

Development of Vizhinjam International Deepwater Multipurpose Seaport

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

Half Yearly Compliance Report (HYCR) for the Period October 2022 to March 2023

Project Concessionaire

Adani Vizhinjam Port Private Ltd. (AVPPL)

Project Authority

Government of Kerala (GoK)

Implementing Agency on behalf of GoK



Vizhinjam International Seaport Limited (VISL)
(A GoK Undertaking)

May 2023

Vizhinjam International Deepwater Multipurpose Seaport
Status of Conditions Stipulated in Environmental and CRZ Clearance

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014
for the Period October 2022 to March 2023

S. No.	Conditions	Compliance Status as on 31.03.2023
11.	Specific Conditions	
(i)	<p>"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.</p>	<p>Complied</p> <p>Consent for Establishment (CTE) had 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.</p> <p>The CTE was renewed vide Consent No. PCB/HO/TVM/ICE-R/02/2018 dated 19.07.2018 valid up to 31.07.2023.</p> <p>Copy of the renewed CTE was submitted to Ministry of Environment and Climate Change (MoEF&CC) with the Half Yearly Compliance Report (HYCR) for the period April 2018 to September 2018.</p>
(ii)	<p>Project Proponent shall carry out intensive monitoring with regulatory reporting six monthly on shoreline changes to the Regional Office, MoEF.</p>	<p>Being Complied</p> <p>Based on the Shoreline Monitoring Plan prepared by L&T Infra Engineers Ltd (L&T IEL) under the guidance of National Institute of Ocean Technology (NIOT), Shoreline monitoring is being carried out by agency Shankar & Co. (SAC) for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to MoEF&CC as a part of the HYCR. Broadly the scope covers:</p> <ul style="list-style-type: none"> • Wave Observations • Onshore Cross beach profiling • Offshore Cross beach profiling • Littoral Environmental Observations (LEO) • Beach Sampling • Multi-beam Echo Sounder (MBES) survey • River cross section surveys • Grab Sampling • Current Observations • Tide Observations • Weather Observations • Marine Water Sampling <p>Shoreline Monitoring Report by SAC for the period October 2022 to March 2023 is enclosed as Annexure I. During the compliance period, for</p>

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		<p>the months of October, November and December 2022 SAC could not conduct shoreline monitoring field data collection along some of the coastal areas and at the port site due to the protests and strike by the Latin Archdiocese and others. The agitation was withdrawn at the Port site on 08.12.2022 and the contractors resumed regular monthly monitoring. However, local people at stretches in Pulluvila still oppose the shoreline monitoring and obstruct the monitoring team from conducting the surveys. SAC shall be able to resume the full scope of shoreline monitoring once the safe and secure working conditions in the areas are ensured.</p> <p>L&T IEL had prepared Mathematical Modelling Reports based on available Shoreline Monitoring data; which were vetted by NIOT.</p> <p>Five mathematical modelling reports have been prepared by L&T IEL so far and submitted to MoEF&CC; as detailed below:</p> <table border="1"> <thead> <tr> <th>Data Period</th> <th>Submitted with HYCR for the Period</th> </tr> </thead> <tbody> <tr> <td>Feb 2015 to Feb 2017</td> <td>Apr 2017 to Sep 2017</td> </tr> <tr> <td>Mar 2017 to Feb 2018</td> <td>Apr 2018 to Sep 2018</td> </tr> <tr> <td>Mar 2018 to Feb 2019</td> <td>Apr 2019 to Sep 2019</td> </tr> <tr> <td>Mar 2019 to Feb 2020</td> <td>Apr 2020 to Sep 2020</td> </tr> <tr> <td>Mar 2020 to Feb 2021</td> <td>Apr 2021 to Sep 2021</td> </tr> <tr> <td>Mar 2021 to Sep 2022</td> <td>Apr 2022 to Sep 2022</td> </tr> </tbody> </table> <p>As per the instructions of the NGT Appointed Shoreline Monitoring Cell vide Minutes of Meeting dated 19.04.2022, "The reporting period of NIOT shall be half yearly verified with LNTIEL analysis period and shall match with EC compliance reporting period". Therefore, to synchronization with the HYCR Period (October – March and April – September), Adani Vizhinjam Port Pvt. Ltd. (AVPPL) has submitted data from March 2021 to September 2022 to</p>	Data Period	Submitted with HYCR for the Period	Feb 2015 to Feb 2017	Apr 2017 to Sep 2017	Mar 2017 to Feb 2018	Apr 2018 to Sep 2018	Mar 2018 to Feb 2019	Apr 2019 to Sep 2019	Mar 2019 to Feb 2020	Apr 2020 to Sep 2020	Mar 2020 to Feb 2021	Apr 2021 to Sep 2021	Mar 2021 to Sep 2022	Apr 2022 to Sep 2022
Data Period	Submitted with HYCR for the Period															
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		<p>L&T IEL for mathematical modelling to assess its impact on shoreline under the guidance of NIOT. Going forward, the mathematical modelling reports will cover the data period from October to September of each year to align with the reporting period specified by the NGT Appointed Shoreline Monitoring Cell.</p> <p>From all the data analyses and model studies carried out by L&T IEL, it has been concluded that there was minimal variation on shoreline, beach morphology and water quality compared to previous years and that the port construction has not induced any additional changes to these parameters in the vicinity of the port.</p>
(iii)	The capital dredged material (7.6 Mm ³) shall be utilized for reclamation of berths.	<p>Being Complied</p> <p>During the compliance period, 0.41 Mm³ material has been dredged and a total 3.31 Mm³ dredged material has been utilized for reclamation.</p>
(iv)	Additional fish landing centre shall be developed as part of the proposed Vizhinjam port for upliftment of fisheries sector.	<p>Being Complied</p> <p>Based on the recommendation of the study carried out by Central Water and Power Research Station (CWPRS), the Harbour Engineering Department (HED) has prepared the preliminary design and estimate for the extension of seaward breakwater of the existing fishing harbour. However, detailed design, including physical model study, is required before its construction. Also, discussions between Fisheries Department and Ports Department, Government of Kerala (GoK) and consultation with the fishermen community are ongoing. GoK would be soon finalising the plan of action to develop and make available the additional fish landing centre for the benefit of the local fishermen. <i>(Source: VISL)</i></p>
(v)	The project shall be executed in such a manner that there is minimum disturbance to fishing activity.	<p>Being Complied</p> <p>Following is being practiced ensuring minimum disturbance to fishing activity:</p> <ul style="list-style-type: none"> • Work is planned in such a way that there is only minimal hindrance to the fishermen due to construction activities.

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		<ul style="list-style-type: none"> • Signboards have been placed for demarcation of construction area and navigational buoys/marker buoys are placed in the marine area for fishing boats to maintain a safe distance from the areas of breakwater construction. <div>  </div> <p style="text-align: center;">Navigational Buoy</p> <ul style="list-style-type: none"> • The number of buoys for monitoring in the project area has been optimized, considering the safety of fishermen and ease of movement during construction. • For mutual understanding of the developmental activities with the local fishing community an exclusive CSR team has been assigned. • Using the technological advancements (such as WhatsApp), the dedicated CSR team of AVPPL are in constant touch with the fishermen/fishing community members to facilitate the flow of various project related information/updates. • AVPPL CSR team also provides regular updates to the committee which has been formed by the local church/other representatives adjoining to the port area, who in turn pass on port project execution information to the fishermen.


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		<ul style="list-style-type: none"> Marine Water Quality is being monitored regularly and results are submitted as part of the compliance reports. No abnormal results were observed during the compliance period (Refer Annexure II).
(vi)	<p>Steps would be taken to safeguard the interests of the fisheries sector as detailed in the Resettlement Action Plan (RAP), Corporate 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).</p>	<p>Being Complied</p> <p>In consultation with the fishermen, enhanced livelihood compensation of Rs. 101.86 Crores was sanctioned by GoK, instead of Rs. 8.55 crores; as suggested earlier in the EIA stage. Till 31.03.2023 an amount of Rs. 100 Crores have been disbursed for a total number of 2641 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost during the breakwater construction period. Verification of documents of a few remaining LAPs is in progress. (Source: VISL)</p> <p>The status of the Social Welfare activities envisaged in the fisheries sector is as follows:</p> <p>Water Supply: Kerala Water Authority (KWA) set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake which was commissioned in April 2013 by VISL by expending an amount of Rs. 8.10 Crores. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. For Operation & Maintenance (O&M) of the same, an amount of Rs. 5.38 crores have been spent up to 31.03.2021. From 04.04.2019 onwards, O&M of the scheme is being done by KWA. An additional amount of Rs. 1.74 Crores has been sanctioned and deposited by VISL to KWA to extend piped water connections for treated water supply</p>



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		<p>facilities to the community at Kottapuram Village. More than 1000 free domestic water connections have been given to the project affected areas. KWA now have adequate coverage of water supply around the port and project affected areas. VISL is coordinating with local body representatives to identify water shortage areas and taking effort to resolve the same. <i>(Source: VISL)</i></p> <p>Fish Landing Centre: The work for the fish landing centre (Rs. 16.00 crores) and the fishery breakwater (Rs. 131.12 crores) had been initiated as part of the funded work component of the concession agreement with AVPPL. However, based on studies on tranquillity carried out by CWPRS, Pune studies on tranquillity at the proposed new fishing harbour, the landing centre needs to be relocated after construction of an extension of seaward breakwater of the old fishing harbour. GoK is finalising the way forward to build the additional fish landing centre for the benefit of the local fishermen. <i>(Source: VISL)</i></p> <p>Existing Fishing Harbour: Tender 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. GoK has formed a higher-level committee to prepare a master plan for the old fishing harbour. Government Departments concerned are coordinating to resolve the differences and to arrive at a mutually acceptable plan in consultation with all stakeholders. <i>(Source: VISL)</i></p> <p>Seafood Park: Procurement of land for seafood park (Rs. 26.00 crores) by VISL has been completed. Action for development of seafood park is being taken to commission the same</p>

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		<p>along with the completion of the new fishing landing facilities planned. <i>(Source: VISL)</i></p> <p>Skill Development: Additional Skill Acquisition Program (ASAP) is a GoK initiative aimed to impart required skills to students for improving their employability. ASAP proceeded with the construction of a Community Skill Park (CSP) in an area of 1.5 acres of land at Vizhinjam and the infrastructure is completed. It will operate on a PPP model wherein 25,000 sq. ft. building with facilities for students' hostel are constructed by GoK by ASAP with ADB assistance, whereas the operation of the centre with logistics and other high-end courses are being taken up by Adani Skill Development Centre (ASDC) as per agreement with GoK/ASAP/VISL.</p> <p>CSP building construction is 90% completed inside Vizhinjam Port area in association with ASAP. The land handover by VISL to the ASAP team for construction having 3 storied building as Ground Floor for office space, Seminar Hall Training Rooms, G-1 Floor for IT lab & Other Training room facilities including Library, Meeting room, Faculty room. We planning to start High End Port related courses accordingly to the anticipated vacancies in abroad as well as in the top organizations. ASAP is planning to handover the building by the end of June 2023 once the building is commissioned.</p> <p>ASDC is planning to start high end port related courses to suite the anticipated vacancies arising in the port and other top organizations. Preference will be given to local students based on qualification, skill, and aptitude.</p>

