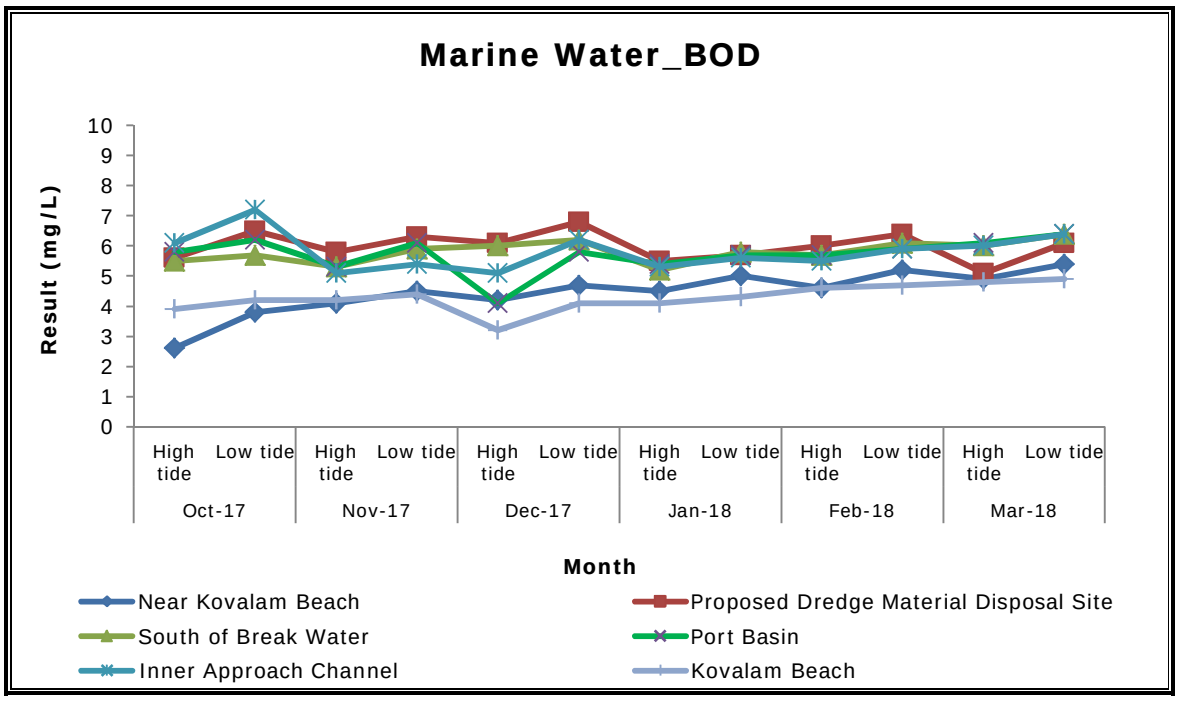


Figure 5.4: Marine Water Analysis for Biochemical Oxygen Demand

5. Summary - Marine water analysis

During the period October 2017 to March 2018, at the location **Near Kovalam Beach**, the low tide and high tide concentration of pH were observed in the range between 7.04 - 8.04, Dissolved oxygen was observed in the range between 5.10 - 6.40 mg/L, No visible colour or offensive odour observed, Floating materials were observed below the detection limit to <1. Faecal Coliforms were observed <1.8 /100 ml and Biochemical Oxygen Demand was observed in the range between 2.60 – 5.40 mg/L.

At the location **Proposed Dredge Material Disposal Site**, the low tide and high tide concentration of pH were observed in the range between 7.64 - 7.95, Dissolved oxygen was observed in the range between 5.10 - 6.20 mg/L, No visible colour or offensive odour observed, Floating materials were observed below detection limit to <1. Faecal Coliforms were observed <1.8 /100 ml and Biochemical Oxygen Demand was observed in the range between 5.10 – 6.80 mg/L.

At the location **South of Break Water**, the low tide and high tide concentration of pH were observed in the range between 7.69 - 8.13, Dissolved oxygen was observed in the range between 5.50 - 6.20 mg/L, No visible colour or offensive odour observed, Floating materials were observed below detection limit to <1. Faecal Coliforms were observed <1.8 /100ml and Biochemical Oxygen Demand was observed in the range between 5.20 – 6.40 mg/L.

At the location **Port Basin**, the low tide and high tide concentration of pH were observed in the range between 7.63 – 8.26, Dissolved oxygen was observed in the range between 5.20 - 6.40 mg/L, No visible colour or offensive odour observed, Floating materials were observed below detection limit to <1. Faecal Coliforms were observed <1.8 /100ml and Biochemical Oxygen Demand was observed in the range between 4.10 – 6.40 mg/L.

At the location **Inner Approach Channel**, the low tide and high tide concentration of pH were observed in the range between 6.86 – 8.27, Dissolved oxygen was observed in the range between 5.00 – 6.30 mg/L, No visible colour or offensive odour observed, Floating materials were observed below detection limit to <1. Faecal

Coliforms was observed <1.8 /100ml and Biochemical Oxygen Demand was observed in the range between 5.10 – 7.20 mg/L.

At the location **Kovalam Beach**, the low tide and high tide concentration of pH were observed in the range between 7.67 – 8.21, Dissolved oxygen was observed in the range between 5.50 – 6.20 mg/L, No visible colour or offensive odour observed, Floating materials were observed below detection limit to <1. Faecal Coliforms was observed <1.8 /100ml and Biochemical Oxygen Demand was observed in the range between 3.20 – 4.90 mg/L.

6. Sediment Analysis Result

Table 5.5: Near Kovalam Beach

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	13.9	14.2	9.53	11.8	11.2	8.20
Total Phosphorus (as P)	mg/kg	10.0	9.86	5.34	8.91	8.15	7.30
Aluminium (as Al)	mg/kg	633	991	226	389	3475	1452
Chromium (as Cr)	mg/kg	19.7	22.7	10.3	21.0	42.9	29.8
Copper (as Cu)	mg/kg	0.639	0.320	0.234	0.320	0.791	0.317
Iron (as Fe)	mg/kg	2870	2719	991	2045	3266	2644
Lead (as Pb)	mg/kg	4.13	3.26	0.701	1.67	7.38	2.98
Manganese (as Mn)	mg/kg	7.39	11.5	5.60	4.83	12.3	6.36
Mercury (as Hg)	mg/kg	0.119	BDL	BDL	0.090	BDL	BDL
Zinc (as Zn)	mg/kg	4.25	3.50	BDL	0.450	2.85	1.36
Nickel (as Ni)	mg/kg	0.230	BDL	0.294	0.609	1.76	0.629
Benthic Organism							
Micro Benthic Organism	/m^2	128457	115923	128400	119500	109800	101500
Macro Benthic Organism	/m^2	104251	97842	98400	96400	97600	96100
Total	**/m^2**	**232708**	**213765**	**226800**	**215900**	**207400**	**197600**

Table 5.6: Proposed Dredge Material Disposal Site

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	8.86	8.90	10.1	7.71	5.82	4.90
Total Phosphorus (as P)	mg/kg	7.16	7.01	4.62	6.01	6.58	6.20
Aluminium (as Al)	mg/kg	2447	856	184	1053	9625	1878
Chromium (as Cr)	mg/kg	31.9	4.29	15.0	20.5	52.0	27.1
Copper (as Cu)	mg/kg	1.82	0.192	0.179	0.704	2.35	0.54
Iron (as Fe)	mg/kg	4702	1394	978	2008	5580	3345
Lead (as Pb)	mg/kg	2.8	0.879	1.77	1.07	6.27	1.68
Manganese (as Mn)	mg/kg	28.2	10.7	3.77	25.1	34.2	23.0
Mercury (as Hg)	mg/kg	BDL	0.128	0.552	0.05	BDL	BDL
Zinc (as Zn)	mg/kg	8.21	1.54	BDL	1.96	9.04	2.89
Nickel (as Ni)	mg/kg	0.403	BDL	0.320	1.18	3.78	1.08
Benthic Organism							
Micro Benthic Organism	/m^2	178976	168452	176400	169800	167900	154900
Macro Benthic Organism	/m^2	118561	105621	114800	105800	102000	100100
Total	**/m^2**	**297537**	**274073**	**291200**	**275600**	**269900**	**255000**

Table 5.7: South of Breakwater

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	9.80	9.69	9.91	9.88	1.00	2.90
Total Phosphorus (as P)	mg/kg	5.85	5.99	4.32	4.70	4.91	3.20
Aluminium (as Al)	mg/kg	324	532	190	173	5087	1161
Chromium (as Cr)	mg/kg	16.7	24.0	9.65	14.8	35.3	14.6
Copper (as Cu)	mg/kg	0.340	0.490	0.116	0.177	0.807	0.128
Iron (as Fe)	mg/kg	1015	1084	1085	978	1809	903
Lead (as Pb)	mg/kg	4.73	5.15	0.238	1.62	4.46	1.54
Manganese (as Mn)	mg/kg	6.11	7.14	4.19	3.56	16.9	5.73

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Mercury (as Hg)	mg/kg	0.015	0.030	0.063	BDL	BDL	BDL
Zinc (as Zn)	mg/kg	1.58	0.965	BDL	BDL	1.36	BDL
Nickel (as Ni)	mg/kg	0.530	BDL	0.383	0.309	3.17	0.353
Benthic Organism							
Micro Benthic Organism	/m^2	42587	40845	42500	41900	40800	39300
Macro Benthic Organism	/m^2	22468	21542	22800	20800	21700	20300
Total	**/m^2**	**65055**	**62387**	**65300**	**62700**	**62500**	**59600**

Table 5.8: Port Basin

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	8.25	8.05	7.52	9.48	5.50	2.52
Total Phosphorus (as P)	mg/kg	8.64	8.42	5.99	5.43	5.83	8.60
Aluminium (as Al)	mg/kg	3569	1409	360	247	6715	1240
Chromium (as Cr)	mg/kg	39.1	18.0	18.4	12.0	59.6	12.6
Copper (as Cu)	mg/kg	1.99	0.750	0.083	0.264	4.20	0.402
Iron (as Fe)	mg/kg	5012	2655	2056	1160	7500	1250
Lead (as Pb)	mg/kg	3.12	1.50	1.69	0.746	3.88	0.589
Manganese (as Mn)	mg/kg	42.3	19.4	4.07	6.19	60.8	9.13
Mercury (as Hg)	mg/kg	0.367	0.612	0.029	BDL	BDL	BDL
Zinc (as Zn)	mg/kg	7.96	3.70	0.802	BDL	11.2	BDL
Nickel (as Ni)	mg/kg	1.21	BDL	0.379	0.333	6.80	0.512
Benthic Organism							
Micro Benthic Organism	/m^2	81876	79842	80400	79800	78900	77100
Macro Benthic Organism	/m^2	72782	70451	71800	69700	68000	67800
Total	**/m^2**	**154658**	**150293**	**152200**	**149500**	**146900**	**144900**

Table 5.9: Inner Approach Channel

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	10.9	10.3	12.9	9.96	1.16	2.90
Total Phosphorus (as P)	mg/kg	5.21	5.34	9.24	4.35	4.22	4.20
Aluminium (as Al)	mg/kg	977	647	235	178	4685	1431
Chromium (as Cr)	mg/kg	19.8	6.06	18.3	9.57	29.7	19.1
Copper (as Cu)	mg/kg	0.789	0.551	0.287	0.111	0.559	0.149
Iron (as Fe)	mg/kg	2394	1433	1772	1080	2896	2187
Lead (as Pb)	mg/kg	2.86	0.570	1.57	0.221	2.57	0.930
Manganese (as Mn)	mg/kg	8.78	4.80	4.39	3.96	12.8	9.62
Mercury (as Hg)	mg/kg	BDL	0.072	BDL	0.504	BDL	BDL
Zinc (as Zn)	mg/kg	2.81	1.31	0.424	BDL	2.89	0.270
Nickel (as Ni)	mg/kg	0.890	BDL	0.561	0.307	1.82	0.626
Benthic Organism							
Micro Benthic Organism	/m^2	34862	30485	32800	31900	31100	30800
Macro Benthic Organism	/m^2	11750	10941	12500	10800	9900	9100
Total	**/m^2**	**46612**	**41426**	**45300**	**42700**	**41000**	**39900**

Table 5.10: Kovalam Beach

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Texture	-	Clay	Clay	Clay	Clay	Clay	Sandy
Organic Matter	%	11.0	10.7	9.96	9.84	10.2	8.11
Total Phosphorus (as P)	mg/kg	4.96	5.25	4.50	4.63	4.76	5.70
Aluminium (as Al)	mg/kg	1043	1016	1177	580	3544	1410
Chromium (as Cr)	mg/kg	15.3	18.4	21.8	18.9	46.4	33.5
Copper (as Cu)	mg/kg	0.243	0.162	0.768	0.083	1.19	0.332
Iron (as Fe)	mg/kg	2510	2575	3156	2131	3068	2523
Lead (as Pb)	mg/kg	1.96	2.47	1.23	1.62	8.15	4.88

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Manganese (as Mn)	mg/kg	12.4	5.92	27.8	4.03	8.35	5.91
Mercury (as Hg)	mg/kg	BDL	BDL	0.079	BDL	BDL	BDL
Zinc (as Zn)	mg/kg	3.24	3.10	2.26	0.760	3.31	1.36
Nickel (as Ni)	mg/kg	0.26	BDL	1.32	0.371	1.84	0.62
Benthic Organism							
Micro Benthic Organism	/m^2	119872	108742	118400	107800	101100	100100
Macro Benthic Organism	/m^2	99582	98451	104000	99700	92400	91300
Total	**/m^2**	**219454**	**207193**	**222400**	**207500**	**193500**	**191400**