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		<div>  </div> <div> <p>Community Skill Park Outside View</p> </div> <div>  </div> <div> <p>Community Skill Park Inside View</p> </div> <div> <p>Environmental Sanitation/Solid Waste Management:</p> </div> <div> <p><u>Material Recovery Facility (MRF):</u> As per the request received from Trivandrum Municipal Corporation it is decided to construct an MRF at harbor ward. Land for the same will be allotted by Harbour Engineering Department. The operation of the unit will be done by Trivandrum Municipal Corporation under the technical support of Suchithwa Mission and Clean Kerala Company and Socio-Economic Foundation (SEUF). A Haritha Karma Sena will be formed for the daily collection of waste after the commissioning of the proposed unit. This is carried out as shared activity between VISL, Thiruvananthapuram Corporation, Adani Foundation and AVPPL. Necessary funds have been transferred and civil construction work by SEUF will commence shortly. The MRF will include:</p> </div> <div> <ul style="list-style-type: none"> • 3500 sqft building • Shredding Machine </div>

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		<ul style="list-style-type: none"> • Baling Machine • Dust remover • Conveyor belt • Compound wall • Internal roads <p>Estimate, BOQ and plans are ready. An MoU is under preparation to demystify the role of all the stakeholders. Adani Foundation have transferred Rs. 44.77 Lakhs to VISL as half share.</p> <p><u>Cleaning Campaign:</u> The cleaning campaign promoted by AF is progressing commendably during the period. One of the livelihood groups, promoted under the CSR of AVPPL/Adani Foundation - Karsheeka Karma Sena is coordinating the campaign. Most of the members who are actively participating in the cleaning campaign are from widows category as part of the widows engagement programme. During the period, engaged 647 women-days for the campaign.</p> <div>  </div> <p style="text-align: center;">Cleaning Campaign</p> <p>Activities carried out by AVPPL/Adani Foundation as a part of CSR intervention for fishermen, fishing community and fisheries</p>

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		sector for the period of October 2022 to March 2023 is given in Annexure III .
(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.	<p>Will be Complied</p> <p>Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway. Geophysical and geomorphological studies, flood mapping studies and hydrogeological studies have also been completed. EC amendments in this regard had been submitted to MoEF&CC on 17.08.2022 vide Proposal No. IA/KL/NCP/285459/2022 and File No. 11-122/2011-IA.III.</p> <p>The Expert Appraisal Committee (EAC) during their 308th and 322nd meetings held on 15.09.2022 and 21.03.2023, 22.03.2023 respectively, considered this amendment. The observations/clarifications sought by the committee had been prepared and submitted. The additional information and clarification sought by the EAC during the latest meeting is under preparation for submission to the committee. <i>(Source: VISL)</i></p>
(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.	<p>Being Complied</p> <p>Resort owners evicted have been compensated for land and not for the structures since they were in violation of CRZ notification. Remaining land of 2.865 Ha is to be acquired by Land Acquisition (LA) process; for which notification has been published and the acquisition is in an advanced stage. <i>(Source: VISL)</i></p>
(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,	<p>Will be Complied</p> <p>Currently project is under construction. This shall be complied during operational phase.</p>


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	oily water or sludge, sewage, garbage etc. The emission of NOx & SOx shall remain within permissible limits.																						
(x)	CSR activities shall cover villages within 10 km radius of the project.	<p>Being Complied All CSR activities are being carried out in villages within 10 km radius of the project. CSR activities are being taken up and carried out mainly in the fields of education, community health, sustainable livelihood development, community infrastructure development and general administration; after receiving formal demands from social controlled institutions, government-controlled institutions and recognized platforms. An amount of Rs. 248.30 Lakhs has been spent on CSR activities during the compliance period (October 2022 to March 2023) as shown below:</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Head</th> <th>Amount (Rs. Lakhs)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Education</td> <td>15.09</td> </tr> <tr> <td>2</td> <td>Community Health</td> <td>64.11</td> </tr> <tr> <td>3</td> <td>Sustainable Livelihood Development</td> <td>38.84</td> </tr> <tr> <td>4</td> <td>Community Infrastructure Development</td> <td>114.05</td> </tr> <tr> <td>5</td> <td>General Administration</td> <td>16.21</td> </tr> <tr> <td colspan="2">Total</td> <td>248.30</td> </tr> </tbody> </table> <p>Details on CSR activities carried out by AVPPL during compliance period (October 2022 to March 2023) are enclosed as Annexure III.</p>	S. No.	Head	Amount (Rs. Lakhs)	1	Education	15.09	2	Community Health	64.11	3	Sustainable Livelihood Development	38.84	4	Community Infrastructure Development	114.05	5	General Administration	16.21	Total		248.30
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1	Education	15.09																					
2	Community Health	64.11																					
3	Sustainable Livelihood Development	38.84																					
4	Community Infrastructure Development	114.05																					
5	General Administration	16.21																					
Total		248.30																					
(xi)	Oil Contingency Management Plan shall be put in place.	<p>Will be Complied After duly incorporating the comments of Indian Coast Guard (ICG), the final facility Level Oil Spill Disaster Contingency Plan (OSDCP) in line with the National Oil Spill-Disaster Contingency Plan (NOS-DCP) has been submitted to ICG for approval vide letter No. AVPPL/ICG/2020-21/1134 dated 22.05.2020.</p> <p>After final review by PRT (West), ICG has made specific remarks on the compliance of OSDCP</p>																					

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		<p>prepared in line with NOS-DCP guidelines; directing AVPPL to submit the OSDCP for approval only after pollution response equipment are in place before start of operation.</p> <p>Considering that the procurement of pollution response equipment will be in line with the development of the port, the final OSDCP will be submitted to ICG for approval prior to commissioning of the port; when the pollution response equipment is in place.</p>
(xii)	All the recommendations /conditions stipulated by Kerala Coastal Zone Management Authority (KCZMA) shall be complied with.	<p>Being Complied AVPPL are complying with all the recommendations/conditions of KCZMA. Copies of the HYCRs are also being sent to KCZMA. Compliance to the recommendations/conditions of KCZMA for the period October 2022 to March 2023 is enclosed as Annexure IV.</p>
(xiii)	The responses/ commitments made during public hearing shall be complied with in letter and spirit.	<p>Being Complied AVPPL are complying with the responses/commitments made during public hearing (as applicable). Status of the same is being submitted regularly with HYCRs to all the authorities concerned. The compliance status of the commitments made during Public Hearing & actions on the same during the compliance period October 2022 to March 2023 is enclosed as Annexure V.</p>
(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 report to MoEF-RO.	<p>Being Complied Project is presently in construction stage. Recommendations of the Construction stage EMP for these areas are being implemented. Status of construction stage EMP in matrix format is enclosed as Annexure VI.</p>

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(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 Implementation of the Tourism Management Plan is being discussed with tourism department for a way forward. <i>(Source: VISL)</i>
(xvi)	The project proponent shall place on its website its response to the Public Hearing, and representations as presented to the EAC in the 128 th meeting held on 23 rd 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. Kerala Water Authority (KWA) set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake which was commissioned in April 2013 by VISL by expending an amount of Rs. 8.10 Crores. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. For Operation & Maintenance (O&M) of the same, an amount of Rs. 5.38 crores have been spent up to 31.03.2021. From 04.04.2019 onwards, O&M of the scheme is being done by KWA.

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		The water for construction purposes for the port is being sourced from the open market/private suppliers. On an average about 104 KLD water is being consumed for construction related activities, sprinkling, and drinking water during the compliance period (October 2022 to March 2023). During the compliance period, for the months of October, November and December 2022 works were stalled due to the ongoing protests and strike by the Latin Archdiocese and others. The agitation was withdrawn at the Port site on 08.12.2022 and the contractors resumed their work thereafter.
(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.	Being Complied The Contractors working at site, under the EPC Contractor Howe, have obtained separate consents from KSPCB for handling Hazardous Waste. During the compliance period (October 2022 to March 2023) 3.15 KL of used oil, 10 kg of oily cotton material, 7 nos. battery waste, 23 nos. oil contaminated filters and 95 nos. of discarded containers have been generated. The Hazardous Waste are being stored according to the Hazardous Waste Rules at site and further disposed to authorized (CPCB/KSPCB) handlers.
(xix)	No hazardous chemicals shall be stored in the Coastal Regulation Zone area.	Being Complied No hazardous chemical is being stored in the CRZ 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.
(xxi)	Sewage Treatment facility should be provided in accordance with the CRZ Notification.	Will be Complied A Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner is being planned and will be implemented along with the commissioning of the project.
(xxii)	No solid waste will be disposed of in the Coastal	Being Complied


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S. No.	Conditions	Compliance Status as on 31.03.2023
	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.	No solid waste is being disposed in the CRZ area. Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and the output is being used as manure in greenbelt development within the port project areas. The dry waste is being properly collected, segregated, and disposed of in line with the Solid Waste Management Rules 2016, as amended.
(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.	Being Complied In the compliance period, 20 DG sets were on site of which 5 were on standby. DG sets are being used only in case of emergency purposes. These are compliant to CPCB guidelines. Concrete storage with dyke constructed for separation is used for containment. If any oil spill occurs, it shall be properly collected and disposed as per the Rules.
(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 being carried out as per the approval obtained under CRZ Notification.
(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 and 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 Management Plan for such development.	Will be Complied Greenbelt: Although a natural greenbelt exists, the greenbelt of adequate width with suitable species as identified in the EIA will be developed in all possible areas including back-up areas and along the boundary of the project area in line with the establishment of the project. A greenbelt development plan has been considered in the Master Plan and adequate budgetary provision has been kept for this

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S. No.	Conditions	Compliance Status as on 31.03.2023
		<p>purpose. Landscape development work has been completed at several locations in the port areas.</p> <p>A Fruit orchard established at GIS –Substation covering 91 cents using 305 numbers of fruit plants ranging from Mango, Jackfruit, Rambutan, Sapota, Gemun, Pomegranate, Ambla, Guava & Papaya. Almost all the plants are of 7 feet Height started flowering and some started bearing fruits.</p>  <p style="text-align: center;">Fruit Orchard at GIS Building</p> <p>The landscaping maintenance at port site is entrusted with Vanitha Karsheeka Karma Sena, one of the livelihood groups formed as part of CSR activities. The maintenance activities include, weeding operations, Application of fertilizers, Pruning of Grown-up plants, Application of plant protection chemicals. Landscaping at high mast circle was also initiated during the period, which is a part of phase I activity which covers a total area of 7000 sqft.</p>

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S. No.	Conditions	Compliance Status as on 31.03.2023
		 <p>Greenbelt along the Median of Approach Road</p>  <p>Greenbelt along 33/11 KV Substation</p> <p>Compensatory Afforestation: AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department; which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port.</p> <p><u>Phase 1:</u> Approximately 15,540 trees on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50 Lakhs has been spent towards Phase-I of the compensatory afforestation at Sainik School.</p>

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S. No.	Conditions	Compliance Status as on 31.03.2023
		 <p>Progress at Sainik School, Kazhakootam</p> <p><u>Phase 2:</u> Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has been spent towards Phase 2 of the compensatory afforestation at Muttathara STP and Kerala University Campus.</p>  <p>Progress at KU, Karyavattom (Bit-1)</p>  <p>Progress at KU, Karyavattom (Bit-2)</p>

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S. No.	Conditions	Compliance Status as on 31.03.2023
		 <p>Progress at STP, Muttathara</p>
(xxvii)	The fund earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.	<p>Being Complied</p> <p>An amount of 40 Crores has been kept solely for EMP implementation as per the commitment in the EIA; and this amount is not diverted for any other purpose.</p> <p>An amount of Rs. 2.62 Crores has been utilized towards EMP implementation measures during compliance period October 2022 to March 2023. Till date, an amount of Rs. 26.09 Crores has been spent on environmental protection measures. The EMP expenditure is enclosed as Annexure VII.</p>
(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.	<p>Complied</p> <p>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 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 between GoK and AVPPL. It is also ensured that contractors executing the work also deploy qualified and competent EHS personnel for effective implementation of EMP measures.</p> <p>Organizational Structure for Environment, Health, and Safety & CSR for construction phase is enclosed as Annexure VIII.</p>