7. Graphical representation of Sediment analysis results for the period October 2017 to March 2018

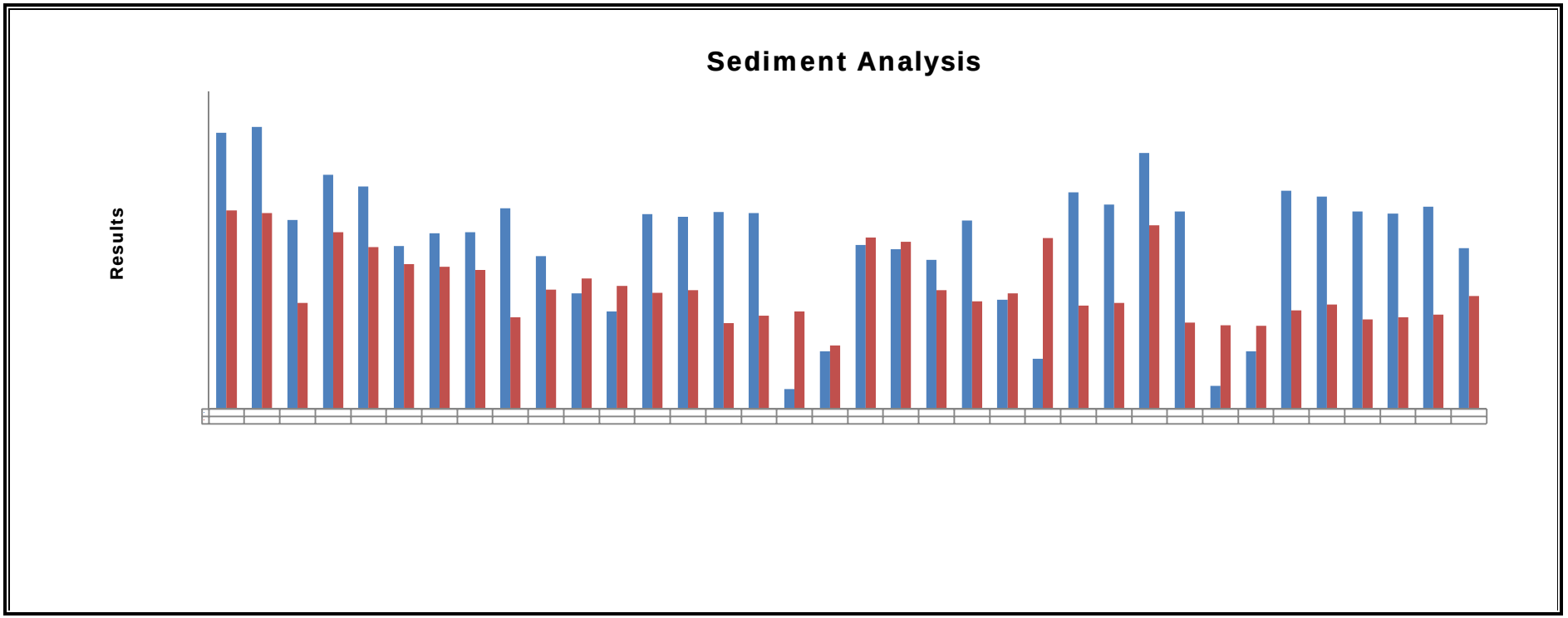


Figure 5.5: Sediment analysis for Organic Matter and Total Phosphorus

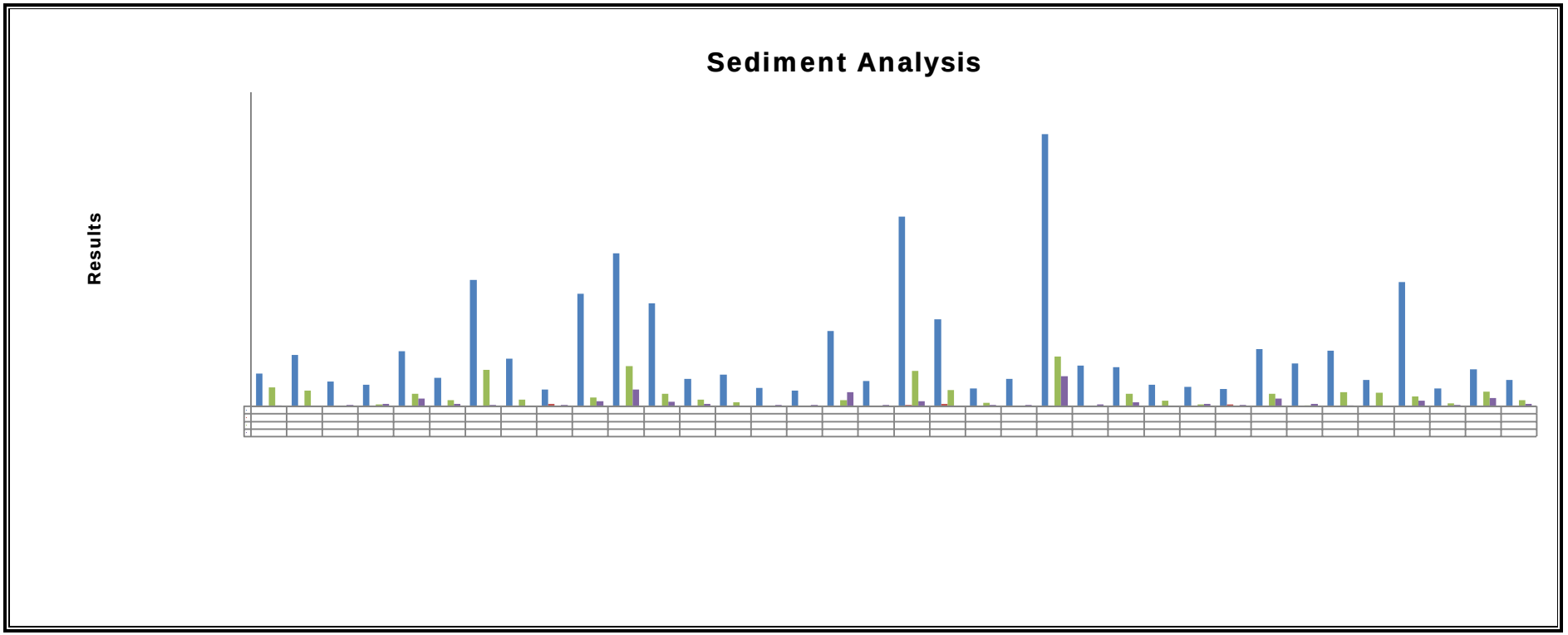


Figure 5.6: Sediment analysis for Manganese, Mercury, Zinc and Nickel

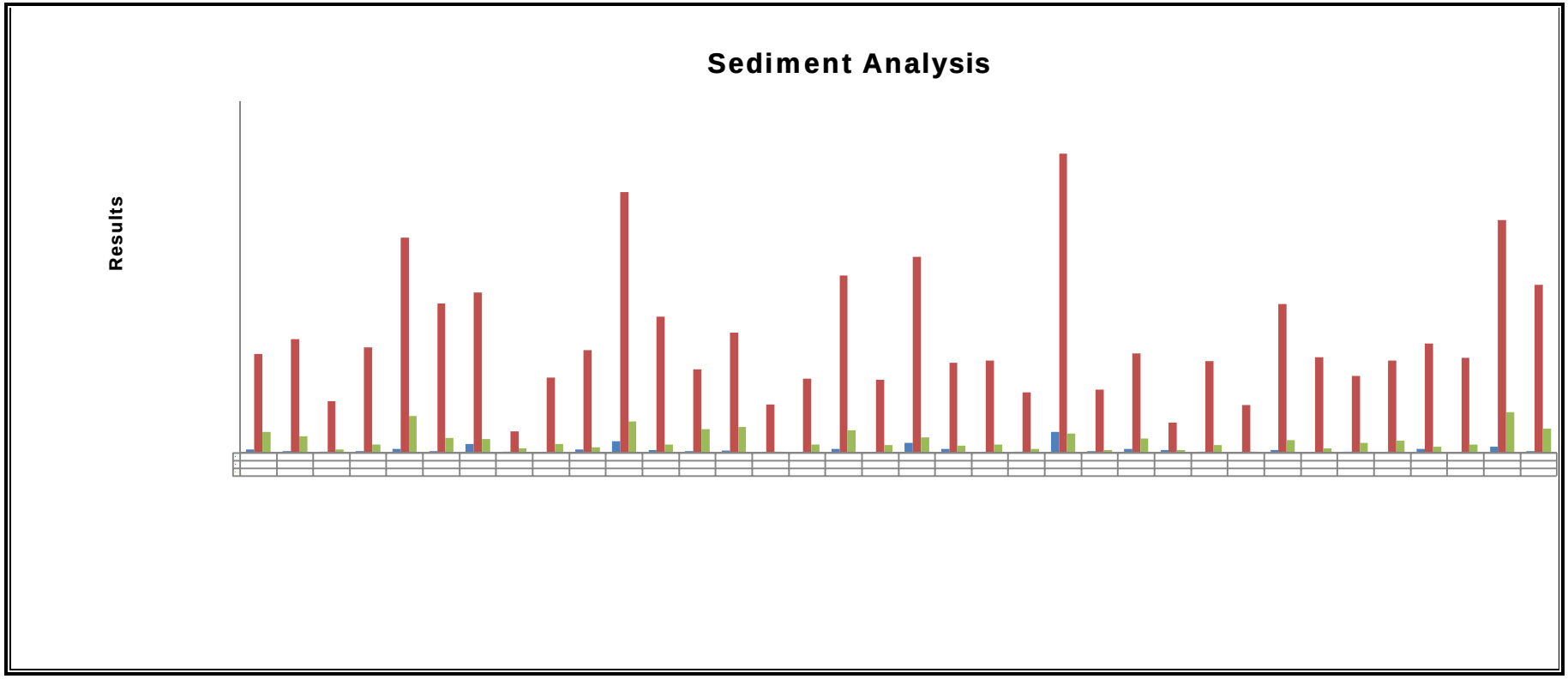


Figure 5.7: Sediment analysis for Copper, Chromium and Lead

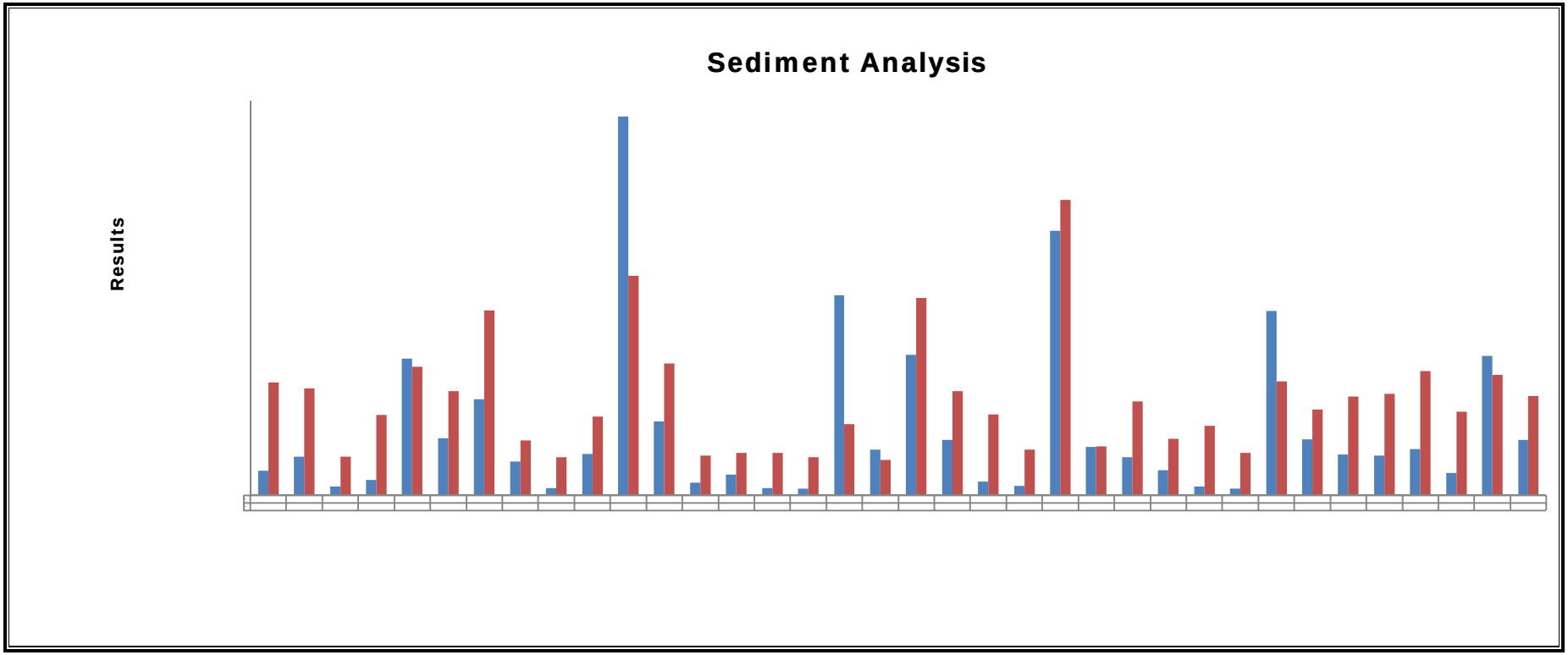


Figure 5.8: Sediment analysis for Aluminium and Iron

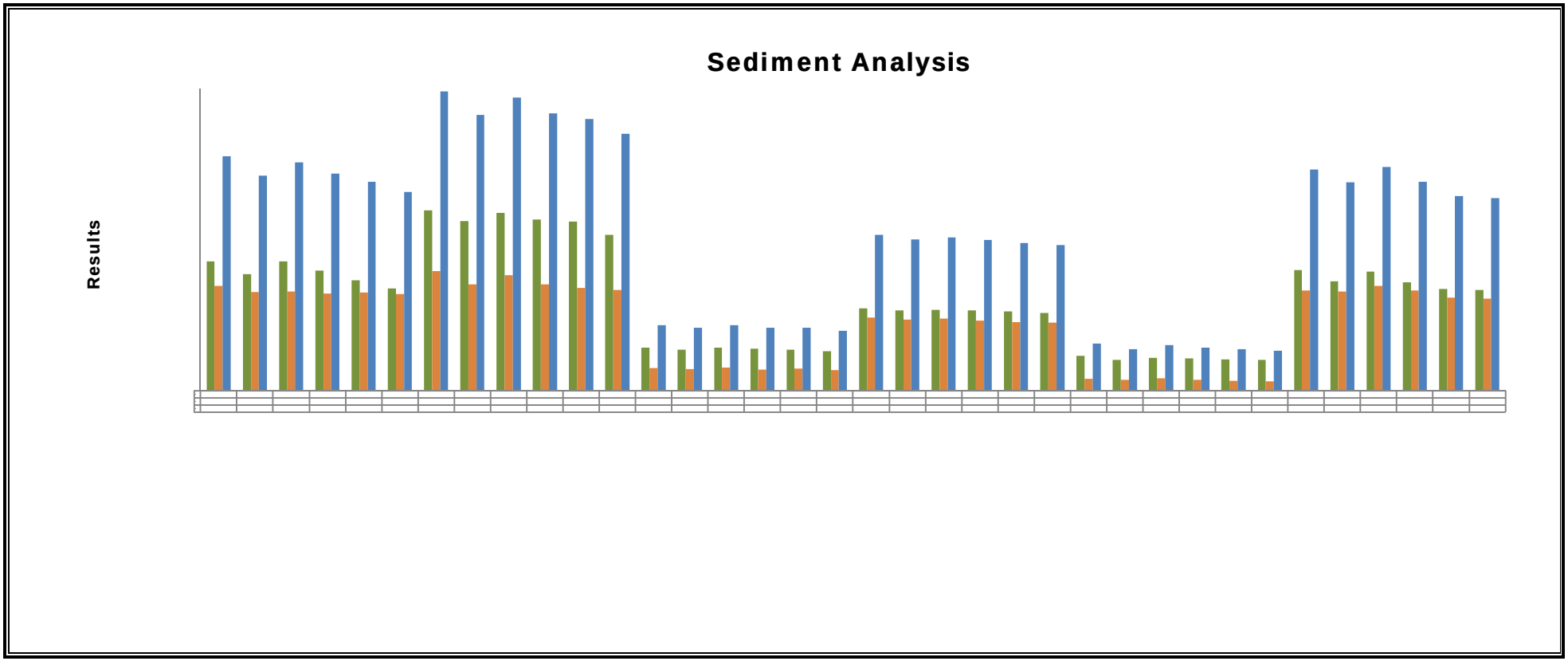


Figure 5.9: Sediment analysis for Benthic organisms

8. Summary - Sediment Analysis

During the period October 2017 to March 2018, At the location **Near Kovalam Beach**, the observed texture was sandy, Organic matter was observed in the range between 8.20 – 14.2 %, Total Phosphorus (as P) was observed in the range between 5.34 – 10.0 mg/kg. Aluminium (as Al) was observed in the range between 226 - 3475 mg/kg. Chromium (as Cr) was observed in the range between 10.3 – 42.9 mg/kg. Copper (as Cu) was observed in the range between 0.234 – 0.791 mg/kg. Iron (as Fe) was observed in the range between 991 - 3266 mg/kg. Lead (as Pb) was observed in the range between 0.701 – 7.38 mg/kg. Manganese (as Mn) was observed in the range between 4.83 – 12.3 mg/kg. Mercury (as Hg) was observed between below the detection limit to 0.119 mg/kg. Zinc (as Zn) was observed in the range between 0.450 – 4.25 mg/kg. Nickel (as Ni) was observed in the range between below the detection limit to 1.76 mg/kg. Micro benthic organisms were observed in the range between 101500 – 128457 /m^2 and macro benthic organisms were observed in the range between 96100 – 104251 /m^2.

At the location **Proposed Dredge Material Disposal site**, the observed texture was clay and sandy, Organic matter was observed in the range between 4.90 – 10.1 %, Total Phosphorus (as P) was observed in the range between 4.62 – 7.16 mg/kg. Aluminium (as Al) was observed in the range between 184 - 9625 mg/kg. Chromium (as Cr) was observed in the range between 4.29 – 52.0 mg/kg. Copper (as Cu) was observed in the range between 0.179 – 2.35 mg/kg. Iron (as Fe) was observed in the range between 978 - 5580 mg/kg. Lead (as Pb) was observed in the range between 0.879 – 6.27 mg/kg. Manganese (as Mn) was observed in the range between 3.77 – 34.2 mg/kg. Mercury (as Hg) was observed in the range between below the detection limit to 0.552 mg/kg. Zinc (as Zn) was observed in the range between below the detection limit to 9.04 mg/kg. Nickel (as Ni) was observed in the range between below the detection limit to 3.78 mg/kg. Micro benthic organisms were observed in the range between 154900 – 178976 /m^2 and macro benthic organisms were observed in the range between 100100 – 118561 /m^2.

At the location **South of break water**, the observed texture was clay and sandy, Organic matter was observed in the range between 1.00 – 9.91 %, Total Phosphorus

(as P) was observed in the range between 3.20 – 5.99 mg/kg. Aluminium (as Al) was observed in the range between 173 - 5087 mg/kg. Chromium (as Cr) was observed in the range between 9.65 – 35.3 mg/kg. Copper (as Cu) was observed in the range between 0.116 – 0.807 mg/kg. Iron (as Fe) was observed in the range between 903 - 1809 mg/kg. Lead (as Pb) was observed in the range between 0.238 – 5.15 mg/kg. Manganese (as Mn) was observed in the range between 3.56 – 16.9 mg/kg. Mercury (as Hg) was observed in the range between below detection limit to 0.063 mg/kg. Zinc (as Zn) was observed in the range between below detection limit to 1.58 mg/kg. Nickel (as Ni) was observed in the range between below detection limit to 3.17 mg/kg. Micro benthic organisms were observed in the range between 39300 – 42587 /m^2 and macro benthic organisms were observed in the range 20300 – 22800 /m^2.

At the location **Port Basin**, the observed texture was clay and sandy, Organic matter was observed in the range between 2.52 – 9.48 %, Total Phosphorus (as P) was observed in the range between 5.43 – 8.64 mg/kg. Aluminium (as Al) was observed in the range between 247 - 6715 mg/kg. Chromium (as Cr) was observed in the range between 12.0 –59.6 mg/kg. Copper (as Cu) was observed in the range between 0.083 – 4.20 mg/kg. Iron (as Fe) was observed in the range between 1160 - 7500 mg/kg. Lead (as Pb) was observed in the range between 0.589 – 3.88 mg/kg. Manganese (as Mn) was observed in the range between 4.07 – 60.8 mg/kg. Mercury (as Hg) was observed in the range between below detection limit to 0.612 mg/kg. Zinc (as Zn) was observed in the range between below detection limit to 11.2 mg/kg. Nickel (as Ni) was observed in the range between below detection limit to 6.80 mg/kg. Micro benthic organisms were observed in the range between 77100 – 81876 /m^2 and macro benthic organisms were observed in the range between 67800 - 72782 /m^2.