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S. No.	Conditions	Compliance Status as on 31.03.2023
(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 construction activities as mentioned hereunder: <ul style="list-style-type: none"> • Consent to Establish (CTE) No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018 was renewed from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE-R/02/2018, dated 19.07.2018 valid up to 31.07.2023. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 07.12.2015. • CTE for consumer pump inside the Vizhinjam port premises was obtained on 05.03.2021 (Consent No.: PCB/TVM-DO/NTA/PTP/15/2021) for the period of 5 years valid up to 28.02.2026. • Consent to Operate (CTO) for Explosives Storage at Chappath area was obtained on 20.07.2021 (Consent No.: PCB/TVM-DO/ICO/NTA/HCS/49/2021) valid up to 31.12.2024. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01.10.2015, AVPPL is not required to obtain any further building permits/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	Complied On an average 910 Nos. of employees, staff and construction workers were engaged in the port construction activities daily during the compliance period October 2022 to March

	Adani Vizhinjam Port Private Limited (AVPPL)	From : October 2022 To : March 2023
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	workers during the construction phase of the project to avoid any damage to the environment.	2023. Due to the agitation and protests led by Latin Archdiocese of Thiruvananthapuram at the Port Site, all activities for the project were on a standstill situation from 16.08.2022 to 07.12.2022. There are no labourers residing in the labour camps. It is ensured that construction workers who are staying outside in the contractor rented houses/apartments are provided with necessary infrastructure facilities.
(iii)	Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.	Being Complied Mitigation measures are being followed while undertaking digging activities Surface & Ground water quality is monitored monthly in line to Environment Monitoring Plan prescribed in EIA and analysis reports are enclosed as Annexure II . 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	Being Complied Quarry material is being obtained from approved quarry sites only. Earth cutting generated from road corridor construction at present are dumped in truck terminal area. <ul style="list-style-type: none"> • 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. • Kerala State Remote Sensing and Environment Centre (KSREC) have studied the impact due to construction of port approach road. Recommendations of KSREC are being implemented and suitable mitigation measures as suggested in the KSREC report are being adopted during construction. • No bituminous or hazardous material has been used.

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	(d) Construction spoils 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.	<p>Being Complied</p> <p>The construction material was obtained from approved quarries only.</p> <p>As on date, AVPPL have obtained Environmental Clearance (EC) from the State Environmental Impact Assessment Authority (SEIAA) and Consent to Operate (CTO) from KSPCB for the following granite building stone quarries:</p> <ul style="list-style-type: none"> • Block No. 29, Re-Survey No. 120/10 in Manickal Village, Nedumangad Taluk, Thiruvananthapuram District, Kerala (Details submitted along with the HYCR for the period October 2019 to March 2020) • Survey No. 555/2, Nagaroor Village (Kadavilla), Chirayinkeezhu Taluk, Thiruvananthapuram District (Details submitted along with the HYCR for the period April 2019 to September 2019) • Block No. 47, Re-Survey Nos. 133/4, 133/16, & 139/6 in Aryanadu Village, Nedumangad Taluk, Thiruvananthapuram District, Kerala (Details submitted along with the HYCR for the period April 2022 to September 2022). • Block No. 30, Re-Survey No. 341/6 in Koodal Village, Konni Taluk, Pathanamthitta District, Kerala (Details submitted along with the HYCR for the period April 2022 to September 2022). • Block No. 37, Re-Survey Nos. 554/1, 554/5 & 554/6 in Nagaroor Village (Kadavilla), Chirayinkeezhu Taluk, Thiruvananthapuram

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S. No.	Conditions	Compliance Status as on 31.03.2023
		<p>District, Kerala (Details submitted along with the HYCR for the period April 2022 to September 2022).</p> <p>In case of new quarries, necessary approvals will be obtained from the competent authority.</p> <p>Apart from these, the concessionaire is also sourcing rocks from the following private quarry owners in Kerala:</p> <ul style="list-style-type: none"> • Vismaya Rocks Pvt. Ltd. Quarry at Kummil Village, Kottarakara Taluk, Kollam District, Kerala • Tasna Mines Quarry at Mancode Village, Kottarakara Taluk, Kollam District, Kerala <p>The concessionaire is also sourcing rocks from several private quarry operators in Tamil Nadu. It is ensured that all private quarry owners have necessary approvals and permits from competent authorities.</p>
(vi)	<p>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.</p>	<p>Being Complied</p> <ul style="list-style-type: none"> • No solid waste is being disposed of in the CRZ area. • Solid waste is handled as per the Solid Waste Management Rules, 2016 as amended. • No solid waste is being disposed in the CRZ area. • Bio-degradable waste is being treated in an OWC installed at site and output is being used as manure in greenbelt development. • The dry waste is being properly collected, segregated, and disposed in line to Solid Waste Management Rules 2016, as amended. • Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner is being planned and will be implemented in line with CRZ Notification along with the commissioning of the project. • Environment Monitoring is being carried out as per Environment Monitoring Plan prescribed in EIA by NABL accredited agency



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S. No.	Conditions	Compliance Status as on 31.03.2023																																										
		<p>Standards Environmental & Analytical Laboratories.</p> <ul style="list-style-type: none"> Ambient Noise is being monitored as per Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) at 5 locations (Residential, commercial & Industrial) twice a month and it is observed that noise readings were within limits at all locations on all monitoring days during the monitoring months (from October 2022 to March 2023). Summary of the Ambient Air Quality Monitoring (AAQM) during the compliance period October 2022 to March 2023 at 5 monitoring locations is mentioned below: <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Max</th> <th>Avg.</th> <th>Min</th> <th>Perm. Limit</th> </tr> </thead> <tbody> <tr> <td>PM₁₀</td> <td>µg/m³</td> <td>79.6</td> <td>58.5</td> <td>42.3</td> <td>100</td> </tr> <tr> <td>PM_{2.5}</td> <td>µg/m³</td> <td>47.3</td> <td>31.1</td> <td>21.7</td> <td>60</td> </tr> <tr> <td>SO₂</td> <td>µg/m³</td> <td>5.86</td> <td>3.84</td> <td>2.11</td> <td>80</td> </tr> <tr> <td>NO₂</td> <td>µg/m³</td> <td>7.45</td> <td>5.13</td> <td>3.11</td> <td>80</td> </tr> <tr> <td>CO</td> <td>mg/m³</td> <td>BDL</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>BDL</td> <td>--</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Detailed Monitoring Reports for the period October 2022 to March 2023 is attached as Annexure II). 	Parameter	Unit	Max	Avg.	Min	Perm. Limit	PM ₁₀	µg/m ³	79.6	58.5	42.3	100	PM _{2.5}	µg/m ³	47.3	31.1	21.7	60	SO ₂	µg/m ³	5.86	3.84	2.11	80	NO ₂	µg/m ³	7.45	5.13	3.11	80	CO	mg/m ³	BDL	BDL	BDL	4	HC	ppm	BDL	BDL	BDL	--
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(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.	<p>Will be Complied</p> <p>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 KSPCB before commissioning of the project and copy of the CTO will be sent to Ministry on receipt.</p>																																										

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(viii)	Adequate precautions shall be taken during transportation of the construction material so that it does not affect the environment adversely.	<p>Complied</p> <p>Following precautionary measures are undertaken during transportation of the construction material as environment safeguard:</p> <ul style="list-style-type: none"> • Tarpaulin cover is being used during transportation of construction material. • All vehicles coming into the site are under a speed restriction of 20 km/hr. • 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. <div style="text-align: center;">  <p>Water Sprinkling in Progress</p>  <p>Tarpaulin Covered Trucks</p> </div>

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		<p style="text-align: center;">PUC Certificate</p>
(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.	<p>Noted</p> <p>There was no visit by officers of Ministry/Regional Office at Bangalore during the compliance period.</p> <p>All necessary support will be extended to officers of this Ministry/Regional Office during inspection of the project/site visit; whenever planned.</p>
(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.	<p>Noted for Compliance</p>
(xi)	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied to the satisfaction of the Ministry.	<p>Noted</p>
(xii)	In the event of a change in project profile or change in the implementation agency,	<p>Noted and Will be Complied</p> <p>AVPPL is the concessionaire for implementing the project and operating it for the next 40</p>


	Adani Vizhinjam Port Private Limited (AVPPL)	From : October 2022 To : March 2023
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	a fresh reference shall be made to the Ministry of Environment & Forests.	years, based on concession agreement signed between the GoK &, AVPPL on 17.08.2015. Vizhinjam International Seaport Limited (VISL) is the nodal agency for development of the port on behalf of GoK. As on date, 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 AVPPL was signed on 17.08.2015. The layout of the port has been approved by GoK by letter No.308799/E1/15/F&PD dated 30.10.2015 (Submitted along with the Compliance Report for the period October 2015 to March 2016). The preliminary construction activities commenced at site on 16.11.2015 followed by official inauguration on 05.12.2015. Financing agreement forming part of financial closure was submitted by the concessionaire on 13.05.2016.
(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 had 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 made thereafter.	Noted for Compliance
14.	All other statutory clearances such as the approvals for storage of	Complied All the construction activities are being carried out as per existing Central/local rules. Necessary


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	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.	<p>permissions under CRZ Notification 2011 & its amendments have been obtained.</p> <p>Further, necessary approvals from concerned Statutory Departments / Agencies have been obtained for the construction designs/drawings relating to the proposed construction as mentioned hereunder:</p> <ul style="list-style-type: none"> • Consent to Establish (CTE) No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018 was renewed from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE-R/02/2018, dated 19.07.2018 valid up to 31.07.2023. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 07.12.2015. • CTE for consumer pump inside the Vizhinjam port premises was obtained on 05.03.2021 (Consent No.: PCB/TVM-DO/NTA/PTP/15/2021) for the period of 5 years valid up to 28.02.2026. • Consent to Operate (CTO) for Explosives Storage at Chappath area was obtained on 20.07.2021 (Consent No.: PCB/TVM-DO/ICO/NTA/HCS/49/2021) valid up to 31.12.2024. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01.10.2015, AVPPL is not required to obtain any further building permits/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	<p>Complied</p> <p>Details regarding the advertisement that the project had been accorded EC and copies of the clearance letter that were published in local newspapers was intimated (along with copy of advertisement) to the regional office of MoEF&CC, vide letter No. VISL/EC/MoEF/2013 dated 20.01.2014 (Submitted along with the HYCR for the period October 2015 to March 2016).</p>

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Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
	<p>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.</p> <p>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 Bangalore.</p>	<p>Copy of the EC is available on VISL website at http://www.vizhinjamport.in/eia-30-5-13.php. The same is also uploaded on Adani Ports and Special Economic Zone (APSEZ) website at https://www.adaniports.com/Downloads</p>
16.	<p>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.</p>	Noted
17.	<p>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.</p>	<p>Noted</p> <p>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 EC granted to the project vide its judgment dated 02.09.2016.</p>
18.	<p>A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any from whom</p>	<p>Complied</p> <p>The EC was 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.</p>

	Adani Vizhinjam Port Private Limited (AVPPL)	From : October 2022 To : March 2023
Vizhinjam International Deepwater Multipurpose Seaport Status of Conditions Stipulated in Environmental and CRZ Clearance		

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
	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.	Copy of the EC is available on VISL website at http://www.vizhinjamport.in/eia-30-5-13.php . The same is also uploaded on APSEZ website at https://www.adaniports.com/Downloads
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 respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO ₂ , NO _x (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.	<p>Being Complied</p> <p>The copy of the latest HYCR for the period April 2022 to September 2022 including the results of six monthly monitoring data for the same period has been uploaded on VISL website http://www.vizhinjamport.in and also on APSEZ website https://www.adaniports.com/Downloads.</p> <p>The HYCR for the period April 2022 to September 2022 has been submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA vide email dated 22.11.2022 (a copy of the email is enclosed as Annexure IX).</p> <p>Environment Monitoring is being carried out as per Environment Monitoring Plan prescribed in EIA by NABL accredited agency Standards Environmental & Analytical Laboratories. Detailed Monitoring reports (Air, Water, Noise, Marine Water, and Sediment) for the Compliance Period April 2022 to September 2022 are enclosed as Annexure II. Additionally, summary of monthly Environment monitoring results is also uploaded on the APSEZ website https://www.adaniports.com/Downloads.</p>
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	<p>Being Complied</p> <p>HYCRs on the status of compliance of the stipulated clearance conditions including results of monitored data are regularly submitted to all the concerned agencies.</p> <p>As per the MoEF&CC Notification dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable,</p>

	Adani Vizhinjam Port Private Limited (AVPPL)	From : October 2022 To : March 2023
Vizhinjam International Deepwater Multipurpose Seaport Status of Conditions Stipulated in Environmental and CRZ Clearance		

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental & CRZ Clearance (EC) F.No.11-122/2011-IA.III dated 03.01.2014 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
	Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.	therefore the HYCR for the period April 2022 to September 2022 has been submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA via email dated 22.11.2022 (a copy of the email is enclosed as Annexure IX). Additionally, as per the MoEF&CC Office Memorandum dated 14.06.2022, the HYCR for the period April 2022 to September 2022 has been submitted online through newly developed compliance module in the PARIVESH Portal.
21.	The environmental statement for each financial year ending 31 st 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.

	Adani Vizhinjam Port Private Limited (AVPPL)	From : October 2022 To : March 2023
Vizhinjam International Deepwater Multipurpose Seaport Status of Conditions Stipulated in Environmental and CRZ Clearance		

Enclosures:

Annexure Number	Details of Annexure
Annexure I:	Shoreline Monitoring Report (October 2022 to March 2023)
Annexure II:	Environment Monitoring Report (October 2022 to March 2023)
Annexure III:	CSR Activities by AVPPL (October 2022 to March 2023)
Annexure IV:	Compliance to Conditions of KCZMA Recommendation
Annexure V:	Compliance of the Commitments made during Public Hearing
Annexure VI:	Status of Environment Management Plan
Annexure VII:	EMP Expenditure
Annexure VIII:	Environment Health, Safety & CSR Organizational Structure
Annexure IX:	Email Submission of HYCR for the Period April 2022 to September 2022

Annexure I
Shoreline Monitoring Report
(October 2022 to March 2023)



SHANKAR SURVEYS

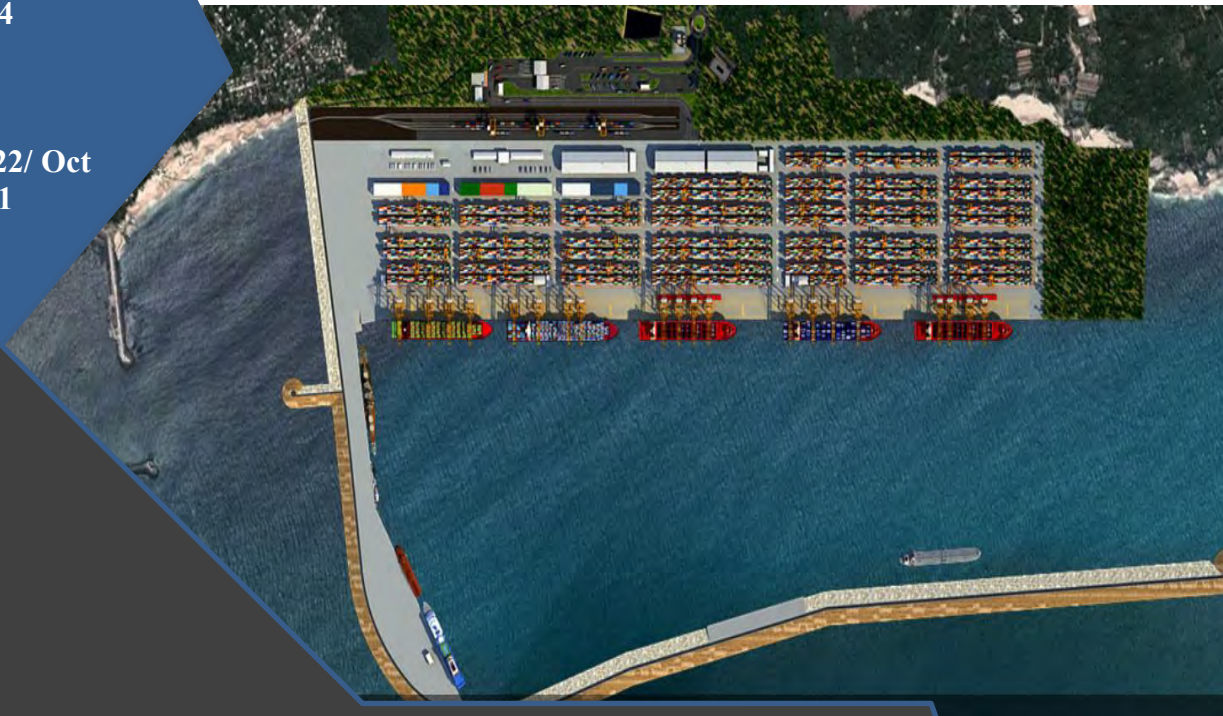
Shankar And Co.
115, Neco Chambers,
CBD Belapur,
Navi Mumbai – 400 614

Date: 26th May 2023

SAC Ref # SAC/P199-22/ Oct
2022 to Mar 2023 Rev 1


Adani Vizhinjam Port Pvt. Ltd.


OCEANOGRAPHIC AND BATHYMETRIC DATA COLLECTION FOR ASSESSMENT OF SHORELINE CHANGES



HALF YEARLY REPORT
(OCTOBER 2022
TO MARCH 2023)

“APPROVAL SHEET”

Prepared by:	Signed	Date
V Chathurala		26/05/2023

Checked and Approved by:	Signed	Date
S Philip		27/05/2023

REVISION CONTROL

Date	Rev	Section / Page No.	Remarks	Comment by
18/05/2023	0		Submitted for approval	
27/05/2023	1	List of Annexures, Pg 3	Annexure II is referred in the report Sec.6.9	AVPPL
		Sec 1, Pg 7	Removed the statement since turbidity was not measured from October 2022 onwards as per instructions from AVPPL	AVPPL
		Sec 3, Pg 12	Added a point as per the comment	AVPPL
		Sec 5.3, Pg 27	Rephrased the sentence	NIOT
		Sec 6, Pg 36	Added units	AVPPL
		Sec 6.1, Pg 36	Changed '5m' to '5.06m'	NIOT
		Sec 6.3.1, Pg 46	Specified the period of observation	AVPPL
		Sec 6.3.1, Pg 46	Reason is provided as a 'Note'	AVPPL
		Sec 6.3.1, Pg 46	Reason is mentioned	AVPPL
		Sec 6.3.2, Pg 48	Dates mentioned	AVPPL
		Sec 6.3.2, Pg 48	Dates corrected	AVPPL
		Sec 6.3.2, Pg 48	Dates mentioned	AVPPL
		Sec 6.3.2, Pg 49	Reason is mentioned	AVPPL
		Sec 6.5, Pg 58	Added 'during the'	AVPPL
		Sec 6.8, Pg 63	Added 'entire month of'	AVPPL
		Sec 6.8, Pg 64	Corrected the graph	AVPPL



		Sec 6.8, Pg 65	Legends shown in all graphs	AVPPL
		Sec 6.11.1, Pg 73	Added more information	AVPPL
		Sec 6.11.2, Pg 79	Changed the 'BS' numbers	AVPPL
		Sec 7, Pg 87	Edited the weather details	AVPPL



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List of Annexures

- ① Annexure I – Photo Documentation of CSP Locations
- Annexure II – Overlay of month-on-month GPS survey charts

ABBREVIATIONS

ADCP	Acoustic Doppler Current Profiler
APHA	American Public Health Association Guidelines
CES	Coastal Erosion Stone
AVPPL	Adani Vizhinjam Port Pvt. Ltd.
BDL	Below Detectable Level
C.M.	Central Meridian
CD	Chart Datum
cm	Centimetre
COG	Course over ground
dd mm.mmm	Degrees minutes. Decimal minutes
DGPS	Differential Global Positioning System
DTM	Digital Terrain Model
EC	Environmental & CRZ Clearance
EIL	Engineer In Charge
EEZ	Exclusive Economic Zone
GoI	Government of India
GoK	Government of Kerala
GPS	Global Positioning System
HSE	Health, Safety & Environment
HWM	High Water Mark
IHO	International Hydrographic Organization
INCOIS	Indian National Centre for Ocean Information Services
IS 1498	Indian Standard for Classification and Identification of Soils for General Engineering Purposes
IS 3025	Indian Standard or Methods of Sampling and Test for Water and Waste water Part 1 - Sampling
kHz	Kilohertz
Km	Kilometre
kPa	Kilo Pascal
LAT	Lowest Astronomical Tide
Lat	Latitude
LEO	Littoral environmental observation
Long	Longitude
m	Metre
MBES	Multibeam Echo Sounder
Mg/L	Milligram per litre
MoEF	Ministry of Environment & Forests



MoU	Memorandum of Understanding
MSL	Mean Sea Level
MV	Motor Vessel
NA	Not Applicable
NABL	National Accreditation Board for Testing and Calibration Laboratories
NHO	Naval Hydrographic Organization
NIOT	National Institute of Ocean Technology
nm	Nautical mile
NTU	Nephelometric Turbidity Units
PEP	Project Execution Plan
PVD	Progressive vector diagram
PPP	Public Private Partnership
ppt	Parts per Thousand
RTK	Real Time Kinematics
SAC	Shankar And Co.
SBES	Single Beam Echo Sounder
Sol	Survey of India
SOG	Speed over ground
SOW	Scope of Work
TEU	Twenty Foot Equivalent Unit
UNCLOS	United Nations Convention on the Law of the Sea
UTM	Universal Transverse Mercator projection
VISL	Vizhinjam International Seaport Ltd.
w.d.	Water depth
WGS84	World Geodetic System 1984
WMO	World Meteorological Organisation



DEFINITIONS

Project Owner	Vizhinjam International Seaport Ltd (VISL), Thiruvananthapuram
Project Concessionaire	Adani Vizhinjam Port Pvt. Ltd. (AVPPL), Thiruvananthapuram
Advisor to VISL	National Institute of Ocean Technology (NIOT), Chennai
Survey Contractor	Shankar And Co. (SAC), Navi Mumbai
Survey Requirement	Oceanographic & Bathymetric Survey for Shoreline Monitoring
Chart Datum	Chart datum is the level to which soundings on published charts are reduced, and above which tidal predictions and tidal levels are given in the Tide Table. All depths on charts are referred to this datum.
Current Speed	The speed at which a water body moves in the ocean. The speed is denoted in cm/s
Rip Current	A relatively strong, narrow current flowing outward from the beach through the surf zone
Current Direction	The direction towards which the currents are flowing. A westerly current implies that the currents are flowing from east to west
LEO	Littoral Environmental Observations
Wave Peak period (Tp)	The peak period gives the characteristic frequency of the arriving wave energy. This gives the period at which the spectrum has its highest value.
Significant Wave Height (Hs)	Significant wave height is the average peak-to-peak amplitude of the largest one third of the waves in a given field.
Wave direction	The direction from which the waves are coming. A westerly wave implies that the waves are moving from west to east.
Wind Speed	The speed at which the air moves with respect to the surface of earth. The speed is denoted in m/s
Wind Direction	Wind direction is an indicator of the direction that the wind is blowing from . A northerly wind is coming from the north and blowing towards the south
Atmospheric pressure	It is defined as the force per unit area exerted against a surface by the weight of the air above that surface. Atmospheric pressure is expressed in millibars (mb)
Relative Humidity	Relative humidity is defined as the ratio of the water vapor density (mass per unit volume) to the saturation water vapor density, usually expressed in percent
Turbidity	Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to the naked eye, similar to smoke in air.