At the location **Inner Approach Channel**, the observed texture was clay and sandy, Organic matter was observed in the range between 1.16 – 12.9 %, Total Phosphorus (as P) was observed in the range between 4.20 – 9.24 mg/kg. Aluminium (as Al) was observed in the range between 178 - 4685 mg/kg. Chromium (as Cr) was observed in the range 6.06 – 29.7 mg/kg. Copper (as Cu) was observed in the range between

0.111 – 0.789 mg/kg. Iron (as Fe) was observed in the range between 1080 - 2896 mg/kg. Lead (as Pb) was observed in the range between 0.221 – 2.86 mg/kg. Manganese (as Mn) was observed in the range between 3.96 – 12.8 mg/kg. Mercury (as Hg) was observed in the range between below detection limit to 0.504 mg/kg. Zinc (as Zn) was observed in the range between below detection limit to 2.89 mg/kg. Nickel (as Ni) was observed in the range between below detection limit to 1.82 mg/kg. Micro benthic organisms were observed in the range between 30485 – 34862 /m^2 and macro benthic organisms were observed in the range between 9100 – 12500 /m^2.

At the location **Kovalam Beach**, the observed texture was clay and sandy, Organic matter was observed in the range between 8.11 – 11.0 %, Total Phosphorus (as P) was observed in the range between 4.50 – 5.70 mg/kg. Aluminium (as Al) was observed in the range between 580 - 3544 mg/kg. Chromium (as Cr) was observed in the range 15.3 – 46.4 mg/kg. Copper (as Cu) was observed in the range between 0.083 – 1.19 mg/kg. Iron (as Fe) was observed in the range between 2131 - 3156 mg/kg. Lead (as Pb) was observed in the range between 1.23 – 8.15 mg/kg. Manganese (as Mn) was observed in the range between 4.03 – 27.8 mg/kg. Mercury (as Hg) was observed in the range between below detection limit to 0.079 mg/kg. Zinc (as Zn) was observed in the range between 0.760 to 3.31 mg/kg. Nickel (as Ni) was observed in the range between below detection limit to 1.84 mg/kg. Micro benthic organisms were observed in the range between 100100 – 119872 /m^2 and macro benthic organisms were observed in the range between 91300 – 104000 /m^2.

9. Marine Water Analysis for Phytoplankton and Zooplankton

Table 5.10: Total Phytoplankton and Zooplankton Results

Parameter	Month	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break water	Port Basin	Inner Approach Channel	Kovalam Beach
Total Phytoplankton No/100 mL	**Oct-17**	4631405	427132	1774665	140550	1116391	4610311
	Nov-17	4713950	436950	1798980	141410	1117320	4733089
	Dec-17	4845700	449100	1855910	150100	1152600	4856800
	Jan-18	4946700	460600	1883190	152200	1172400	4962500

Parameter	Month	Near Kovalam Beach	Proposed Dredge Material Disposal Site	South of Break water	Port Basin	Inner Approach Channel	Kovalam Beach
	Feb-18	4842300	446400	1835800	147200	1146100	4842100
	Mar-18	4739200	428600	1799300	145300	1117500	4742300
Total Zooplankton No/ 100 mL	**Oct-17**	9941	11527	9468	9598	10650	10044
	Nov-17	10451	11872	9792	9941	11115	10590
	Dec-17	10823	12211	10757	10382	12987	11236
	Jan-18	10297	12008	10444	10206	12275	10849
	Feb-18	10497	12238	10757	10419	13528	11371
	Mar-18	10172	11807	10432	10069	12613	11371

10. Graphical representation of Plankton analysis results for the period October 2017 to March 2018

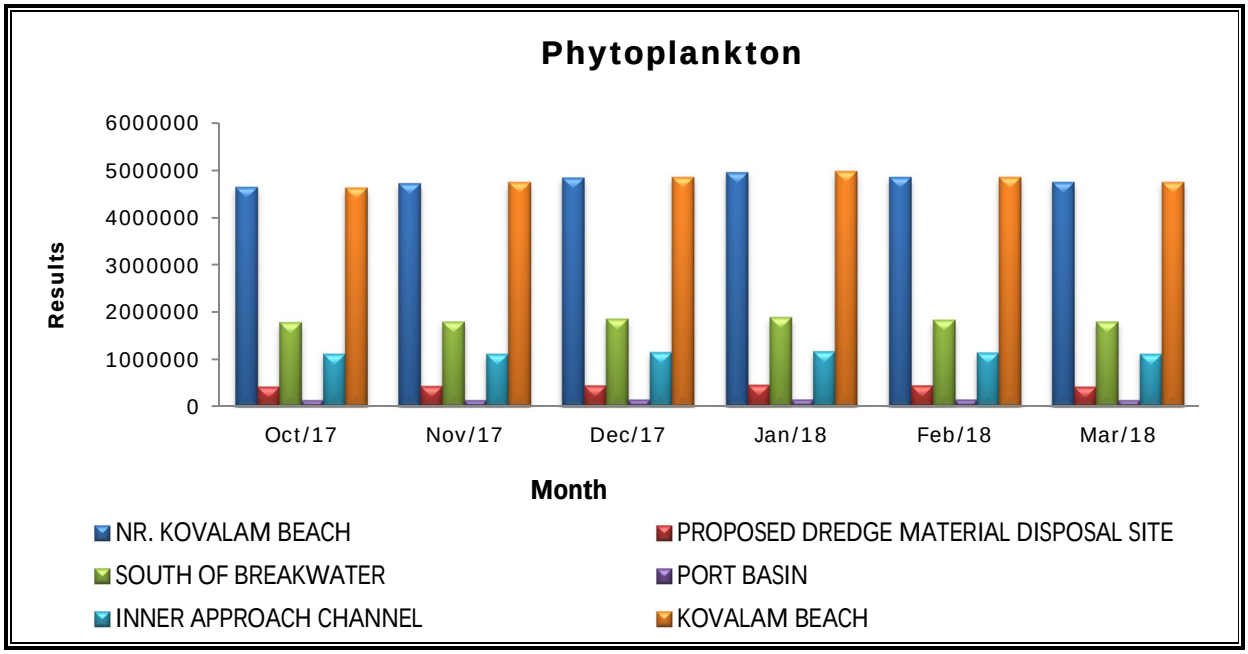


Figure 5.10: Marine Water Analysis for Total Phytoplankton

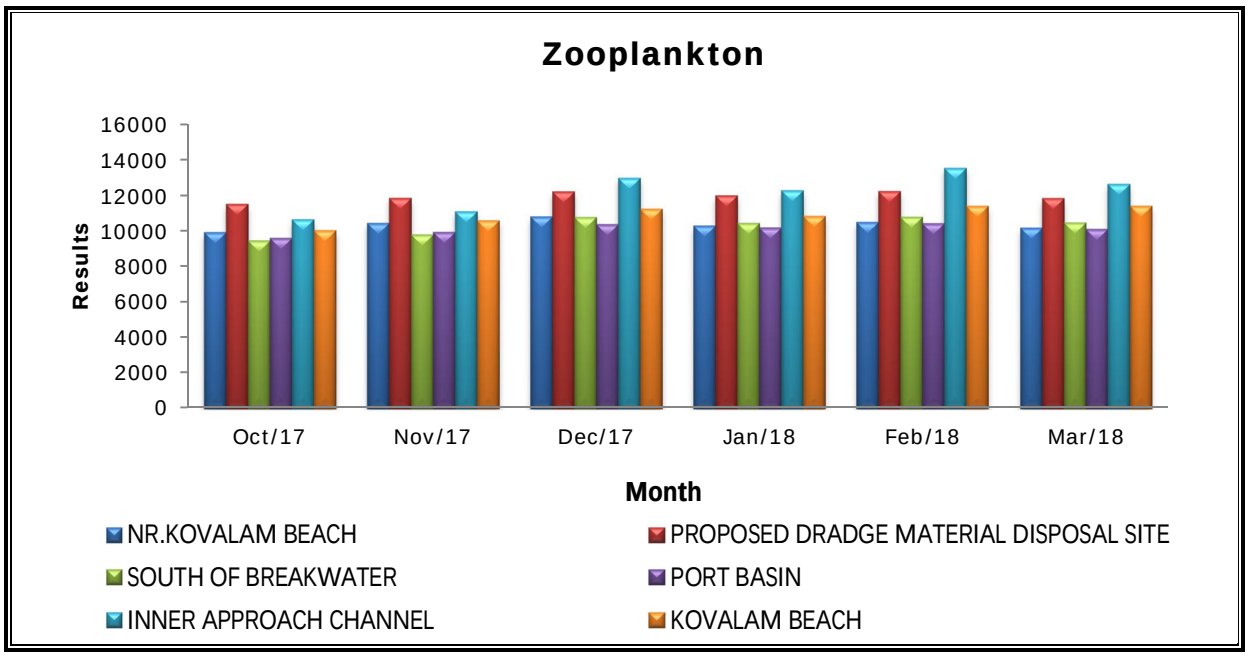


Figure 5.11: Marine Water Analysis for Total Zooplankton

11. Summary - Marine Water Analysis for Phytoplankton and Zooplanktons

During the period October 2017 to March 2018, at the location **Near Kovalam Beach**, Phytoplanktons were observed in the range between 4631405 - 4946700 No/100 mL and Zooplanktons were observed in the range between 9941 - 10823 No/100 mL.

At the location **Proposed Dredge Material Disposal site**, Phytoplanktons were observed in the range between 427132 - 460600 No/100 mL and Zooplanktons were observed in the range between 11527 - 12238 No/100 mL.

At the location **South of Break water**, Phytoplanktons were observed in the range between 1774665 - 1883190 No/100 mL and Zooplanktons were observed in the range between 9468 - 10757 No/100 mL.

At the location **Port Basin**, Phytoplanktons were observed in the range between 140550 - 152200 No/100 mL and Zooplanktons were observed in the range between 9598 - 10419 No/100 mL.

At the location **Inner Approach Channel**, Phytoplanktons were observed in the range between 1116391 - 1172400 No/100 mL and Zooplanktons was observed in the range between 10650 – 13528 No/100 mL.

At the location **Kovalam Beach**, Phytoplanktons were observed in the range between 4610311 - 4962500 No/100 mL and Zooplanktons was observed in the range between 10044 – 11371 No/100 mL.

CHAPTER 6

Water Analysis

1. Ground water and surface water sources details:

This chapter describes the sampling location, methodology adopted for analysis and analysis results of Ground water and Surface water during the period October 2017 to March 2018. Ground water sampling was carried out at three locations including Port Site, PAF Area and Proposed Port Estate Area and surface water sampling was carried out at Poovar West Canal, Vizhinjam Branch Canal and Vellayani Lake.

Table 6.1: Ground Water Location details

Sr. No.	Location	Latitude	Longitude
Ground Water			
1.	Port Site	8^0,22',06.03" N	77^0,00',17.03" E
2.	PAF Area	8^0,22',20.43" N	77^0,00',04.06" E
3.	Proposed Port Estate Area	8^0,22',24.64" N	77^0,01',46.27" E
Surface Water			
1.	Poovar West Canal	8^0,19',08.18" N	77^0,04',35.30" E
2.	Vizhinjam Branch Canal	8^0,22',49.55" N	76^0,59',35.01" E
3.	Vellayani Lake	8^0,25',30.71" N	76^0,59',37.70" E

Figure 6.1: Google earth views of Ground water and Surface water sources

2. Methodology of Sampling and Analysis:

Table 6.2: Ground Water and Surface Water methodology

Sr. No.	Parameter	Unit	Detection Limi	Method Reference
1.	Colour	Hazen Units	**1**	IS 3025(Part 4): 1983, Reaffirmed 2006
2.	Odour	-	**Qualitative**	IS 3025 (Part 5): 1983, Reaffirmed 2006
3.	pH Value	-	**1-14**	IS 3025(Part 11):1983, Reaffirmed 2006
4.	Turbidity	N.T.U.	**0.1**	IS 3025(Part 10):1984, Reaffirmed 2006
5.	Electrical Conductivity (at 25°C)	µmho/cm	**0.1**	IS 3025(Part 14): 1984 , Reaffirmed 2006
6.	Total Dissolved Solids	mg/L	**5**	IS 3025 (Part 16):1984, Reaffirmed 2006, Ed.2.1 (1999-12)
7.	Dissolved Oxygen	mg/L	**0.05**	IS 3025 (Part 38): 1989, Reaffirmed 2009
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	**1**	IS 3025 (Part 44): 1993, Reaffirmed 2009, Amds.1
9.	Oil & Grease	mg/L	**1**	APHA,22 nd Ed.,2012,5520-B, 5-40
10.	Aluminium (as Al)	mg/L	**0.025**	APHA, 22nd Ed., 2012, 3500-Al-B,3-61
11.	Ammonia (as NH_3- N)	mg/L	**0.1**	APHA, 22nd Ed., 2012 , 4500 NH3, B & C, 4 -110, 4-112,
12.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	**0.1**	APHA, 22nd Ed.,2012, 5540-B&C,5-51& 5-53,
13.	Barium (as Ba)	mg/L	**0.1**	IS 3025(Part 2): 2004
14.	Boron (as B)	mg/L	**0.1**	APHA, 22nd Ed., 2012, 4500-B - B,4-25
15.	Calcium (as Ca)	mg/L	**0.4**	IS 3025(Part 40): 1991, Reaffirmed 2009, Ed.2.1 (2004-02)
16.	Chloramines (as Cl_2)	mg/L	**0.05**	APHA, 22nd Ed., 2012, 4500-Cl-G, 4-69
17.	Chloride (as Cl)	mg/L	**0.25**	IS 3025 (Part 32):1988, Reaffirmed 2009
18.	Copper (as Cu)	mg/L	**0.02**	IS 3025(Part 2): 2004
19.	Fluoride (as F)	mg/L	**0.05**	APHA, 22nd Ed., 2012, 4500-F-, D, 4-87
20.	Iron (as Fe)	mg/L	**0.06**	IS 3025(Part 2): 2004
21.	Magnesium (as Mg)	mg/L	**0.02**	IS 3025(Part 46):1994, Reaffirmed 2009, Amds.2
22.	Manganese (as Mn)	mg/L	**0.02**	IS 3025(Part 2): 2004
23.	Mineral Oil	mg/L	**0.005**	Clause 6 of IS: 3025 (Part 39): 1991, Amds.2, Sept 2013
24.	Nitrate (as NO_3)	mg/L	**0.2**	APHA,22nd Ed.,2012,4500-NO3,B-4-122
25.	Phenolic Compounds (as C_6H_5OH)	mg/L	**0.001**	APHA, 22nd Ed.,2012, 5530- B & C, 5-47

Sr. No.	Parameter	Unit	Detection Limi	Method Reference
26.	Selenium (as Se)	mg/L	**0.005**	IS 3025(Part 2): 2004
27.	Silver (as Ag)	mg/L	**0.005**	IS 3025(Part 2): 2004
28.	Sulphate (as SO_4)	mg/L	**2**	IS 3025 (Part 24): 1986, Reaffirmed 2009
29.	Sulphide (as H_2S)	mg/L	**0.025**	IS 3025 (Part 29) 1986, Reaffirmed 2009
30.	Total Phosphate (as PO_4)	mg/L	**0.1**	APHA, 22 nd Ed. 2012 , 4500 P,E, 4-155
31.	Total Alkalinity (as $CaCO_3$)	mg/L	**0.5**	IS 3025(Part 23): 1986, Reaffirmed 2009, Amds. 1
32.	Total Hardness (as $CaCO_3$)	mg/L	**0.5**	IS 3025(Part 21): 1983, Reaffirmed 2006
33.	Calcium Hardness (as $CaCO_3$)	mg/L	**-**	IS 3025(Part 21): 1983, Reaffirmed 2006
34.	Zinc (as Zn)	mg/L	**0.05**	IS 3025(Part 2): 2004
35.	Sodium (as Na)	mg/L	**0.2**	IS 3025 (Part 45):1993, Reaffirmed 2009, Amds.1
36.	Potassium (as K)	mg/L	**0.06**	IS 3025(Part 45): 1993, Reaffirmed 2009, Amds.1
37.	Sodium Absorption Ratio	-	**-**	IS 11624:1986, Reaffirmed 2006
38.	Cadmium (as Cd)	mg/L	**0.002**	IS 3025(Part 2): 2004
39.	Cyanide (as CN)	mg/L	**0.001**	APHA,22nd Ed.,2012, 4500-CN, C & E, 4-41 & 4-44
40.	Lead (as Pb)	mg/L	**0.008**	IS 3025(Part 2): 2004
41.	Mercury (as Hg)	mg/L	**0.0008**	IS 3025(Part 2): 2004
42.	Molybdenum (as Mo)	mg/L	**0.002**	IS 3025(Part 2): 2004
43.	Nickel (as Ni)	mg/L	**0.01**	IS 3025(Part 2): 2004
44.	***Pesticide Residues***			
i.	Alachlor	µg/L	**0.01**	US EPA 525.2,1995
ii.	Atrazine	µg/L	**0.01**	US EPA 525.2,1995
iii.	Aldrin/Dieldrin	µg/L	**0.01**	US EPA 525.2,1995
iv.	Alpha HCH	µg/L	**0.01**	US EPA 525.2,1995
v.	Beta HCH	µg/L	**0.01**	US EPA 525.2,1995
vi.	Butachlor	µg/L	**0.01**	US EPA 525.2,1995
vii.	Chlorpyrifos	µg/L	**0.05**	US EPA 525.2,1995
viii.	Delta HCH	µg/L	**0.01**	US EPA 525.2,1995
ix.	2,4D chlorophenoxyacetic acid	µg/L	**0.07**	US EPA 515.1,1995
x.	DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	**0.01**	US EPA 525.2,1995
xi.	Endosulfan (, & Sulphate)	µg/L	**0.01**	US EPA 525.2,1995
xii.	Ethion	µg/L	**0.05**	US EPA 525.2,1995
xiii.	γ HCH (Lindane)	µg/L	**0.01**	US EPA 525.2,1995
xiv.	Isoproturon	µg/L	**0.07**	US EPA 532,2000
xv.	Malathion	µg/L	**0.05**	US EPA 525.2,1995
xvi.	Methyl Parathion	µg/L	**0.05**	US EPA 525.2,1995