1 EXECUTIVE SUMMARY

The **Vizhinjam International Deepwater Multipurpose Seaport** is a prestigious project taken up by the Government of Kerala, (GoK). It is designed primarily to cater to container trans-shipment besides multi-purpose and break-bulk cargo. The port is being currently developed in a Public-Private Partnership (PPP) component on a design, build, finance, operate and transfer (“DBFOT”) basis. The private partner, the Concessionaire **M/s Adani Vizhinjam Port Private Limited** (AVPPL) had commenced construction on 5th December 2015.

Vizhinjam International Seaport Ltd (VISL) - a company fully owned by GoK is the implementing agency for the project, will be responsible for all obligations and responsibilities of GoK in respect of the Project and the Concession Agreement.

With its numerous natural advantages and potential, the port will contribute greatly to economic development and will be an asset in terms of infrastructure development in the country.

The project obtained Environmental & CRZ Clearance (“EC”) from the Ministry of Environment & Forests (MoEF), Government of India (GoI) on 3rd January 2014, wherein it has been specified to carry out intense monitoring and regulatory reporting of the shoreline changes in the project area. Accordingly, VISL has entered into a memorandum of understanding (MoU) with the National Institute of Ocean Technology (NIOT), Chennai, under the Ministry of Earth Sciences (MoES), for a long-term shoreline monitoring programme including the seasonal bathymetry mapping.

(Source: <https://www.vizhinjamport.in/home.html>)

Shankar And Co, hereinafter referred to as SAC, based in Navi Mumbai has been awarded the contract to carry out Shoreline Monitoring – Oceanographic & Bathymetric Data Collection in the vicinity of the proposed site for the development of the Vizhinjam International Deepwater Multipurpose Seaport, vide the service order; SO 5700267194 by AVPPL.

① As part of the study, NIOT provided a wave rider buoy to be deployed off Mulloor and the data and watch & ward of the buoy was to be monitored by SAC.

This report provides the results of the data collected for the half yearly period from October 2022 to March 2023. All co-ordinates in the reports and charts are referenced to WGS-84, UTM Projection, CM 75° East, Zone 43, Northern Hemisphere.



2 INTRODUCTION

The proposed project is being developed as a PPP project on a DBFOT basis in accordance with the terms and conditions set forth in the concession agreement signed between AVPPL and GoK/VISL. The investment for land, external infrastructure (rail, water and power) and breakwater will be borne by the landlord (VISL/GoK). The investments for other port infrastructure (dredging & reclamation, berths, terminals, superstructure & equipment) will be shared on PPP basis availing Viability Gap Funding (VGF). The PPP concessionaire, AVPPL has been given the right to operate the port for a specified concession period of 40 years. Traffic-linked stage-wise future development of the project with an ultimate berth length of 2000m is also envisaged.

The proposed site is endowed with a natural depth of 23 to 25m (which is by far the best compared to other ports in the world) as close as 2 km from the coast. This will enable berthing of mother vessels of 18000 TEU and higher. Since the port site is located at the southern tip of India, barely 10 nautical miles from the international sea route (Suez – Far East route & Far East – Middle East route), it has the potential to become the future trans-shipment hub of the country.

(Source: <https://www.vizhinjampor.in/download/Feasibility-Report.pdf>)

The study includes carrying out MetOcean observations (wave, meteorological parameters and tide) at one location, to measure current for 30 days each, at four locations, during 3 different seasons; Pre-monsoon (Mar-May), monsoon (Jun-Oct), and Post-monsoon period (Nov-Feb), to measure in real-time turbidity from three levels and three locations, bathymetric survey of up to 20m contour in two seasons, cross-shore profiling (CSP) from 10m CD (4 CSP lines carried out up to a depth of 20m during the months of January, May, August and October) to 100m inland from the high water line along a stretch of 40 km, water & grab sampling, littoral environmental observation and river crossing survey. All these are to be carried out for a period of 3 years commencing June 2019.

A Google Earth image, showing the Multibeam survey area; locations of the observations, including the wave/current, tide and Automatic Weather Station (AWS) measurement location, is given in Figure 2-1 and Figure 2-2.

P1, P2 and P3 correspond to Acoustic Doppler Current Profiler (ADCP) locations and P4 corresponds to both, ADCP and wave location.



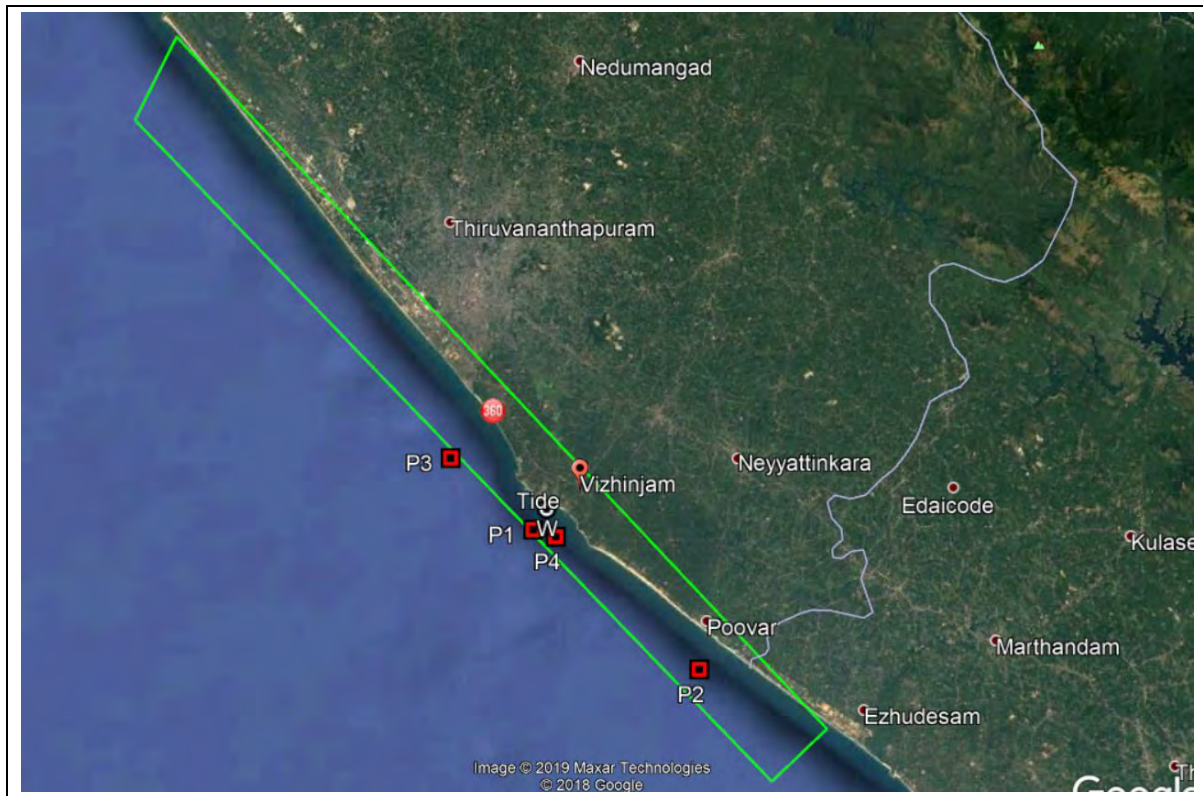


Figure 2-1: General Survey Location

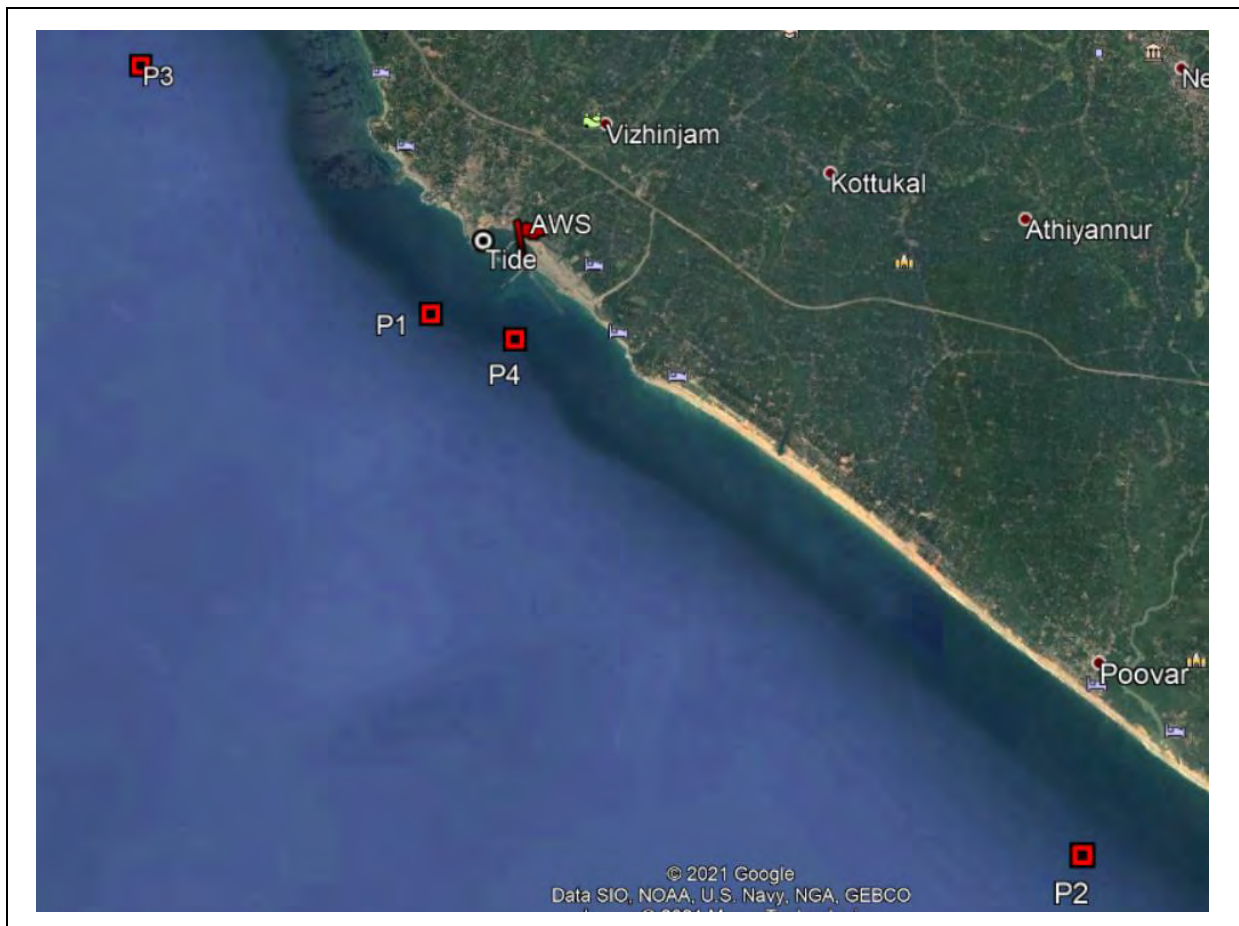


Figure 2-2: MetOcean Locations

The CSP lines, which coincide with the Littoral Environment Observation (LEO), beach sampling and photographic documentation, are indicated in Figure 2-3. The cross-shore profiles are named as CSP-01 to CSP-81. CSP-01 corresponds to the southernmost profile which lies to the south of the existing Vizhinjam Harbour and gradually increases progressing towards north for the entire 40 km stretch (20 km on either side of the port) with a 500 m interval between each CSP line, CSP-81 being the northernmost profile.