Sr. No.	Parameter	Unit	Detection Limi	Method Reference
xvii.	Monocrotophos	µg/L	**0.05**	US EPA 525.2,1995
xviii.	Phorate	µg/L	**0.07**	US EPA 8141B ,Rev2,Feb2007
45.	Polychlorinated Biphenyls (PCB)	mg/L	**0.00007**	Annex M of IS 13428:2005 ,Amds.4
46.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	**0.00007**	APHA, 22nd Ed., 2012,6440, 6-94
47.	Total Arsenic (as As)	mg/L	**0.005**	IS 3025(Part 2): 2004
48.	Total Chromium (as Cr)	mg/L	**0.02**	IS 3025(Part 2): 2004
49.	**Trihalomethanes**			
a)	Bromoform	mg/L	**0.01**	USEPA 551.1, Rev1,1995 WI/SAP-GC/5/16,
b)	Dibromochloromethane	mg/L	**0.01**	USEPA 551.1, Rev1,1995 WI/SAP-GC/5/16,
c)	Bromodichloroethane	mg/L	**0.01**	USEPA 551.1, Rev1,1995 WI/SAP-GC/5/16
d)	Chloroform	mg/L	**0.01**	USEPA 551.1, Rev1,1995 WI/SAP-GC/5/16
50.	*E.coli*	MPN Index /100 ml	**1.8**	APHA, 22nd Ed., 2012, 9221-E, G, 9-76
51.	Total Coliforms	MPN Index /100 ml	**1.8**	APHA, 22nd Ed., 2012, 9221-B, 9-66
52.	Faecal Coliforms	MPN Index /100ml	**1.8**	APHA, 22nd Ed., 2012,9221-E,9-74

3. Ground Water Analysis Results for the period October 2017 to March 2018

Table 6.3 - Location: Port Site

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Organoleptic & Physical Parameters								
Colour	Hazen Units	*Max.* 5	1	1	1	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH Value	-	6.5 to 8.5	7.14	6.76	6.71	6.95	7.30	6.57
Turbidity	N.T.U.	*Max.* 1	BDL	1.30	0.200	1.30	BDL	1.00
Total Dissolved Solids	mg/L	*Max.* 500	302	354	440	220	250	272
General Parameters concerning substances undesirable in excessive amounts								
Aluminium (as Al)	mg/L	*Max.* 0.03	BDL	BDL	BDL	BDL	BDL	BDL
Ammonia (as NH_3- N)	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Barium (as Ba)	mg/L	*Max.* 0.7	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	*Max.* 0.5	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Calcium (as Ca)	mg/L	*Max.* 75	28.2	37.7	50.0	28.1	28.1	34.4
Chloramines (as Cl_2)	mg/L	*Max.* 4.0	BDL	BDL	BDL	BDL	BDL	BDL
Chloride (as Cl)	mg/L	*Max.*250	98.8	102	138	101	84.6	87
Copper (as Cu)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Fluoride (as F)	mg/L	*Max.* 1	0.420	BDL	0.300	0.640	0.300	BDL
Iron (as Fe)	mg/L	*Max.*0.3	0.151	0.125	0.140	0.210	BDL	0.26
Magnesium (as Mg)	mg/L	*Max.* 30	23.5	12.6	16.5	16.0	13.1	13.1
Manganese (as Mn)	mg/L	*Max.*0.1	0.034	0.067	0.083	BDL	0.028	0.065
Mineral Oil	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	*Max.*45	0.600	BDL	0.550	BDL	BDL	BDL
Phenolic Compounds (as C_6H_5OH)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	*Max.* 200	35.9	48.4	49.5	15.7	33.6	44.2
Sulphide (as H_2S)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	*Max.*200	81.7	95.0	112	88.4	80.8	92.0
Total Hardness (as $CaCO_3$)	mg/L	*Max.* 200	125	146	192	136	124	140
Zinc (as Zn)	mg/L	*Max.* 5	BDL	BDL	BDL	BDL	BDL	BDL
Parameters Concerning Toxic Substances								
Cadmium (as Cd)	mg/L	*Max.* 0.003	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Molybdenum (as Mo)	mg/L	*Max.* 0.07	BDL	BDL	BDL	BDL	BDL	BDL
Nickel (as Ni)	mg/L	*Max.*0.02	BDL	BDL	BDL	BDL	BDL	BDL
Pesticide Residues								
Alachlor	µg/L	20	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	125	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL
Delta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic acid	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL
DDT (o,p & p,p- Isomers	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
of DDT, DDE, DDD)								
Endosulfan (a,b & Sulphate)	µg/L	0.4	BDL	BDL	BDL	BDL	BDL	BDL
Ethion	µg/L	3	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	9	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	190	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	0.3	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL
Phorate	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Polychlorinated Biphenyls (PCB)	mg/L	*Max.* 0.0005	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	*Max.* 0.0001	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Trihalomethanes								
Bromoform	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloro Methane	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Bromodichloroethane	mg/L	*Max.* 0.06	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Bacteriological Analysis								
E.coli	MPN Index/ 100 mL	Not Detectable	<1.8	17	6	<1.8	<1.8	9.30
Total Coliforms	MPN Index/ 100 mL	-	350	47	58	14	13	140

Table 6.4 - Location: Proposed Port Estate Area

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Organoleptic & Physical Parameters								
Colour	Hazen Units	*Max.* 5	1	1	1	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH Value	-	6.5 to 8.5	6.65	6.56	6.86	6.68	6.71	6.82
Turbidity	N.T.U.	*Max.* 1	2.10	1.40	18.2	BDL	BDL	BDL
Total Dissolved Solids	mg/L	*Max.* 500	60.0	194	280	122	58.0	58.0
General Parameters concerning substances undesirable in excessive amounts								

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Aluminium (as Al)	mg/L	*Max.* 0.03	BDL	BDL	BDL	BDL	BDL	BDL
Ammonia (as NH_3- N)	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Barium (as Ba)	mg/L	*Max.* 0.7	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	*Max.* 0.5	BDL	BDL	BDL	BDL	BDL	BDL
Calcium (as Ca)	mg/L	*Max.* 75	3.53	14.4	28.0	12.8	4.00	4.01
Chloramines (as Cl_2)	mg/L	*Max.* 4.0	BDL	BDL	BDL	BDL	BDL	BDL
Chloride (as Cl)	mg/L	*Max.*250	19.6	58.2	54.4	49.9	19.0	16.6
Copper (as Cu)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Fluoride (as F)	mg/L	*Max.* 1	BDL	0.440	0.330	0.450	0.300	BDL
Iron (as Fe)	mg/L	*Max.*0.3	0.180	0.240	0.260	0.240	0.082	0.110
Magnesium (as Mg)	mg/L	*Max.* 30	2.14	3.40	10.2	7.29	3.40	4.86
Manganese (as Mn)	mg/L	*Max.*0.1	0.024	BDL	BDL	BDL	0.027	0.027
Mineral Oil	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	*Max.*45	3.96	6.80	33.5	11.4	2.50	0.980
Phenolic Compounds (as C_6H_5OH)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	*Max.* 200	16.5	37.0	46.8	10.4	10.2	9.35
Sulphide (as H_2S)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	*Max.*200	9.90	17.5	61.2	30.3	11.0	24.8
Total Hardness (as $CaCO_3$)	mg/L	*Max.* 200	17.6	64.0	112	62	24.0	30.0
Zinc (as Zn)	mg/L	*Max.* 5	BDL	BDL	BDL	BDL	BDL	BDL
Parameters Concerning Toxic Substances								
Cadmium (as Cd)	mg/L	*Max.* 0.003	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Molybdenum (as Mo)	mg/L	*Max.* 0.07	BDL	BDL	BDL	BDL	BDL	BDL
Nickel (as Ni)	mg/L	*Max.*0.02	BDL	BDL	BDL	BDL	BDL	BDL
Pesticide Residues								
Alachlor	µg/L	20	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	125	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Delta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic acid	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL
DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL
Endosulfan (a,b & Sulphate)	µg/L	0.4	BDL	BDL	BDL	BDL	BDL	BDL
Ethion	µg/L	3	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	9	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	190	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	0.3	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL
Phorate	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Polychlorinated Biphenyls (PCB)	mg/L	*Max.* 0.0005	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	*Max.* 0.0001	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Trihalomethanes								
Bromoform	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloro Methane	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Bromodichloroethane	mg/L	*Max.* 0.06	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Bacteriological Analysis								
E.coli	MPN Index/ 100 mL	Not Detectable	<1.8	<1.8	<1.8	<1.8	<1.8	6.80
Total Coliforms	MPN Index/ 100 mL	-	47	49	63	<1.8	20	79

Table 6.5 - Location: PAF Area

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Organoleptic & Physical Parameters								
Colour	Hazen Units	*Max.* 5	1	1	1	1	1	1
Odour	-	Agreeable	Agre	Agreea	Agree	Agree	Agreea	Agree

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
			eable	ble	able	able	ble	able
pH Value	-	6.5 to 8.5	6.41	6.53	6.61	6.82	6.77	6.71
Turbidity	N.T.U.	*Max.* 1	BDL	BDL	BDL	BDL	BDL	BDL
Total Dissolved Solids	mg/L	*Max.* 500	356	412	426	334	406	276
General Parameters concerning substances undesirable in excessive amounts								
Aluminium (as Al)	mg/L	*Max.* 0.03	BDL	BDL	BDL	BDL	BDL	BDL
Ammonia (as NH_3-N)	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Barium (as Ba)	mg/L	*Max.* 0.7	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	*Max.* 0.5	BDL	BDL	BDL	BDL	BDL	BDL
Calcium (as Ca)	mg/L	*Max.* 75	26.4	36.1	49.7	36.9	25.7	21.6
Chloramines (as Cl_2)	mg/L	*Max.* 4.0	BDL	BDL	BDL	BDL	BDL	BDL
Chloride (as Cl)	mg/L	*Max.*250	135	135	118	205	186	143
Copper (as Cu)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Fluoride (as F)	mg/L	*Max.* 1	BDL	0.100	0.26	0.32	0.300	BDL
Iron (as Fe)	mg/L	*Max.*0.3	BDL	BDL	BDL	0.13	BDL	0.080
Magnesium (as Mg)	mg/L	*Max.* 30	13.4	17.0	22.8	22.8	17.0	14.1
Manganese (as Mn)	mg/L	*Max.*0.1	0.029	BDL	0.020	BDL	0.041	0.060
Mineral Oil	mg/L	*Max.*0.5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	*Max.*45	6.20	5.66	5.93	5.46	4.25	6.06
Phenolic Compounds (as C_6H_5OH)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	*Max.* 200	93.4	88.2	93.3	8.84	68.1	50.4
Sulphide (as H_2S)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	*Max.*200	35.7	45.0	76.5	40.4	40.4	24.8
Total Hardness (as $CaCO_3$)	mg/L	*Max.* 200	121	160	218	186	134	112
Zinc (as Zn)	mg/L	*Max.* 5	BDL	BDL	BDL	BDL	BDL	BDL
Parameters Concerning Toxic Substances								
Cadmium (as Cd)	mg/L	*Max.* 0.003	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	*Max.*0.05	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	*Max.* 0.001	BDL	BDL	BDL	BDL	BDL	BDL
Molybdenum (as Mo)	mg/L	*Max.* 0.07	BDL	BDL	BDL	BDL	BDL	BDL
Nickel (as Ni)	mg/L	*Max.*0.02	BDL	BDL	BDL	BDL	BDL	BDL
Pesticide Residues								

Parameter	Unit	Acceptable Limit as per IS 10500: 2012	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Alachlor	µg/L	20	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	0.03	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	0.01	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	125	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL
Delta HCH	µg/L	0.04	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic acid	µg/L	30	BDL	BDL	BDL	BDL	BDL	BDL
DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL
Endosulfan (a,b & Sulphate)	µg/L	0.4	BDL	BDL	BDL	BDL	BDL	BDL
Ethion	µg/L	3	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	9	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	190	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	0.3	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	1	BDL	BDL	BDL	BDL	BDL	BDL
Phorate	µg/L	2	BDL	BDL	BDL	BDL	BDL	BDL
Polychlorinated Biphenyls (PCB)	mg/L	*Max.* 0.0005	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	*Max.* 0.0001	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	*Max.* 0.01	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	*Max.* 0.05	BDL	BDL	BDL	BDL	BDL	BDL
Trihalomethanes								
Bromoform	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloro Methane	mg/L	*Max.* 0.1	BDL	BDL	BDL	BDL	BDL	BDL
Bromodichloroethane	mg/L	*Max.* 0.06	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	mg/L	*Max.* 0.2	BDL	BDL	BDL	BDL	BDL	BDL
Bacteriological Analysis								
E.coli	MPN Index / 100mL	Not Detectable	<1.8	7.8	<1.8	<1.8	<1.8	<1.8
Total Coliforms	MPN Index /100 mL	-	24	17	70	<1.8	17	22

4. **Graphical representation of Ground water analysis results for the period October 2017 to March 2018**

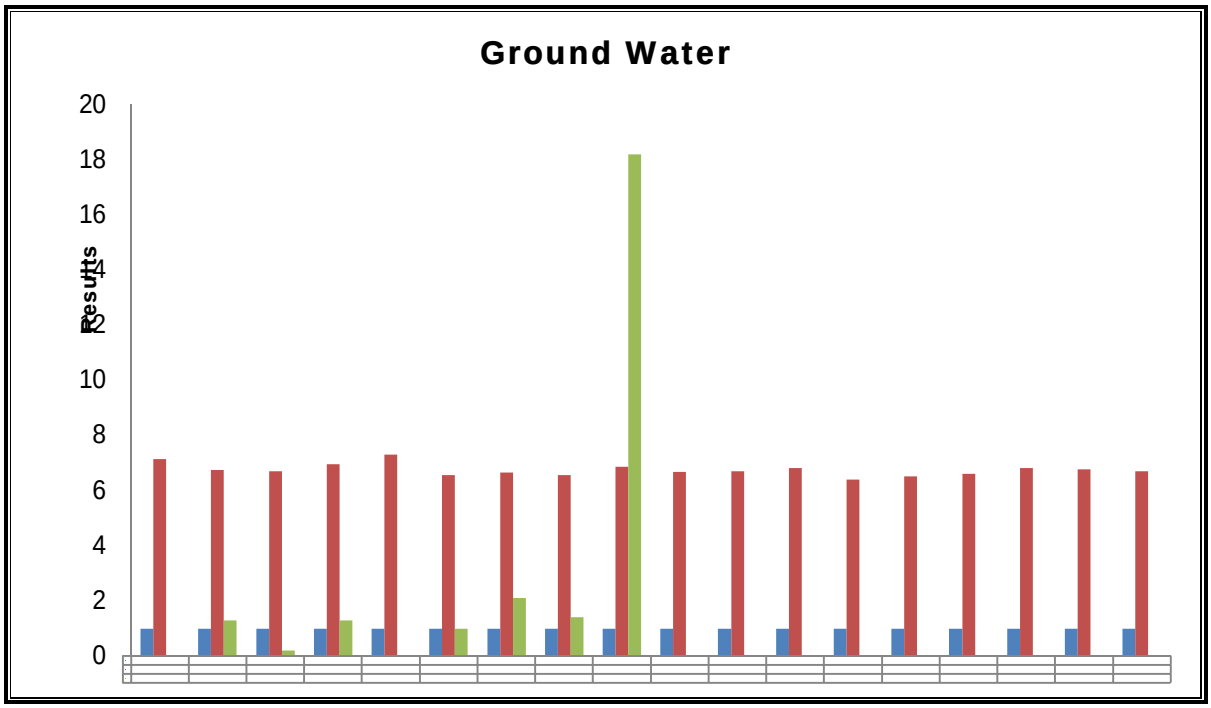


Figure 6.2: Ground Water Analysis for Colour, pH value and Turbidity

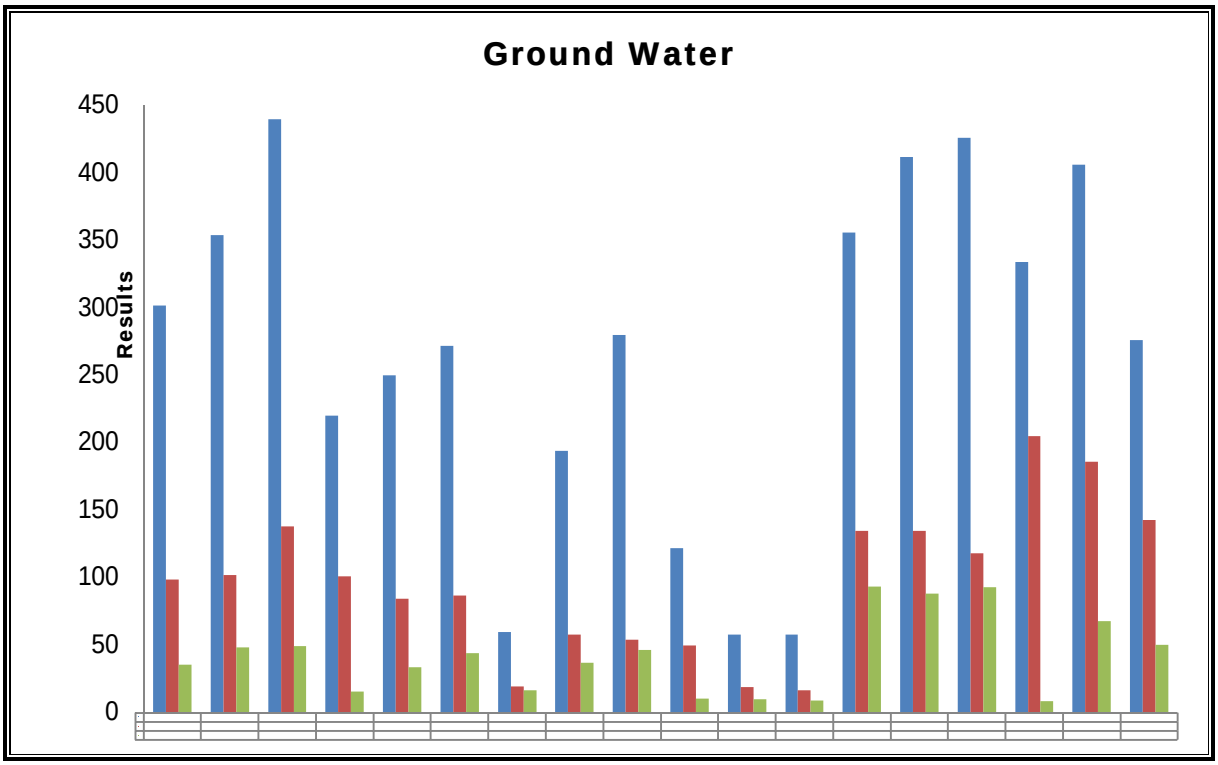


Figure 6.3: Ground Water Analysis for Total Dissolved Solids, Chloride and Sulphate