Figure 2-3: CSP, LEO and Photographic Documentation Locations

3 SCOPE OF WORK

The survey scope of work as per the contract includes the following:

- To mobilise a suitable marine spread and a survey boat at site for carrying out the operations.
- To provide requisite personnel and equipment for undertaking of oceanographic measurements and study of shoreline.
- Monthly cross-shore beach profiling perpendicular to the shoreline for a 40 km stretch at intervals of 500m, using RTK or total station landward up to 100m from HTL or +2m of HTL and using shallow draft boats, sled or any other suitable techniques seaward down to 10m CD (4 CSP Lines carried out up to a depth of 20 m in the months of January, May, August and October).
- Monthly monitoring of littoral zone (at the CSP locations) to observe the littoral transport direction and alongshore current speed by means of appropriate drogue observations and visual observations.
- Monthly photographic documentation of geomorphological changes (at the CSP locations).
- Seasonal beach sediment sampling and analysis (at the CSP locations).
- Bathymetric survey twice in a year, i.e. just after the monsoon season and just prior to the commencement of the next monsoon to generate 0.5m contours (with bathymetric survey lines spaced at 25 m interval) in areas with depths to 20m CD using multi beam echo sounder.
- Bathymetry/cross section survey for 500m length of rivers debouching in a 40 km stretch of the coast.
- Seabed sediment sampling and analysis in 80 sq. km with one sample per sq km.
- Collection and analysis of water samples at specified periods (seasonal) for total suspended solids (TSS) and turbidity from four specified locations.
- Current measurements (both magnitude and direction) using Acoustic Doppler Current Profiler (ADCP) at four locations, as marked in Figure 2-1, for the duration of full tidal cycle/30 days each during Pre-monsoon (Mar-May), Monsoon (Jun-Oct) and Post-monsoon period (Nov-Feb).
- Wave observations using WRB Datawell DWG-G shall be carried out at one location as marked on the location map.
- Tide measurements using an automatic tide gauge close to the survey area to observe the tidal variations around the clock at 6-minute intervals or as specified to cover one full year. The tide gauge shall be connected to the nearest Survey of India Benchmark.



- Collection of wind speed & direction, atmospheric pressure, humidity, temperature at 1 location specified by the client/EIC (Engineer In Charge) by establishing an Automatic Weather Station (AWS).
- Additionally, shoreline monitoring survey using RTK in GPS mode is to be carried out along the entire 40 km stretch every month (commenced from November 2021 onwards) and sled survey to be carried out for the nearshore areas along 7 CSP transects (CSP Nos. 2, 33, 34, 68, 69, 73 and 74) every month using pressure sensor. This survey shall be carried out till the minimum depth which can be navigated by the offshore CSP survey boat.
- Analysis and processing of the data and submission of periodic reports.

①

Note: Continuous monitoring of turbidity at 3 location (1 upstream & 2 downstream of dredging location) was discontinued as per the instructions from AVPPL on September 2022, The decision was backed up by the NGT Expert committee meetings dated 5th and 6th January 2023, and buoys were decommissioned.

3.1 Location Coordinates

The location co-ordinates for the current and wave observations are given below:

Table 3-1: Current / Wave locations

Location Co-ordinates			
WGS-84 Spheroid, UTM Projection, CM 75 East, Zone 43, North			
Name	Latitude	Longitude	Depth w.r.t CD (m)
ADCP - P1 (Vizhinjam)	08° 21' 55.4"N	76° 58' 51.6"E	22.1
ADCP- P2 (Poovar)	08° 17' 35.8"N	77° 04' 03.5"E	23.1
ADCP- P3 (Pachalloor)	08° 24' 08.6"N	76° 56' 16.1"E	21.9
ADCP/Wave - P4 (Mulloor)	08° 21' 42.3"N	76° 59' 33.9"E	22.9

The current observations are to be carried out for 30 days in each of the seasons at the above locations.

The location co-ordinates of the tide station are provided below:



Table 3-2: Tide station location coordinates

Tide Station Co-ordinates			
WGS-84 Spheroid, UTM Projection, CM 75 East, Zone 43, North			
Name	Latitude	Longitude	Height above CD (m)
Tide station	08° 22' 33.68"N	76° 59' 16.65"E	2.711

The Gill Metpack Automatic Weather Station with rain gauge was installed on the terrace of the Port Control Office building. The following table shows the coordinates of the AWS installation:

Table 3-3: Weather station location coordinates

Weather Station Co-ordinates			
WGS-84 Spheroid, UTM Projection, CM 75 East, Zone 43, North			
Name	Latitude	Longitude	Height above CD (m)
Weather station (on top of Port Control Office building)	08° 22' 22.75" N	76° 59' 39.62" E	12.785

The wind sensor was installed at a height of 14.235m above MSL (14.785m above CD). As suggested by NIOT and as per the WMO standard, 7% of the speed was reduced to derive the wind speeds at 10m above MSL.

3.2 Beach and Water Sampling

A total of 81 beach samples were to be collected in one season, as part of the contract. The samples were to be analyzed for grain size distribution as per Wentworth classification.

In the monsoon 2022 period, only 45 samples could be collected out of 81. The samples which couldn't be collected due to lack of beach were BS-3, BS-48 to BS-52, BS-63, BS-65 and BS-66. Samples from BS-23 to BS-41 and BS-53 to BS-60 could not be collected as a result of the ongoing agitation faced from the locals residing in these areas.

In the post monsoon 2022 period (October 2022 to March 2023), 70 samples could be collected out of 81. The samples which could not be collected due to lack of beach were BS-3, BS-11 to BS-13, BS-35, BS-49 to BS-51, BS-59, BS-63, and BS64. We could not approach the locations BS-29 and BS-30 due to the local protest.

The location coordinates of beach samples are provided in the table below.

Table 3-4: Beach Sampling Locations

BEACH SAMPLING LOCATIONS		
WGS-84, UTM Projection, CM 75° East, Zone 43, North		
Location	Latitude	Longitude
BS-1	8° 16.0265" N	77° 7.9532" E
BS-2	8° 16.1775" N	77° 7.7195" E
BS-3	8° 16.3348" N	77° 7.4987" E
BS-4	8° 16.4955" N	77° 7.2778" E
BS-5	8° 16.6565" N	77° 7.0579" E
BS-6	8° 16.8176" N	77° 6.8379" E
BS-7	8° 16.9782" N	77° 6.6187" E
BS-8	8° 17.1382" N	77° 6.3980" E
BS-9	8° 17.2984" N	77° 6.1765" E
BS-10	8° 17.4586" N	77° 5.9566" E
BS-11	8° 17.6207" N	77° 5.7379" E
BS-12	8° 17.7276" N	77° 5.5946" E
BS-13	8° 17.8899" N	77° 5.3756" E
BS-14	8° 18.0524" N	77° 5.1568" E
BS-15	8° 18.2151" N	77° 4.9388" E
BS-16	8° 18.3603" N	77° 4.7165" E

BEACH SAMPLING LOCATIONS		
WGS-84, UTM Projection, CM 75° East, Zone 43, North		
BS-17	8° 18.5517" N	77° 4.5120" E
BS-18	8° 18.7213" N	77° 4.3003" E
BS-19	8° 18.8852" N	77° 4.0829" E
BS-20	8° 19.0488" N	77° 3.8659" E
BS-21	8° 19.2152" N	77° 3.6499" E
BS-22	8° 19.3848" N	77° 3.4369" E
BS-23	8° 19.5582" N	77° 3.2282" E
BS-24	8° 19.7318" N	77° 3.0196" E
BS-25	8° 19.9075" N	77° 2.8098" E
BS-26	8° 20.0796" N	77° 2.5989" E
BS-27	8° 20.2492" N	77° 2.3841" E
BS-28	8° 20.4130" N	77° 2.1703" E
BS-29	8° 20.5731" N	77° 1.9581" E
BS-30	8° 20.7305" N	77° 1.7499" E
BS-31	8° 20.8951" N	77° 1.5274" E
BS-32	8° 21.0493" N	77° 1.2973" E
BS-33	8° 21.1815" N	77° 1.0911" E
BS-34	8° 21.3210" N	77° 0.8491" E
BS-35	8° 21.3974" N	77° 0.6359" E
BS-36	8° 21.6830" N	77° 0.4829" E
BS-37	8° 21.8799" N	77° 0.2980" E
BS-38	8° 22.1369" N	77° 0.1947" E
BS-39	8° 22.3420" N	76° 59.9895" E
BS-40	8° 22.5417" N	76° 59.7689" E
BS-41	8° 22.8201" N	76° 59.0753" E
BS-42	8° 23.0287" N	76° 58.7934" E
BS-43	8° 23.1727" N	76° 58.6741" E
BS-44	8° 23.3709" N	76° 58.5145" E
BS-45	8° 23.7061" N	76° 58.3743" E
BS-46	8° 23.8974" N	76° 58.3798" E
BS-47	8° 24.1304" N	76° 58.2814" E
BS-48	8° 24.4789" N	76° 58.1346" E
BS-49	8° 24.6320" N	76° 58.0289" E
BS-50	8° 24.8665" N	76° 57.8917" E



BEACH SAMPLING LOCATIONS		
WGS-84, UTM Projection, CM 75° East, Zone 43, North		
BS-51	8° 25.0976" N	76° 57.7474" E
BS-52	8° 25.3176" N	76° 57.5868" E
BS-53	8° 25.5653" N	76° 57.4562" E
BS-54	8° 25.7602" N	76° 57.2767" E
BS-55	8° 25.9643" N	76° 57.0963" E
BS-56	8° 26.1500" N	76° 56.9073" E
BS-57	8° 26.3461" N	76° 56.7308" E
BS-58	8° 26.5741" N	76° 56.5678" E
BS-59	8° 26.7782" N	76° 56.4051" E
BS-60	8° 26.9997" N	76° 56.2272" E
BS-61	8° 27.2030" N	76° 56.0492" E
BS-62	8° 27.4175" N	76° 55.8762" E
BS-63	8° 27.6142" N	76° 55.6937" E
BS-64	8° 27.8102" N	76° 55.5014" E
BS-65	8° 28.0132" N	76° 55.3255" E
BS-66	8° 28.2159" N	76° 55.1437" E
BS-67	8° 28.4224" N	76° 54.9642" E
BS-68	8° 28.6228" N	76° 54.7840" E
BS-69	8° 28.8276" N	76° 54.6048" E
BS-70	8° 29.0316" N	76° 54.4243" E
BS-71	8° 29.1104" N	76° 54.3586" E
BS-72	8° 29.3118" N	76° 54.1755" E
BS-73	8° 29.5150" N	76° 53.9964" E
BS-74	8° 29.7202" N	76° 53.8181" E
BS-75	8° 29.9258" N	76° 53.6393" E
BS-76	8° 30.1345" N	76° 53.4652" E
BS-77	8° 30.3450" N	76° 53.2940" E
BS-78	8° 30.5558" N	76° 53.1226" E
BS-79	8° 30.7701" N	76° 52.9558" E
BS-80	8° 30.9840" N	76° 52.7867" E
BS-81	8° 31.1988" N	76° 52.6188" E

The water samples (132 from four locations) were collected and analysed for TSS as per IS 3025, Part 17:1984 (reaffirmed 2012); Turbidity was analysed as per IS 3025,



Part 10:1984 (reaffirmed 2012) technical specifications. The salinity was analysed as per American Public Health Association (APHA) guidelines.

The water samples were collected in the month of March 2023 for the post monsoon 2022 period.