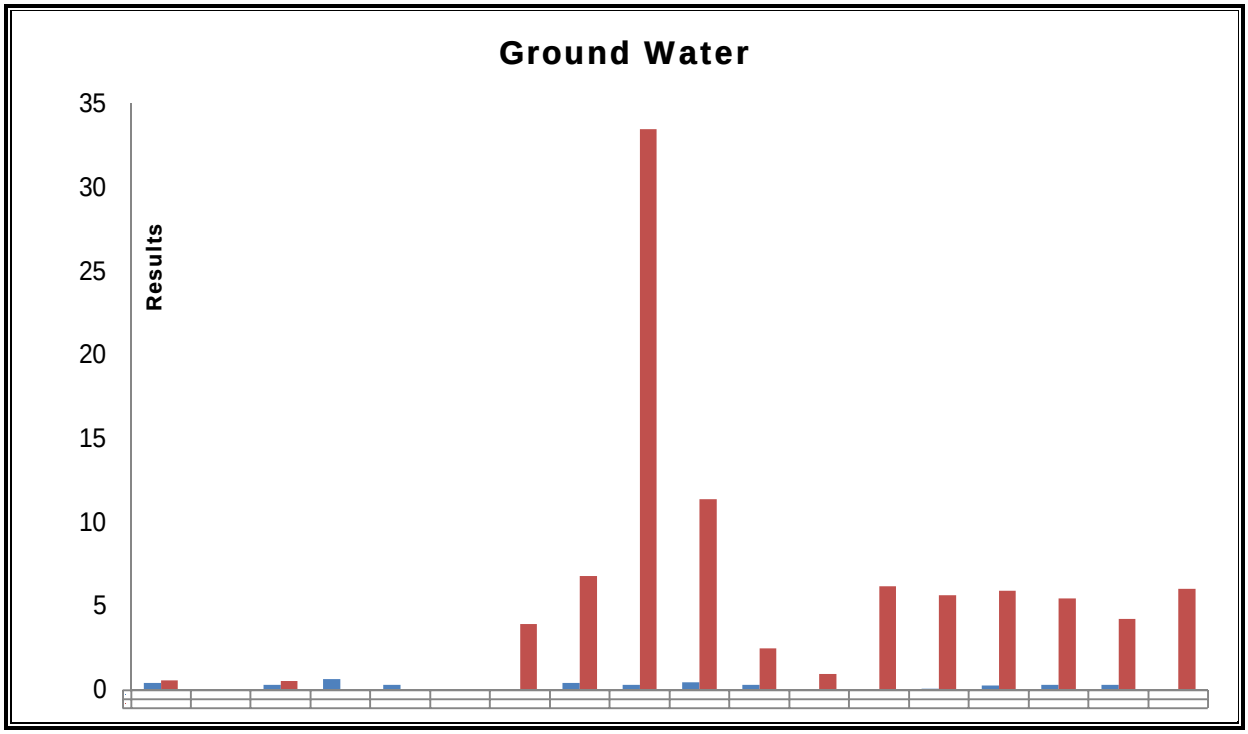


Figure 6.4: Ground Water Analysis for Fluoride and Nitrate

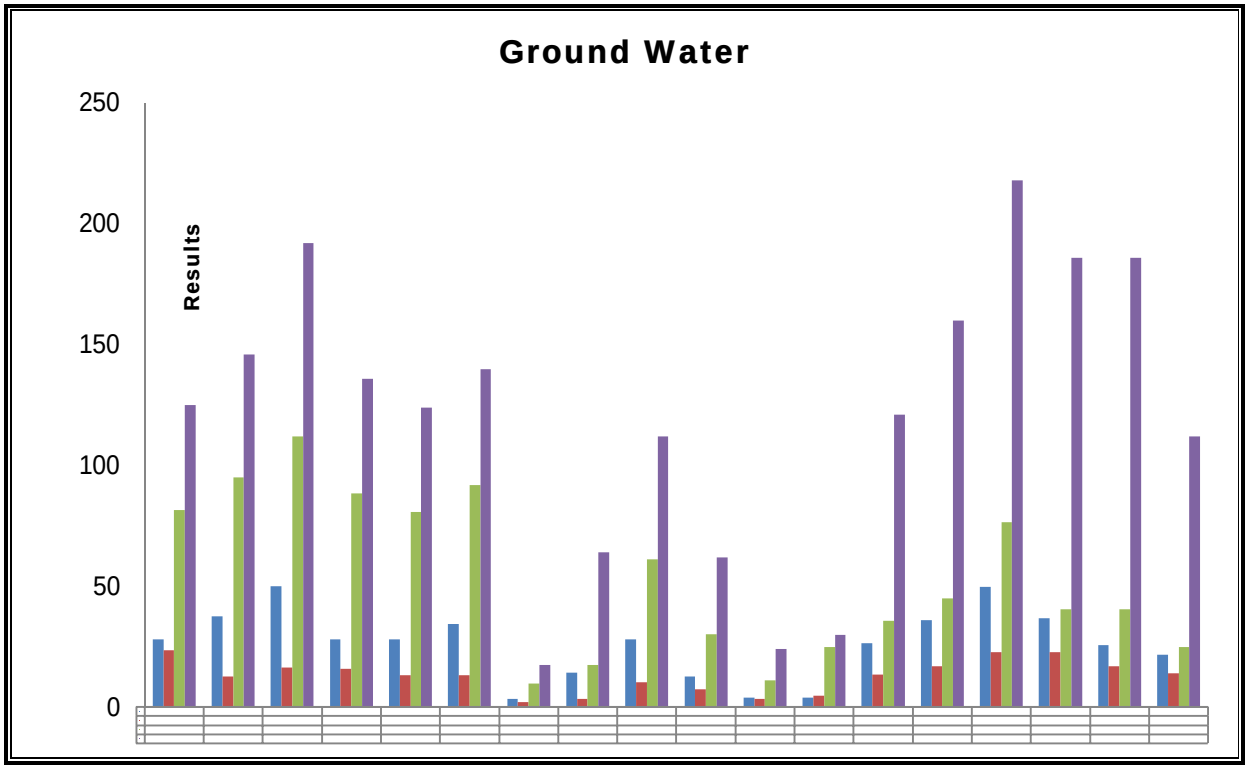


Figure 6.5: Ground Water Analysis for Calcium, Magnesium, Total Alkalinity and Total Hardness

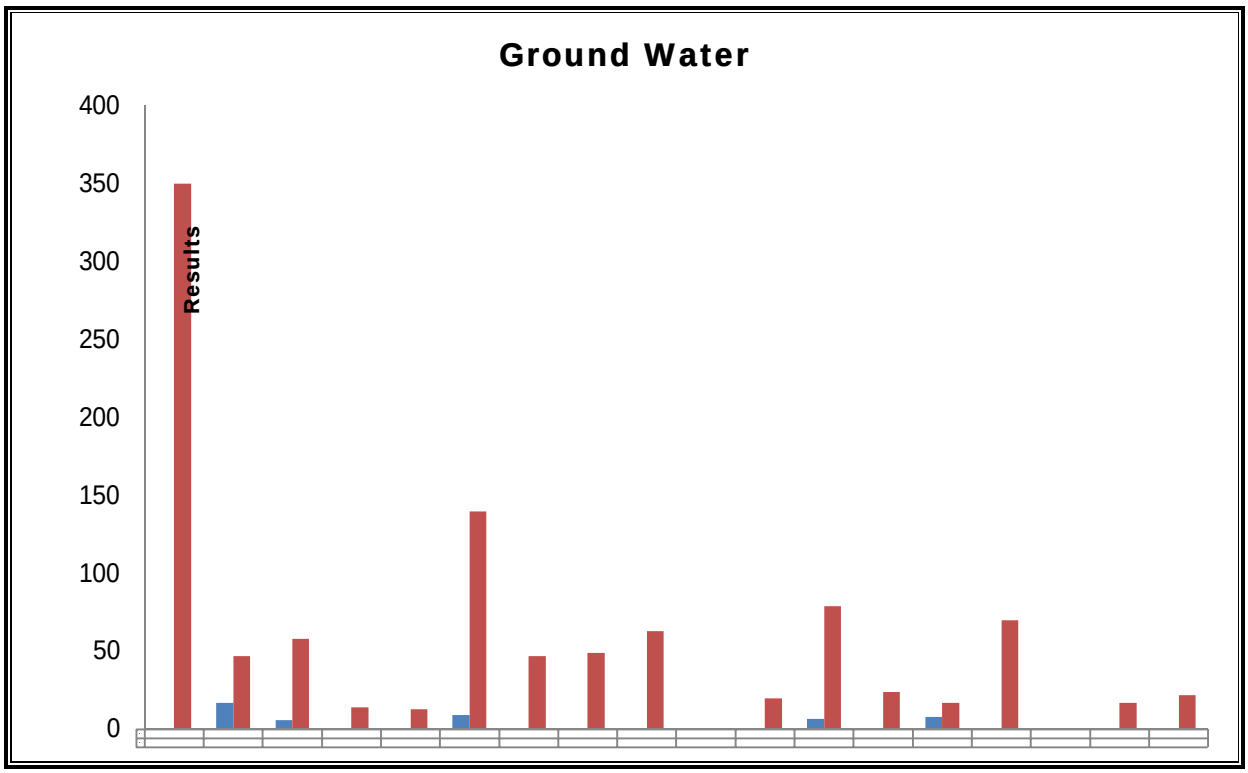


Figure 6.6: Ground Water Analysis for *E.Coli.* and Total Coliforms

5. Summary - Ground Water Analysis

During the period October 2017 to March 2018, at the location **Port Site** (Open Well), the Colour observed was 1 Hazen unit and the odour was agreeable. pH was observed in the range between 6.57 – 7.30. Turbidity was observed in the range between below detection limit to 1.30 NTU. Total Dissolved Solids was observed in the range between 220 - 440 mg/L. limit. Calcium (as Ca) was observed in the range between 28.1 – 50.0 mg/L. Chloride (as Cl) was observed in the range between 84.6 – 138 mg/L. Fluoride (as F) was observed in the range between below detection limit to 0.640 mg/L. Iron (as Fe) was observed in the range between below detection limit to 0.260 mg/L. Magnesium (as Mg) was observed in the range between 12.6 – 23.5 mg/L. Manganese (as Mn) was observed in the range between below detection limit to 0.083 mg/L. Nitrate (as NO_3) was observed in the range between below detection limit to 0.600 mg/L. Sulphate (as SO_4) was observed in the range between 15.7 – 49.5 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 80.8 - 112 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 124 - 192 mg/L. Aluminium (as Al), Ammonia (as NH_3- N), Anionic Detergents, Barium (as Ba), Boron, Chloramines (as Cl_2), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se),

Silver (as Ag), Sulphide (as H_2S), Zinc (as Zn), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detection limit. Bacteriological parameters such as *E.coli* was observed in the range between <1.8 - 17 MPN Index/100 mL and Total Coliforms were observed in the range between 13 - .50 MPN Index/100 mL.

At the location **Proposed Port Estate Area** (Open Well), the Colour observed was 1 Hazen unit and the odour was agreeable. pH was observed in the range between 6.56 – 6.86. Turbidity was observed in the range between 1.40 – 18.2 NTU. Total Dissolved Solids was observed in the range between 58.0 - 280 mg/L. Calcium (as Ca) was observed in the range between 3.53 – 28.0 mg/L. Chloride (as Cl) was observed in the range between 16.6 – 58.2 mg/L. Fluoride (as F) was observed in the range between below detection limit to 0.450 mg/L. Iron (as Fe) was observed in the range between 0.082 – 0.260 mg/L. Magnesium (as Mg) was observed in the range between 2.14 – 10.2 mg/L. Manganese (as Mn) was observed in the range between below detection limit to 0.027 mg/L. Nitrate (as NO_3) was observed in the range between 0.980 – 33.5 mg/L. Sulphate (as SO_4) was observed in the range between 9.35 – 46.8 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 9.90 – 61.2 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 17.6 - 112 mg/L. Aluminium (as Al), Ammonia (as NH_3- N), Anionic Detergents, Barium (as Ba), Boron, Chloramines (as Cl_2), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C_6H_5OH), Selenium (as Se) and Silver (as Ag), Sulphide (as H_2S) Zinc (as Zn), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB) and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detection limit. Bacteriological parameters such as *E.coli* was observed in the range between <1.8 to 6.80 MPN Index/100 mL and Total Coliforms were observed in the range between <1.8 to 79 MPN Index/100 mL.

At the location **PAF Area** (Open Well), the Colour observed was 1 Hazen unit and the odour was agreeable. pH was observed in the range between 6.41 – 6.82. Turbidity was

observed in the range between below detection limit. Total Dissolved Solids was observed in the range between 276 - 426 mg/L. Calcium (as Ca) was observed in the range between 21.6 – 49.7 mg/L. Chloride (as Cl) was observed in the range between 118 - 205 mg/L. Fluoride (as F) was observed in the range between below detection limit to 0.320 mg/L. Iron (as Fe) was observed in the range between 0.080 – 0.130 mg/L. Magnesium (as Mg) was observed in the range between 13.4 – 22.8 mg/L. Manganese (as Mn) was observed in the range between below the detection limit to 0.060. Nitrate (as NO_3) was observed in the range between 4.25 – 6.20 mg/L. Sulphate (as SO_4) was observed in the range between 8.84 – 93.4 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 24.8 - 76.5 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 112 – 218 mg/L. Aluminium, Ammonia (as NH_3- N), Anionic Detergents and Barium (as Ba), Boron (as B), Chloramines (as Cl_2), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se) and Silver (as Ag), Sulphide (as H_2S), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Molybdenum (as Mo), Nickel (as Ni), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues, Trihalomethanes, Polychlorinated Biphenyls (PCB), Polynuclear Aromatic Hydrocarbons (PAH) and Zinc (as Zn) were observed below detection limit. Bacteriological parameters such as *E.coli* was observed in the range between <1.8 to 7.8 MPN Index/100 mL and Total Coliforms were observed in the range between <1.8 to 70 MPN Index/100 mL.

6. Surface Water Analysis Results for the period October 2017 to March 2018

Table 6.6 - Location: Poovar West Canal

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Physical Parameters							
Colour	Hazen Units	1	1	1	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH Value	-	6.95	7.01	6.77	6.74	6.62	6.80
Turbidity	N.T.U.	5.60	5.10	0.600	BDL	BDL	BDL
Electrical Conductivity (at 25°C)	µmho/cm	575	310	137	1580	150	1690
Total Dissolved Solids	mg/L	322	128	76	888	84	976
Chemical Parameters							
Dissolved Oxygen	mg/L	6.20	6.00	6.00	6.20	5.80	5.80
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	3.30	3.90	4.40	3.20	3.20	8.00
Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Free Ammonia	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Barium (as Ba)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Calcium (as Ca)	mg/L	15.0	18.9	6.41	63.6	7.21	20.0
Chloride (as Cl)	mg/L	174	61.0	28.7	28.7	33.2	664
Copper (as Cu)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Fluoride (as F)	mg/L	BDL	BDL	0.46	1.62	0.400	0.100
Iron (as Fe)	mg/L	0.201	0.520	0.280	0.180	BDL	BDL
Magnesium (as Mg)	mg/L	8.02	6.70	4.37	23.3	12.9	48.1
Manganese (as Mn)	mg/L	BDL	BDL	0.020	BDL	BDL	BDL
Mineral Oil	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	4.38	6.99	4.04	1.58	0.210	0.340
Phenolic Compounds (as C_6H_5OH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	40.0	21.5	4.21	48.2	4.64	92.3
Total Phosphate (as PO_4)	mg/L	0.180	0.110	BDL	BDL	0.26	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	17.3	12.5	20.4	15.2	20.2	22
Total Hardness (as $CaCO_3$)	mg/L	70.4	61.0	34.0	196	30.0	248
Calcium Hardness (as $CaCO_3$)	mg/L	37.4	32.0	16.0	100	18.0	50
Zinc (as Zn)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (as Na)	mg/L	17.3	6.10	2.60	14.5	1.10	31.8
Potassium (as K)	mg/L	7.40	2.86	1.00	1.10	4.20	16.7
Sodium Absorption Ratio	-	0.900	0.260	BDL	0.640	0.047	0.87
Cadmium (as Cd)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Pesticide Residues							
Alachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Delta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic	µg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
acid							
DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Endosulfan (a,b & Sulphate)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Ethion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Phorate	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Biological Analysis							
Total Coliforms	MPN Index/100 mL	220	38	41	13	<1.8	13
Faecal Coliforms	MPN Index/100 mL	180	14	21	<1.8	<1.8	<1.8

Table 6.7 - Location: Vizhinjam Branch Canal

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Physical Parameters							
Colour	Hazen Units	1	1	1	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH Value	-	7.12	7.41	7.00	7.00	6.96	6.97
Turbidity	N.T.U.	5.80	3.70	0.400	BDL	BDL	BDL
Electrical Conductivity (at 25°C)	µmho/cm	292	306	205	205	201	410
Total Dissolved Solids	mg/L	164	172	114	154	112	230
Chemical Parameters							
Dissolved Oxygen	mg/L	5.60	5.40	6.20	5.80	5.90	6.00
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	5.00	5.80	2.60	6.00	2.90	3.20
Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Free Ammonia	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Barium (as Ba)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Calcium (as Ca)	mg/L	14.1	16.8	15.2	12.8	9.62	32.0
Chloride (as Cl)	mg/L	55.3	50.4	42.3	55.0	26.4	117
Copper (as Cu)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Fluoride (as F)	mg/L	BDL	BDL	0.350	0.940	0.200	BDL
Iron (as Fe)	mg/L	0.210	0.250	0.270	0.180	BDL	0.220
Magnesium (as Mg)	mg/L	7.00	5.83	5.35	6.80	14.6	9.72
Manganese (as Mn)	mg/L	BDL	BDL	BDL	BDL	BDL	0.020
Mineral Oil	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	7.88	6.22	8.27	2.99	1.24	BDL
Phenolic Compounds (as C_6H_5OH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	26.4	22.2	9.52	8.84	34.9	6.65
Total Phosphate (as PO_4)	mg/L	0.170	0.100	BDL	BDL	3.39	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	49.5	45.0	40.8	40.4	12.6	89.1
Total Hardness (as $CaCO_3$)	mg/L	64.0	66.0	60.0	32.0	84.0	120
Calcium Hardness (as $CaCO_3$)	mg/L	35.2	42.0	38.0	60.0	24.0	80.0
Zinc (as Zn)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (as Na)	mg/L	4.90	6.20	3.90	2.70	3.80	3.50
Potassium (as K)	mg/L	11.2	1.20	1.10	4.20	6.60	5.40
Sodium Absorption Ratio	-	0.530	0.470	0.310	BDL	0.140	BDL
Cadmium (as Cd)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Pesticide Residues							
Alachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Delta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic acid	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Endosulfan (a,b & Sulphate)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Ethion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Phorate	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Biological Analysis							
Total Coliforms	MPN Index/100 mL	49	32	63	<1.8	22	17
Faecal Coliforms	MPN Index/100 mL	79	11	31	<1.8	<1.8	<1.8

Table 6.8 - Location: Vellayani Lake

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Physical Parameters							
Colour	Hazen Units	1	1	1	1	1	1
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
pH Value	-	7.01	7.11	6.87	6.75	7.19	6.69
Turbidity	N.T.U.	BDL	2.60	0.300	BDL	BDL	0.500
Electrical Conductivity (at 25°C)	µmho/cm	257	179	144	175	306	134
Total Dissolved Solids	mg/L	144	98.0	80.0	98.0	172	78
Chemical Parameters							
Dissolved Oxygen	mg/L	5.80	5.80	5.70	6.00	5.80	5.20
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	6.10	4.80	6.60	4.70	3.20	4.80
Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Free Ammonia	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Barium (as Ba)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Boron (as B)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Calcium (as Ca)	mg/L	7.05	10.4	10.4	7.21	17.6	6.41
Chloride (as Cl)	mg/L	50.4	34.2	30.1	36.0	78.7	32.0
Copper (as Cu)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Fluoride (as F)	mg/L	0.520	0.510	0.310	0.740	0.200	BDL
Iron (as Fe)	mg/L	BDL	0.258	0.230	0.220	BDL	0.140
Magnesium (as Mg)	mg/L	5.35	3.40	5.83	4.86	8.75	4.86
Manganese (as Mn)	mg/L	BDL	0.051	0.025	0.025	BDL	BDL
Mineral Oil	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate (as NO_3)	mg/L	2.17	1.91	3.21	1.18	0.520	0.500
Phenolic Compounds (as C_6H_5OH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Selenium (as Se)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Silver (as Ag)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate (as SO_4)	mg/L	13.7	13.2	BDL	14.9	10.2	4.60
Total Phosphate (as PO_4)	mg/L	0.170	BDL	BDL	BDL	4.23	BDL
Total Alkalinity (as $CaCO_3$)	mg/L	34.6	35.7	33.2	35.4	68.2	27.2
Total Hardness (as $CaCO_3$)	mg/L	39.6	40.0	50.0	38.0	80.0	36
Calcium Hardness (as $CaCO_3$)	mg/L	17.6	26.0	26.0	18.0	44.0	16
Zinc (as Zn)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Sodium (as Na)	mg/L	6.80	5.20	2.30	2.60	2.20	1.3
Potassium (as K)	mg/L	10.6	1.50	1.00	2.00	4.40	4.1
Sodium Absorption Ratio	-	0.660	0.510	BDL	BDL	0.100	BDL
Cadmium (as Cd)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Cyanide (as CN)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Lead (as Pb)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (as Hg)	mg/L	BDL	BDL		BDL	BDL	BDL
Pesticide Residues							
Alachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Aldrin/Dieldrin	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Alpha HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Beta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Butachlor	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Chlorpyrifos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Delta HCH	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
2,4D chlorophenoxyacetic acid	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Endosulfan (a,b & Sulphate)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Ethion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
γ HCH (Lindane)	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Isoproturon	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Malathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Methyl Parathion	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Monocrotophos	µg/L	BDL	BDL	BDL	BDL	BDL	BDL

Parameter	Unit	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
Phorate	µg/L	BDL	BDL	BDL	BDL	BDL	BDL
Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Arsenic (as As)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Total Chromium (as Cr)	mg/L	BDL	BDL	BDL	BDL	BDL	BDL
Biological Analysis							
Total Coliforms	MPN Index/100 mL	7.8	14	26	<1.8	13	9.3
Faecal Coliforms	MPN Index/100 mL	22	6.0	8.3	<1.8	<1.8	<1.8

7. Graphical representation of Surface water analysis results for the period October 2017 to March 2018

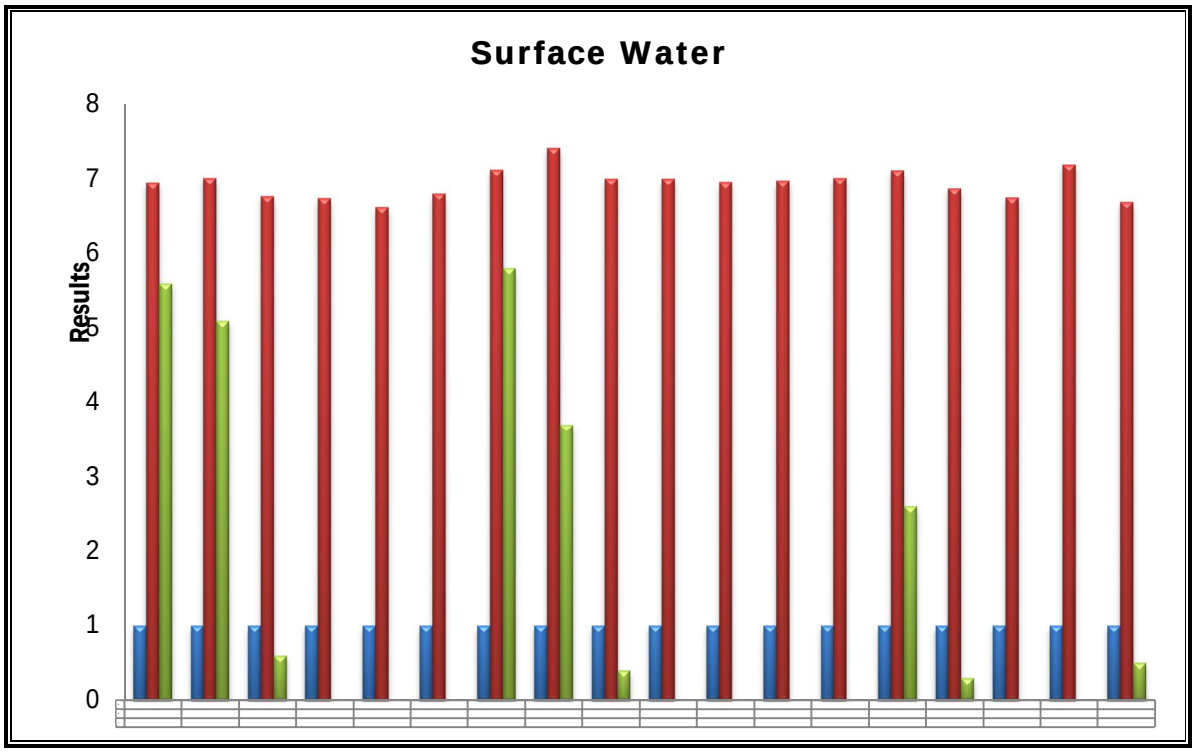


Figure 6.7: Surface Water Analysis for Colour, pH value and Turbidity

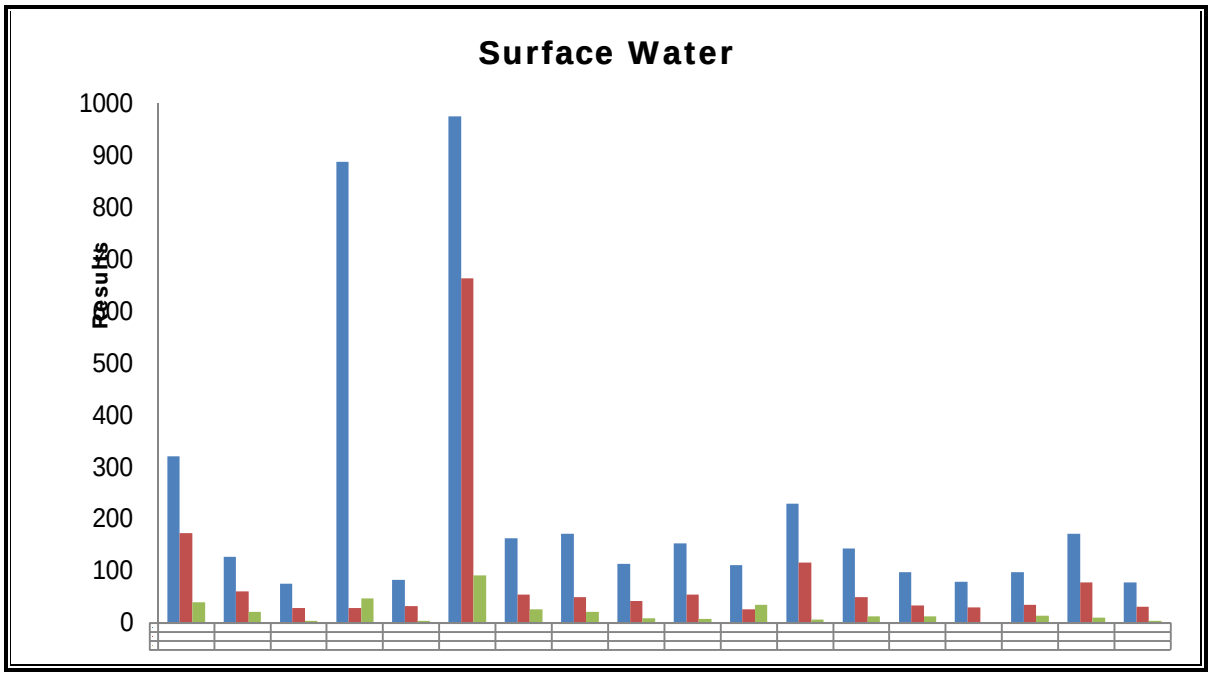


Figure 6.8: Surface Water Analysis for Total Dissolved Solids, Chloride and Sulphate

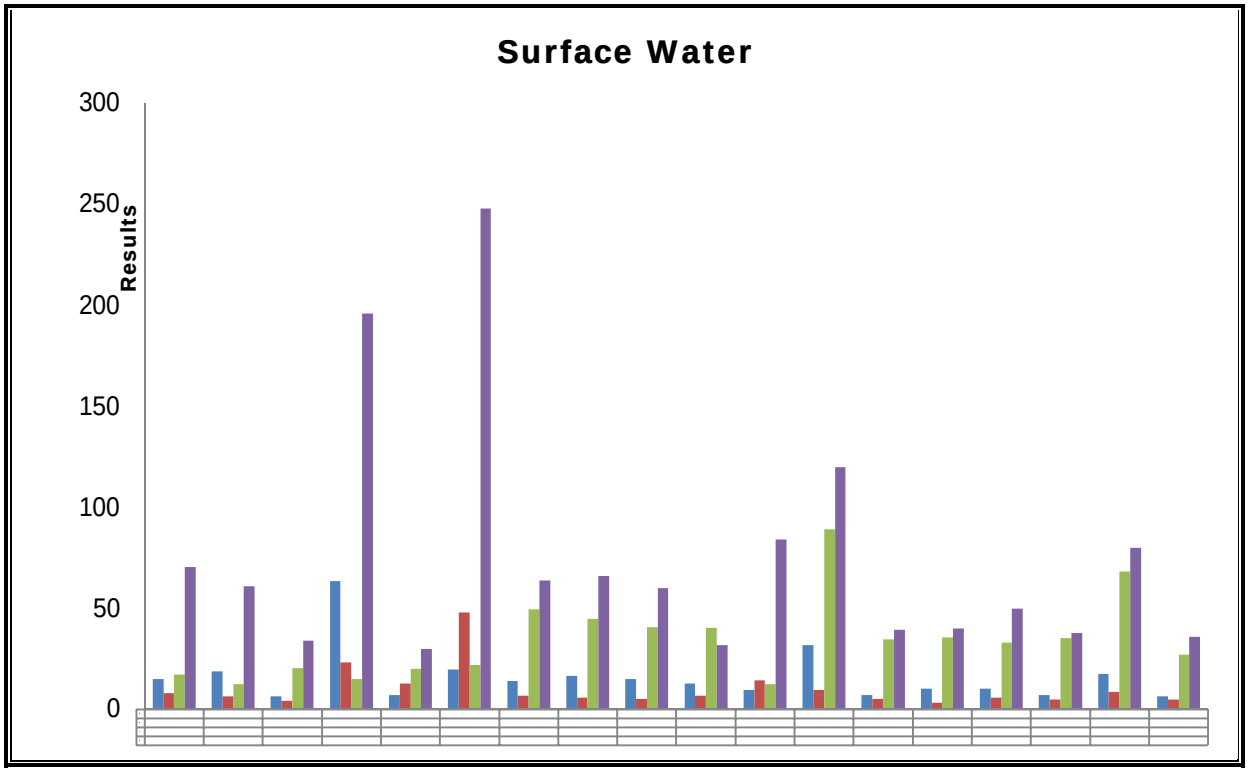


Figure 6.9: Surface Water Analysis for Calcium, Magnesium, Total Alkalinity and Total Hardness