The location co-ordinates of water sampling locations are provided below:

Table 3-5: Water Sampling Locations

WATER SAMPLING LOCATIONS			
WGS-84, UTM Projection, CM 75° East, Zone 43, North			
Location	Water Depth (m)	Latitude	Longitude
L1 (Mulloor)	21.1	08° 21.923" N	76° 58.860' E
L2 (Proposed Dredge dumping)	23.2	08° 21.705" N	76° 59.565" E
L3 (Pachalloor)	27.4	08° 24.143' N	76° 56.268' E
L4 (Poovar)	23.0	08° 17.597" N	77° 04.058" E

4 SURVEY CONTROL

4.1 Geodesy

The survey operations were conducted in the WGS 84 Spheroid, Universal Transverse Mercator Projection based on the geodetic parameters presented below. All co-ordinates quoted within this document are with reference to it.

Table 4-1: Geodetic Parameters

GEODETTIC PARAMETERS	
Satellite Datum	
Spheroid	WGS-84
Datum	WGS 84
Semi-Major Axis	6378137.000 m
Semi Minor Axis	6356752.314 m
Inverse Flattening	298.2572
Projection Parameters	
Grid Projection	Universal Transverse Mercator
Latitude of Origin of Projection	0° (Equator)
Longitude of Origin of Projection	75° E, Zone 43
Hemisphere	North
False Easting (metres)	500000
False Northing (metres)	0
Scale Factor on CM	0.9996
Units	Metres



4.2 Survey Vessels

The following vessels were utilized for the survey operation:



Figure 4-1: Watch keeping vessel MFB Samuel



Figure 4-2: Transit vessel MFB Sindhu Yatra Matha



Figure 4-3: Multibeam Survey boat Bismi

4.3 Personnel

The following survey personnel from SAC/AVPPL were assigned to the project in the capacities listed in the table below during the period.

Table 4-2: Personnel

Shankar And Co.	
Name	Designation
Rajinder Singh Sandhu	Project Manager (Navi Mumbai office)
Vishnu K.	Party Chief /Survey Engineer
Vishnu Haridas	Land / Hydrographic Surveyor
Ajeesh A.S.	Assistant Surveyor
Amal Deva	Assistant Engineer
Sanjeevaneer Khaire	Data Processor (Navi Mumbai office)
Adani Vizhinjam Port Pvt. Ltd.	
Name	Designation
Hebin C.	Manager - Environment
Jesse Fullonton	Assistant Manager - Environment



5 SURVEY EQUIPMENT DETAILS

5.1 Wave Rider Buoy

The Datawell DWR (G) Wave Rider Buoy (WRB) was deployed by NIOT in collaboration with VISL and AVPPL, under a tripartite agreement and is being monitored and maintained by SAC. A Datawell DWR (G) was supplied and installed for the project. The WRB was programmed to measure all the wave parameters at half-hourly intervals. The data is transmitted on a real time basis via the HF antenna to the receiver set up at Ayur Bay resort.

The system consists of WRB with HF whip/LED flasher, GPS antenna, internal data logger, RX-D receiver with HF antenna and acquisition and post processing software w@ves21. The system has a GPS receiver mounted on a buoy along with HF radio for data transmission in real time. The system has an accuracy of 1 cm + 0.5% of vertical motion; resolution of 1cm and range of ± 30 m at the sampling rate of 1.28 Hz. The directional accuracy and resolution are 1.5° within the range of 0° to 360° .

Since the WRB is GPS based, it does not require any calibration.

5.1.1 Principles of wave measurement

The GPS wave buoy measurement principle bears a strong analogy with the Doppler-shift phenomenon of a car passing nearby, blowing its horn. The GPS system calculates the velocity of the buoy from changes in the frequency of GPS signals. The velocities are integrated with time to determine buoy displacement. In practice the GPS system uses signals from multiple satellites to determine three-dimensional buoy motion. A gravity sensitive accelerometer in the buoy measures wave height by means of vertical acceleration of the platform of the buoy.

5.1.2 Instrument Mooring

The mooring arrangement incorporates the following components between the sea bottom and the mooring eye underneath the buoy: a sinker or anchor weight, polypropylene rope, nylon covered galvanized steel cable (combination rope) and associated terminals, floats, rubber cords with associated terminals, swivels, ballast chain, anodes and shackles and cotter pins.

A schematic of the mooring of WRB is given below:



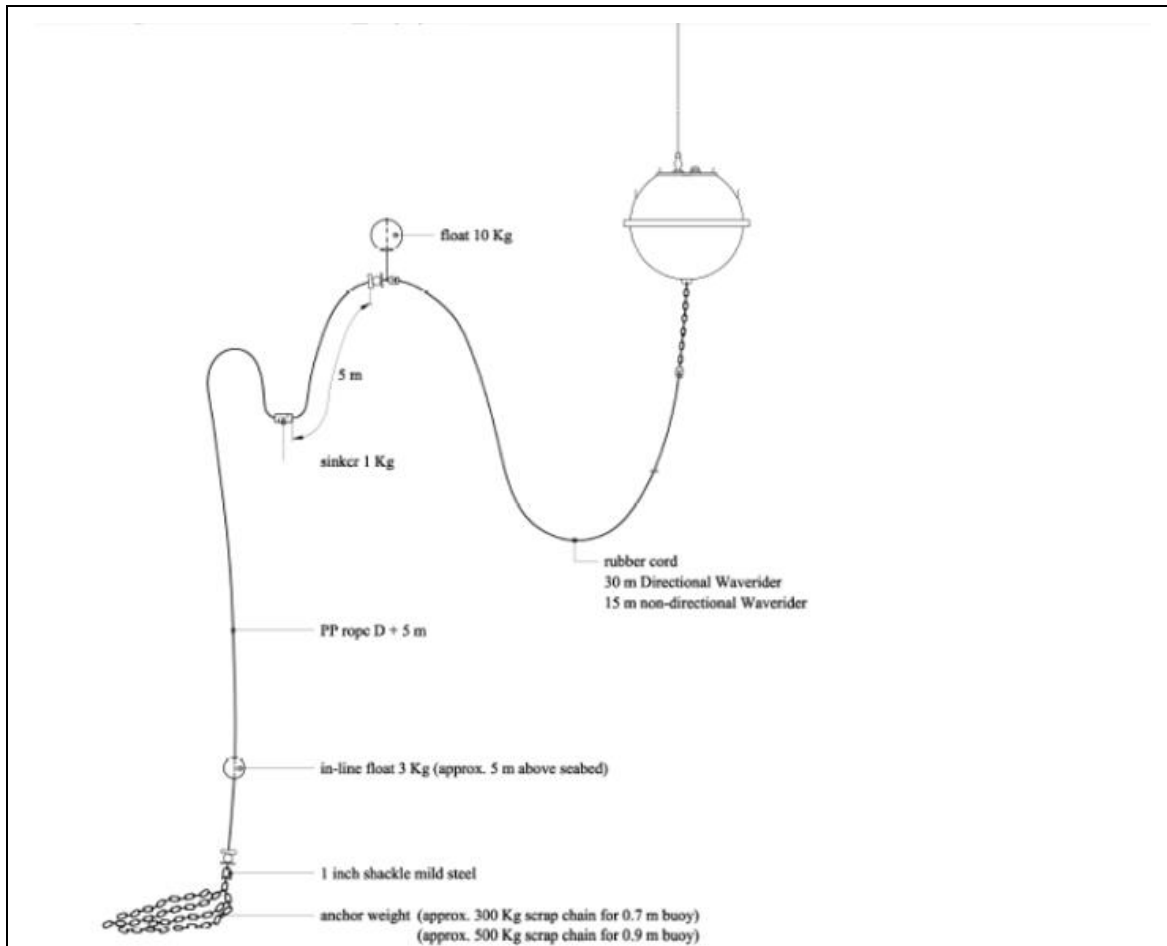


Figure 5-1: WRB Mooring Diagram

A highly elastic rubber cord is essential for high quality wave measurements. It allows the buoy to follow the wave motion, thus guaranteeing that the measured motion of the buoy is indeed the same as the desired motion. The buoy was deployed using single point mooring with free-floating method. The mooring design was configured as per the site conditions, followed by the mooring suggestions provided by the supplier. As frequent fishing activities were observed at the deployment location, one boat was anchored near the WRB without hindering the wave data measurements along with sufficient crew on board for around the clock watch-keeping.

A photograph of WRB deployed at the location is shown below:





Figure 5-2: WRB deployed at site

5.2 Current Meter

Teledyne Workhorse Sentinel 600 KHz Acoustic Doppler Current Profilers (ADCP) were installed at locations P1, P2, P3 and P4, namely, Vizhinjam, Poovar, Pachalloor and Mulloor respectively, for Monsoon 2022 period. Nortek Aquadopp 600 KHz ADCP's were deployed at Vizhinjam, Poovar and Mulloor for Post Monsoon 2022 period. Since we had lost one ADCP during the monsoon 2022 campaign, the observations were carried out only at 3 locations for post monsoon 2022. The current speed and direction were measured at intervals of every 10 minutes from surface to seabed at every 1m bin. Data from three various depths i.e. at the surface, mid-depth and bottom at each location are provided in the report. A few field photographs of ADCP installation are shown below.

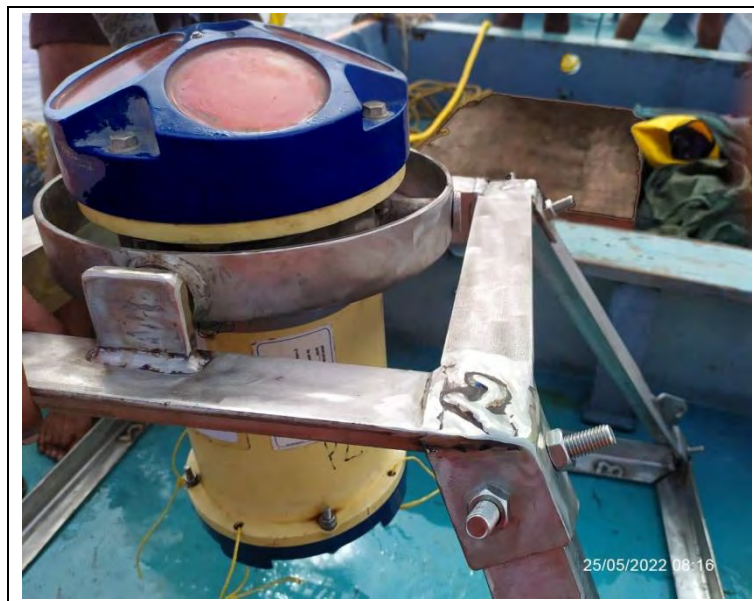


Figure 5-3: ADCP deployment at Poovar (Monsoon 2022)