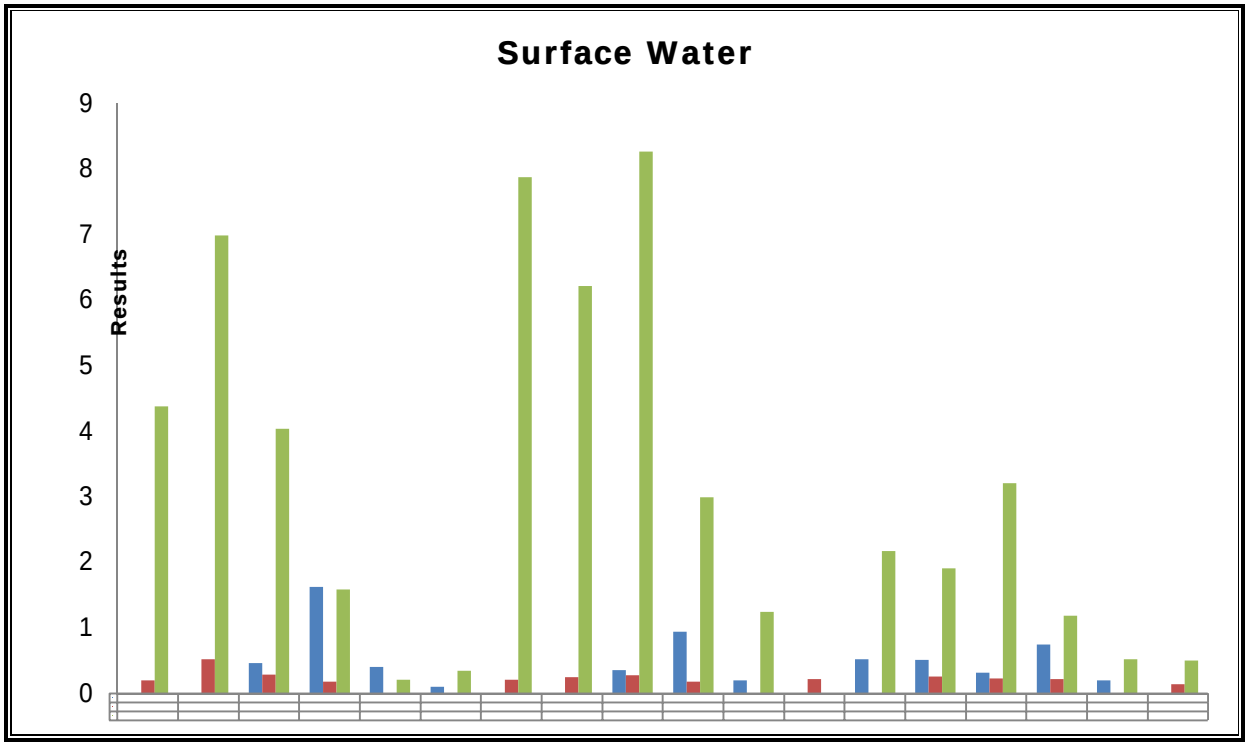


Figure 6.10: Surface Water Analysis for Fluoride, Iron and Nitrate

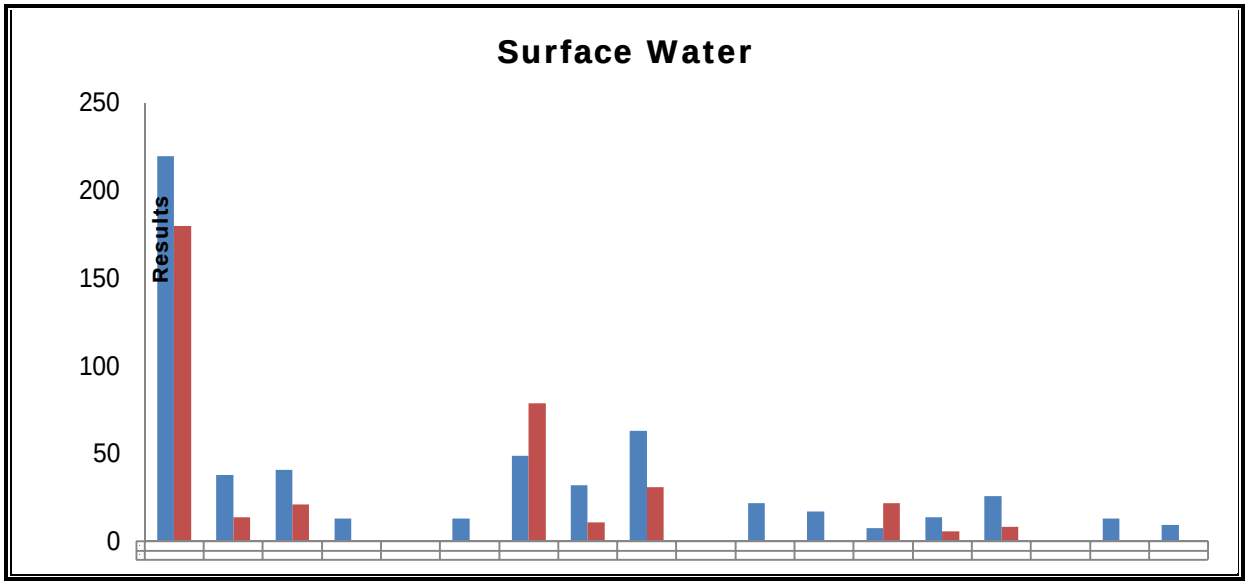


Figure 6.11: Surface Water Analysis for *E.coli.* and Total Coliforms

8. Summary - Surface water Analysis

During the period October 2017 to March 2018, at the location **Poovar West Canal**, Colour was observed 1 Hazen unit and odour was agreeable. pH was observed in the range between 6.62 – 7.01. Turbidity was observed in the range between below the

detection limit to 5.60 NTU. Total Dissolved Solids was observed in the range between 76 - 976 mg/L. Electrical Conductivity was observed in the range between 137 - 1690 µmho/cm. Dissolved Oxygen was observed in the range between 5.80 – 6.20 mg/L. Biochemical Oxygen Demand (3 days, 27^{o}C) was observed in the range between 3.20 – 8.00 mg/L. Calcium (as Ca) was observed in the range between 6.41 – 63.6 mg/L. Chloride (as Cl) was observed in the range between 28.7 - 664 mg/L. Fluoride (as F) was observed in the range between below the detection limit to 1.62 mg/L. Iron (as Fe) was observed in the range between below the detection limit to 0.520 mg/L. Magnesium (as Mg) was observed in the range between 4.37 – 48.1 mg/L. Manganese (as Mn) was observed in the range between below the detection limit to 0.020 mg/L. Nitrate (as NO_3) was observed in the range between 0.210 – 6.99 mg/L. Sulphate (as SO_4) was observed in the range between 4.21 – 92.3 mg/L. Total Phosphate (as PO_4) was observed in the range between below the detection limit to 0.260 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 12.5 – 22.0 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 30.0 – 248 mg/L. Calcium Hardness (as $CaCO_3$) was observed in the range between 16.0 – 100 mg/L. Sodium (as Na) was observed in the range between 1.10 – 31.8 mg/L. Potassium (as K) was observed in the range between 1.00 – 16.7 mg/L. Sodium Absorption Ratio was observed in the range between 0.047 – 0.900. Oil & Grease, Free Ammonia, Anionic Detergents and Barium (as Ba), Boron (as B), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se) and Silver (as Ag), Zinc (as Zn), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detection limit. Bacteriological parameters such as Total Coliforms were observed in the range between <1.8 to 220 MPN Index/100 mL and Faecal Coliforms were observed in the range between <1.8 to 180 MPN Index/100 mL.

At the location **Vizhinjam Branch Canal**, Colour was observed 1 Hazen unit and odour was agreeable. pH was observed in the range between 6.96 – 7.41. Turbidity was observed in the range between below detection limit to 5.80 NTU. Total Dissolved Solids was observed in the range between 112 - 230 mg/L. Electrical Conductivity was observed in the range between 201 – 410 µmho/cm. Dissolved

Oxygen was observed in the range between 5.40 – 6.20 mg/L. Biochemical Oxygen Demand (3 days, 27°C) was observed in the range between 2.60 – 6.00 mg/L. Calcium (as Ca) was observed in the range between 9.62 – 32.0 mg/L. Chloride (as Cl) was observed in the range between 26.4 - 117 mg/L. Fluoride (as F) was observed in the range between below detection level to 0.940 mg/L. Iron (as Fe) was observed in the range between below detection level to 0.270 mg/L. Magnesium (as Mg) was observed in the range between 5.35 – 14.6 mg/L. Manganese (as Mn) was observed in the range between below detection level to 0.020 mg/L. Nitrate (as NO_3) was observed in the range between below detection level to 8.27 mg/L. Sulphate (as SO_4) was observed in the range between 6.65 – 34.9 mg/L. Total Phosphate (as PO_4) was observed in the range between below the detection limit to 3.39 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 12.6 – 89.1 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 32.0 - 120 mg/L. Calcium Hardness (as $CaCO_3$) was observed in the range between 24.0 – 80.0 mg/L. Sodium (as Na) was observed in the range between 2.70 – 6.20 mg/L. Potassium (as K) was observed in the range between 1.10 – 11.2 mg/L. Sodium Absorption Ratio was observed in the range between 0.140 – 0.530. Oil & Grease, Free Ammonia, Anionic Detergents and Barium (as Ba), Boron (as B), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se) and Silver (as Ag), Zinc (as Zn), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detection limit. Bacteriological parameters such as Total Coliforms were observed in the range between <1.8 to 63 MPN Index/100 mL and Faecal Coliforms were observed in the range between <1.8 to 79 MPN Index/100 mL.

At the location **Vellayani Lake**, Colour was observed 1 Hazen unit and odour was agreeable. pH was observed in the range between 6.69 – 7.19. Turbidity was observed in the range between below detection limit to 2.60 NTU. Total Dissolved Solids was observed in the range between 78.0 - 172 mg/L. Electrical Conductivity was observed in the range between 134 - 306 µmho/cm. Dissolved Oxygen was observed in the range between 5.20 – 6.00 mg/L. Biochemical Oxygen Demand (3 days, 27°C) was observed in the range between 3.20 – 6.60 mg/L. Calcium (as Ca)

was observed in the range between 6.41 – 17.6 mg/L. Chloride (as Cl) was observed in the range between 30.1 – 78.7 mg/L. Fluoride (as F) was observed in the range between below detection level to 0.740 mg/L. Iron (as Fe) was observed in the range between below detection level to 0.258 mg/L. Magnesium (as Mg) was observed in the range between 3.40 – 8.75 mg/L. Manganese (as Mn) was observed in the range between below detection level to 0.051 mg/L. Nitrate (as NO_3) was observed in the range between 0.500 – 3.21 mg/L. Sulphate (as SO_4) was observed in the range between below detection level to 14.9 mg/L. Total Phosphate (as PO_4) was observed in the range between below the detection limit to 4.23 mg/L. Total Alkalinity (as $CaCO_3$) was observed in the range between 27.2 – 68.2 mg/L. Total Hardness (as $CaCO_3$) was observed in the range between 36.0 – 80.0 mg/L. Calcium Hardness (as $CaCO_3$) was observed in the range between 16.0 – 44.0 mg/L. Sodium (as Na) was observed in the range between 1.30 – 6.80 mg/L. Potassium (as K) was observed in the range between 1.00 – 10.6 mg/L. Sodium Absorption Ratio was observed in the range between below the detection limit to 0.660. Oil & Grease, Free Ammonia, Anionic Detergents and Barium (as Ba), Boron (as B), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C_6H_5OH), Selenium (as Se) and Silver (as Ag), Zinc (as Zn), Cadmium (as Cd), Cyanide (as CN), Lead (as Pb), Mercury (as Hg), Total Arsenic (as As), Total Chromium (as Cr), Pesticide Residues and Polynuclear Aromatic Hydrocarbons (PAH) were observed below detection limit. Bacteriological parameters such as Total Coliforms were observed in the range between <1.8 to 26 MPN Index/100 mL and Faecal Coliforms were observed in the range between <1.8 to 22 MPN Index/100 mL.

CHAPTER 7

Soil Analysis

1. Soil sources details

This chapter describes the sampling location, methodology adopted for analysis and analysis results of soil for the year 2018. Soil samples were collected from four locations, such as: Port Site, Proposed Port Estate Area, Along Road Network (Mulloor) and Along Rail Network (Balaramapuram)

Table 7.1: Soil Sampling Location details

Sr. No.	Location	Latitude	Longitude
Soil			
1	Port Site	8^0,22',20.43" N	77^0,00',04.06" E
2	Proposed Port Estate Area	8^0,22',25.51" N	77^0,01',44.11" E
3	Along with Road Network (Mulloor)	8^0,22',41.01" N	77^0,00',45.71" E
4	Along with Rail Network (Balarampuram)	8^0,25',48.80" N	77^0,02',22.00" E

Figure 7.1: Google earth view of Soil sampling locations

2. Methodology of Sampling and Analysis:

Table 7.2: Soil Analysis methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
1.	Texture	-	1	WI/SAP-Soil/5/03, Issue no. 03, Issue date: 01.04.2014
2.	Particle Size Distribution	%	1	WI/SAP-Soil/5/03, Issue no. 03, Issue date: 01.04.2014
3.	pH (1:5 Suspension)	-	1	FAO, Sec. III, 1, Page no.65
4.	Electrical Conductivity (1:5 Suspension at 25^0C)	µS/cm	5	FAO, Sec. III,5, Page no.85
5.	Porosity	%	-	WI/SAP-Soil/5/19
6.	Total Kjeldhal Nitrogen (as TKN)	mg/kg	20	FAO 1976, Sec. III,4, Page no.78
7.	Available Phosphorus (as P)	mg/kg	5	FAO Sec. III .12-1, Page No.157
8.	Available Potassium (as K)	mg/kg	1	FAO Sec. III .8-1, Page No. 115
9.	Total Organic Carbon	g/100g (%)	0.025	FAO, Sec. III,3, Page no.73
10.	Organic Matter	g/100g (%)	0.025	FAO, Sec. III,3, Page no.73
11.	Available Sodium	mg/kg	1	FAO 1976, Sec. III,8-1, Page no.115
12.	Lead (as Pb)	mg/kg	0.5	USEPA/SW 846/6010C

Note:
ND: Not Detected
FAO: Food & Agriculture Organization, United Nations

3. Soil Analysis Result for the year 2018

Table 7.3: Soil Analysis Results

Sr. No.	Parameters		Units	Results			
				Port Site	Port Colony	Along Road Network (Mulloor)	Along Rail Network (Balarampuram)
1.	Texture		-	Sandy	Sandy	Sandy	Sandy
2.	Particle Size Distribution	Gravel	%	19.1	1.65	0.550	1.54
		Sand		36.4	78.9	61.9	70.3
		Silt		28.4	17.2	26.0	19.6
		Clay		16.2	2.28	11.6	8.56
3.	pH (1:5 Suspension)		-	7.51	6.52	7.37	5.68
4.	Electrical Conductivity (1:5 Suspension at 25^0C)		µS/cm	193	20.3	53.3	31.3
5.	Porosity		%	73.9	62.0	67.9	76.9
6.	Infiltration (Void		-	1.22	2.06	1.65	2.09

Sr. No.	Parameters	Units	Results			
			Port Site	Port Colony	Along Road Network (Mulloor)	Along Rail Network (Balarampuram)
	Ratio)					
7.	Total Kjeldhal Nitrogen (as TKN)	mg/kg	154	98	167	139
8.	Available Phosphorus (as P)	mg/kg	53.0	59.1	66.1	67.0
9.	Available Potassium (as K)	mg/kg	45.0	43.2	39.2	47.0
10.	Total Organic Carbon	g/100g (%)	1.00	0.800	0.960	0.860
11.	Organic Matter	g/100g (%)	1.72	1.13	1.66	1.48
12.	Available Sodium	mg/kg	21.4	30.1	18.2	21.2
13.	Lead (as Pb)	mg/kg	3.10	4.20	3.40	3.80
Note: All results are on air dry basis.						

4. Graphical representation of Soil analysis results for the year 2018

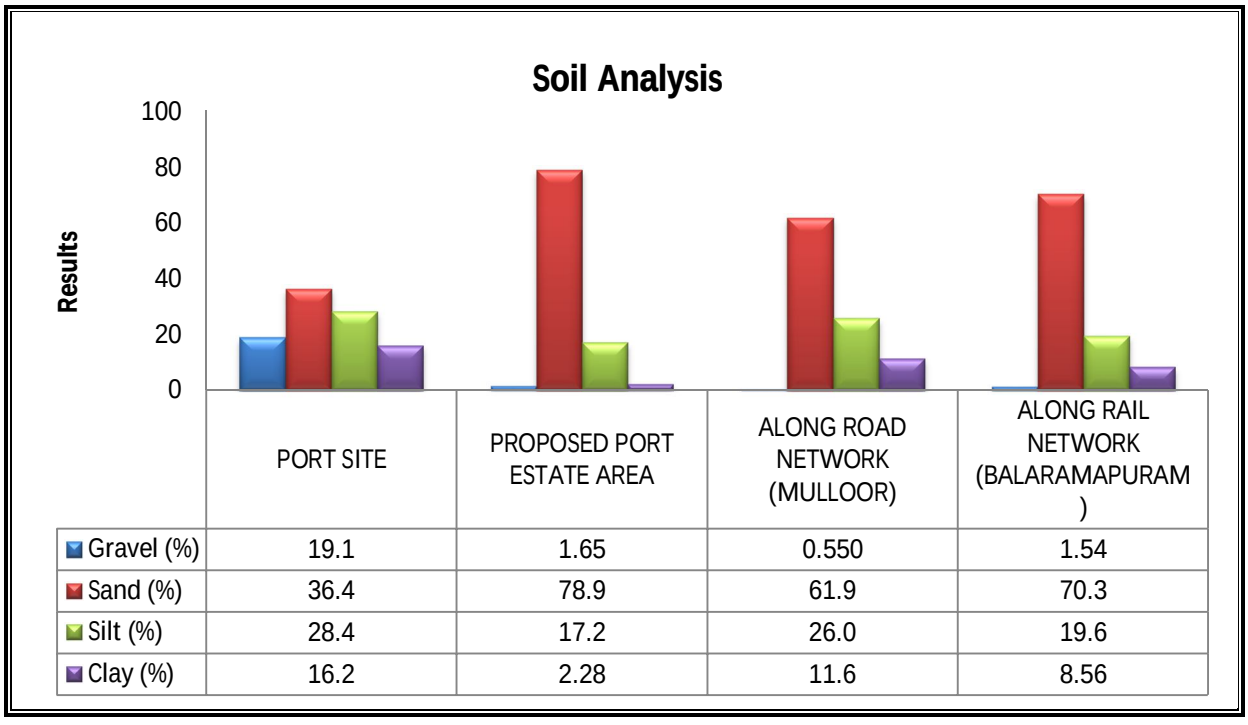


Figure 7.2: Soil analysis for Gravel, Sand, Silt and Clay

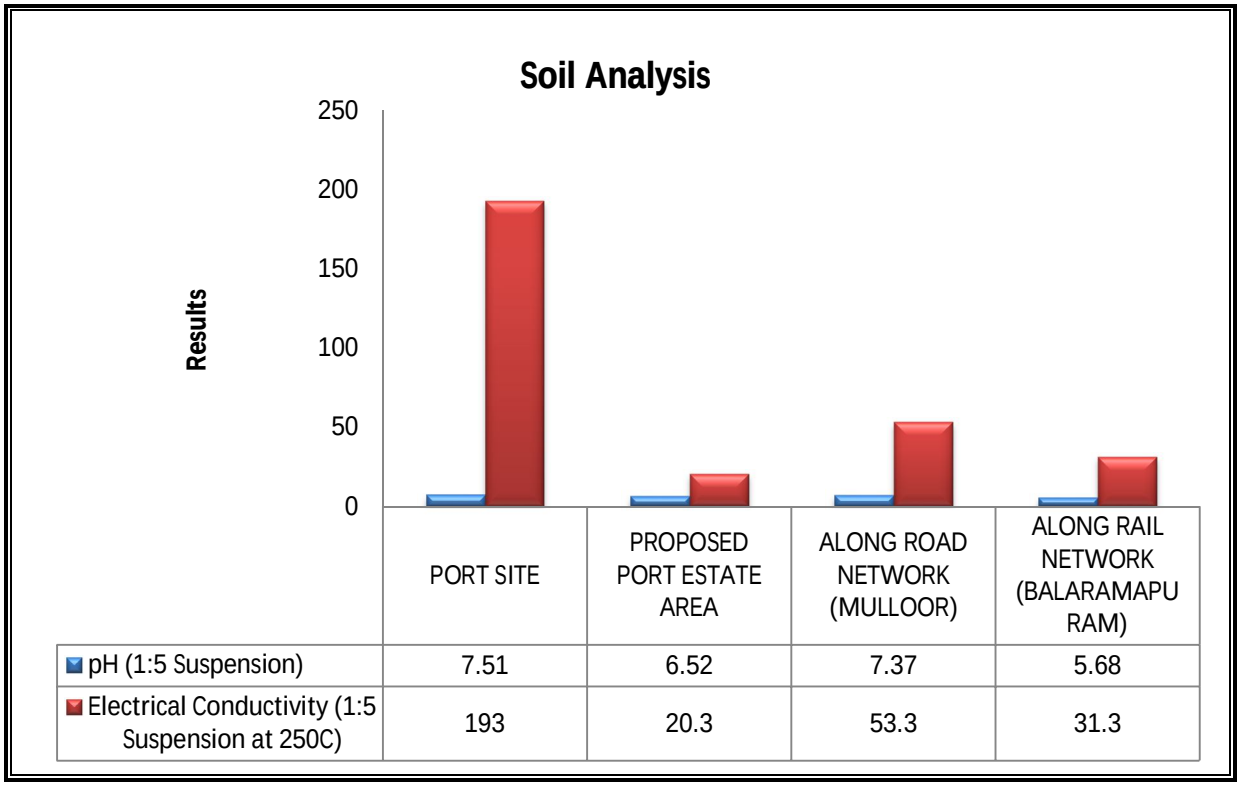


Figure 7.3: Soil analysis for pH and Electrical Conductivity

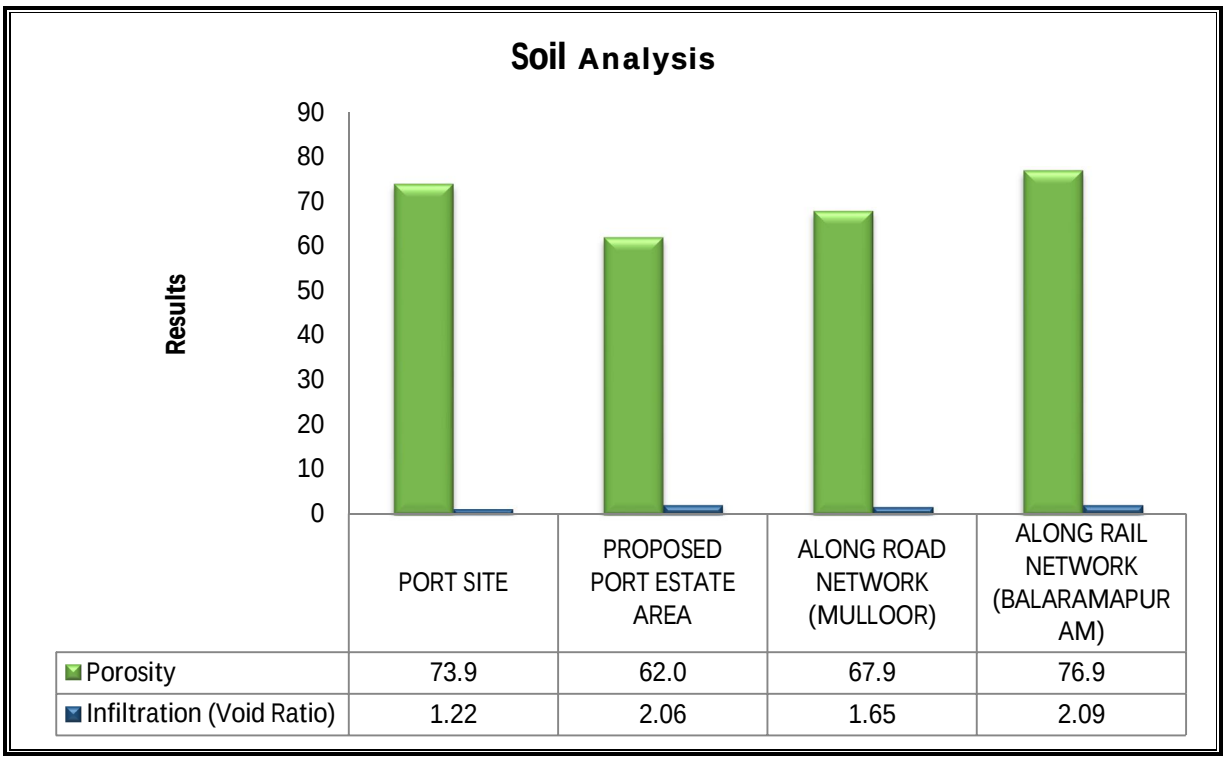
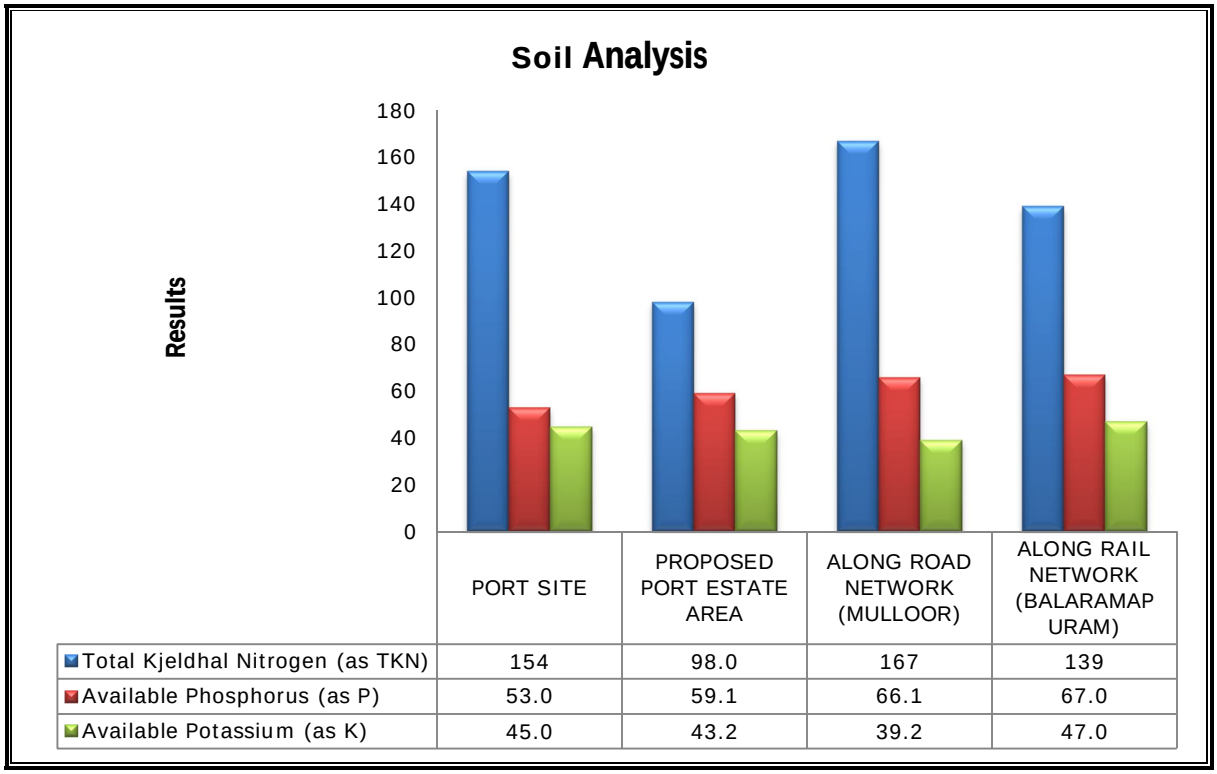
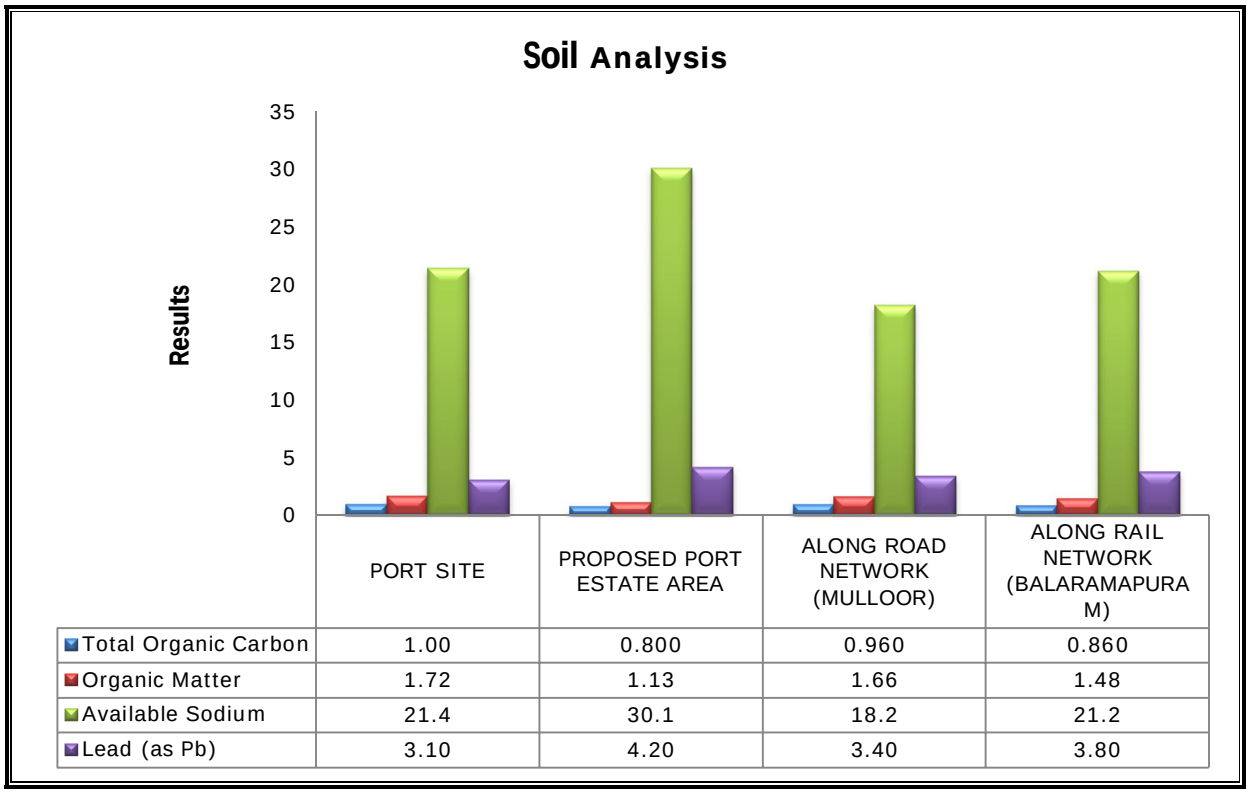


Figure 7.4: Soil analysis for Porosity and Infiltration



	PORT SITE	PROPOSED PORT ESTATE AREA	ALONG ROAD NETWORK (MULLOOR)	ALONG RAIL NETWORK (BALARAMAPURAM)
Total Kjeldhal Nitrogen (as TKN)	154	98.0	167	139
Available Phosphorus (as P)	53.0	59.1	66.1	67.0
Available Potassium (as K)	45.0	43.2	39.2	47.0

Figure 7.5: Soil analysis for Total Kjeldhal Nitrogen, Available Phosphorus and Available Potassium



	PORT SITE	PROPOSED PORT ESTATE AREA	ALONG ROAD NETWORK (MULLOOR)	ALONG RAIL NETWORK (BALARAMAPURAM)
Total Organic Carbon	1.00	0.800	0.960	0.860
Organic Matter	1.72	1.13	1.66	1.48
Available Sodium	21.4	30.1	18.2	21.2
Lead (as Pb)	3.10	4.20	3.40	3.80

Figure 7.6: Soil analysis for Total Organic Carbon, Organic Matter, Available Sodium and Lead

5. Summary - Soil Analysis

At the location **Port Site,** the texture observed was sandy. For the particle size distribution Gravel, Sand, Silt and Clay contribute 19.1%, 36.4%, 28.4% and 16.2% respectively. pH observed was 7.51, Electrical conductivity observed was 193 µS/cm, Porosity observed was 73.9%, Infiltration observed was 1.22, Total Kjeldhal Nitrogen (as TKN) observed was 154 mg/kg, Available Phosphorus (as P) observed was 53.0 mg/kg, Available Potassium (as K) observed was 45.0 mg/kg, Total Organic Carbon observed was 1.00 g/100g (%), Organic Matter observed was 1.72 g/100g (%), Available Sodium observed was 21.4 mg/kg and Lead (as Pb) observed was 3.10 mg/kg.

At the location **Proposed Port Estate Area,** the texture observed was sandy. For the particle size distribution Gravel, Sand, Silt and Clay contribute 1.65%, 78.9%, 17.2% and 2.28% respectively. pH observed was 6.52, Electrical conductivity observed was 20.3 µS/cm, Porosity observed was 62.0%, Infiltration observed was 2.06, Total Kjeldhal Nitrogen (as TKN) observed was 98.0 mg/kg, Available Phosphorus (as P) observed was 59.1 mg/kg, Available Potassium (as K) observed was 43.2 mg/kg, Total Organic Carbon observed was 0.800 g/100g (%), Organic Matter observed was 1.13 g/100g (%), Available Sodium observed was 30.1 mg/kg and Lead (as Pb) observed was 4.20 mg/kg.

At the location **Along Road Network (Mulloor),** the texture observed was sandy. For the particle size distribution Gravel, Sand, Silt and Clay contribute 0.550%, 61.9%, 26.0% and 11.6% respectively. pH observed was 7.37, Electrical conductivity observed was 53.3 µS/cm, Porosity observed was 67.9%, Infiltration observed was 1.65, Total Kjeldhal Nitrogen (as TKN) observed was 167 mg/kg, Available Phosphorus (as P) observed was 66.1 mg/kg, Available Potassium (as K) observed was 39.2 mg/kg, Total Organic Carbon observed was 0.960 g/100g (%), Organic Matter observed was 1.66 g/100g (%), Available Sodium observed was 18.2 mg/kg and Lead (as Pb) observed was 3.40 mg/kg.

At the location **Along Rail Network (Balaramapuram),** the texture observed was sandy. For the particle size distribution Gravel, Sand, Silt and Clay contribute 1.54%,

70.3%, 19.7% and 8.56% respectively. pH observed was 5.68, Electrical conductivity observed was 31.3 µS/cm, Porosity observed was 76.9%, Infiltration observed was 2.09, Total Kjeldhal Nitrogen (as TKN) observed was 139 mg/kg, Available Phosphorus (as P) observed was 67.0 mg/kg, Available Potassium (as K) observed was 47.0 mg/kg, Total Organic Carbon observed was 0.860 g/100g (%), Organic Matter observed was 1.48 g/100g (%), Available Sodium observed was 21.2 mg/kg and Lead (as Pb) observed was 3.80 mg/kg.)