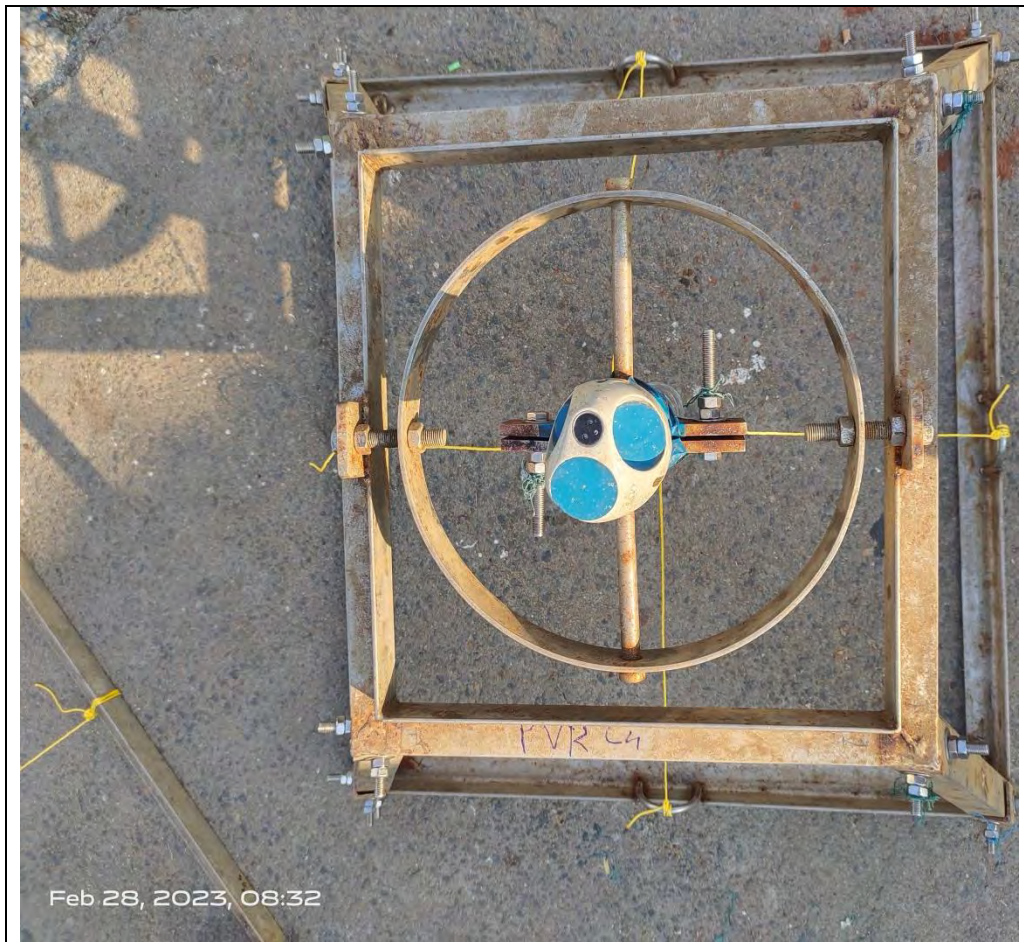


Figure 5-4: ADCP deployed at Poovar (Post Monsoon 2022)

5.3 Automatic Tide Gauge

The Valeport Tidemaster Automatic Tide Gauge (ATG) was installed at the Coast Guard jetty, inside the fishing harbour for measuring the tides. The tide gauge is a pressure-sensor based instrument, measuring the water level due to change in pressure on the surface of sensor. The sensor was installed in a 6m long pipe to ensure that the zero of sensor is always in water, irrespective of the phases of tide. This was levelled to the jetty top, whose value is 2.711m above CD. The tide station was programmed to measure the tide at 6-minute intervals throughout the duration of the project.

①

A photograph of the tide gauge location is shown below:



Figure 5-5: Tide Gauge

The specifications of Valeport Tidemaster ATG is provided below:

Model	:	Tidemaster
Type	:	Vented Strain Gauge with stainless steel mounting
Range	:	Standard 10 dBar (~10m)
Accuracy	:	±0.1 % Full scale

5.4 Automatic Weather Station (AWS)

A Gill Metpack Automatic Weather Station (AWS) was installed on the terrace of the Port Control Office building. The system measures wind speed/direction, atmospheric pressure, temperature, relative humidity and rainfall.

The system consists of the following:

- Sonic anemometer
- Relative humidity & temperature sensor
- Pressure sensor
- Rainfall Gauge
- Datalogger

The data is logged in a data logger installed at the receiving station at intervals of 10 minutes. The data is also transmitted from the data logger to a cloud-based server for further processing and QC checks.

Some images of the automatic weather station are provided below:





Figure 5-6: AWS on top of Port Control Office building

5.5 Real Time Kinematic (RTK) Survey

An RTK system was mobilized at site to carry out cross-shore profiling on the landward side. The system used was a Geomax Zenith 35 Pro RTK system with base station and rover. A photograph of the system is provided below:



Figure 5-7: RTK System with base station and rover

5.6 Multibeam Echo Sounder System

An R2Sonic 2020 Multibeam Echo Sounder, operating at a frequency of 500 kHz, was used to delineate the topography of the seabed. The measured sound velocity and observed tide was fed into the system during data processing.

The swath bathymetry system was calibrated according to methods described in the manufacturer's manual. The swath transducer system was aligned with the roll/pitch/heave sensor. Great care was taken to mount the heads and pitch/roll/heave sensor as accurately as possible and the final calibration was carried out during sea trials prior to each survey. The calibration values obtained in the month of March 2023 are given below.

Table 5-1: MBES Calibration results

Parameter	Value	Comments
Latency	0.00s	Trimble SPS 461 positioning system
Roll	-2.20°	DMS accuracy 0.05° in roll
Pitch	-11.00°	DMS accuracy 0.05° in pitch
Yaw	-5.00°	Accuracy better than 0.2°

5.7 DGPS Positioning System

Vessel positioning was carried out by the Trimble SPS 461 dual antenna DGPS system which also provides the heading. Vessel track and offset positions were recorded digitally in the navigation software. The positioning system was interfaced to the navigation software as well as the digital data acquisition system. DGPS positioning accuracy of the moving vessel was better than $\pm 1\text{m}$.

The computed position of the vessel from the DGPS receiver was interfaced to the navigation computer system. Hypack navigation and data acquisition software was used to provide track guidance information to the survey crew and also output the position of the vessel to assist the helmsman in maintaining the selected track guidance line. The VDU displays the selected survey line, the position of the vessel in relation to that line and numerical data to assist the helmsman such as the along-line and off-line distances, vessel speed and course made good, gyro heading, distance and bearing to end of line and water depth. The position of each fix, together with other information such as fix numbers, depths, PDOP (Position Dilution of Precision) and along-line distances were logged to the hard drive.

5.7.1 DGPS Consistency Check

In order to determine the integrity and reliability of the positioning system, the system was checked for its consistency during mobilization. The DGPS calibration for the month of January 2023 is provided in this report.

After installing the Trimble SPS 461 DGPS positioning system on board the vessel, two points were marked on the jetty. The DGPS antenna was set up on the jetty at these two points, designated as Point A and Point B.

Time was synchronized between Trimble/Hypack and the observer's watch, for which local time (GMT+5.30) was used. The Trimble DGPS antenna positions were logged in the Hypack navigation software. The logged data was processed to derive the final positions of both the points.

The difference between the calculated distance and measured distance was found to be within the permissible accuracy limit. The scatter plot of the DGPS calibration is shown in the figure below.



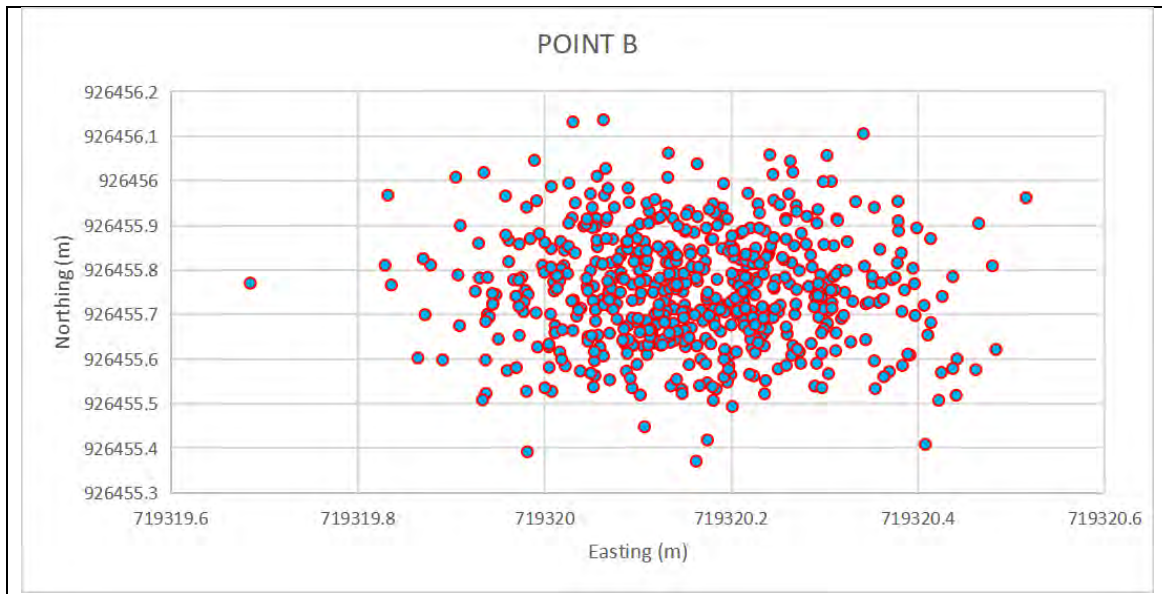
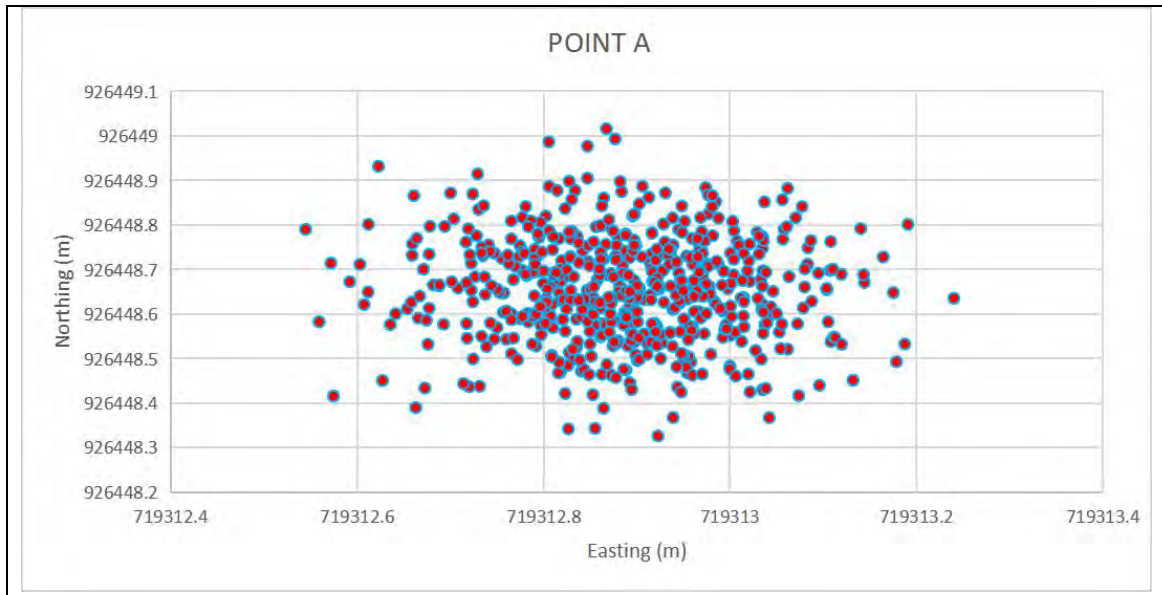


Figure 5-8: Scatter Plot of DGPS calibration on board MV Samuel 3

Table 5-2: DGPS Calibration results

AVERAGE POSITIONS		
POINT	EASTING	NORTHING
A	719313.13	926447.95
B	719320.33	926454.98
Distance between points		10.06 m
Measured Distance		10.00 m
Difference		0.06 m



5.7.2 Gyrocompass Calibration

The calculated heading of the vessel was compared with the recorded gyrocompass heading to derive a calculated-observed (C-O) value. A final C-O of -0.06° was obtained, which was entered into the navigation software before commencing the survey. The gyro calibration for the month of January 2023 is provided in the figure below.

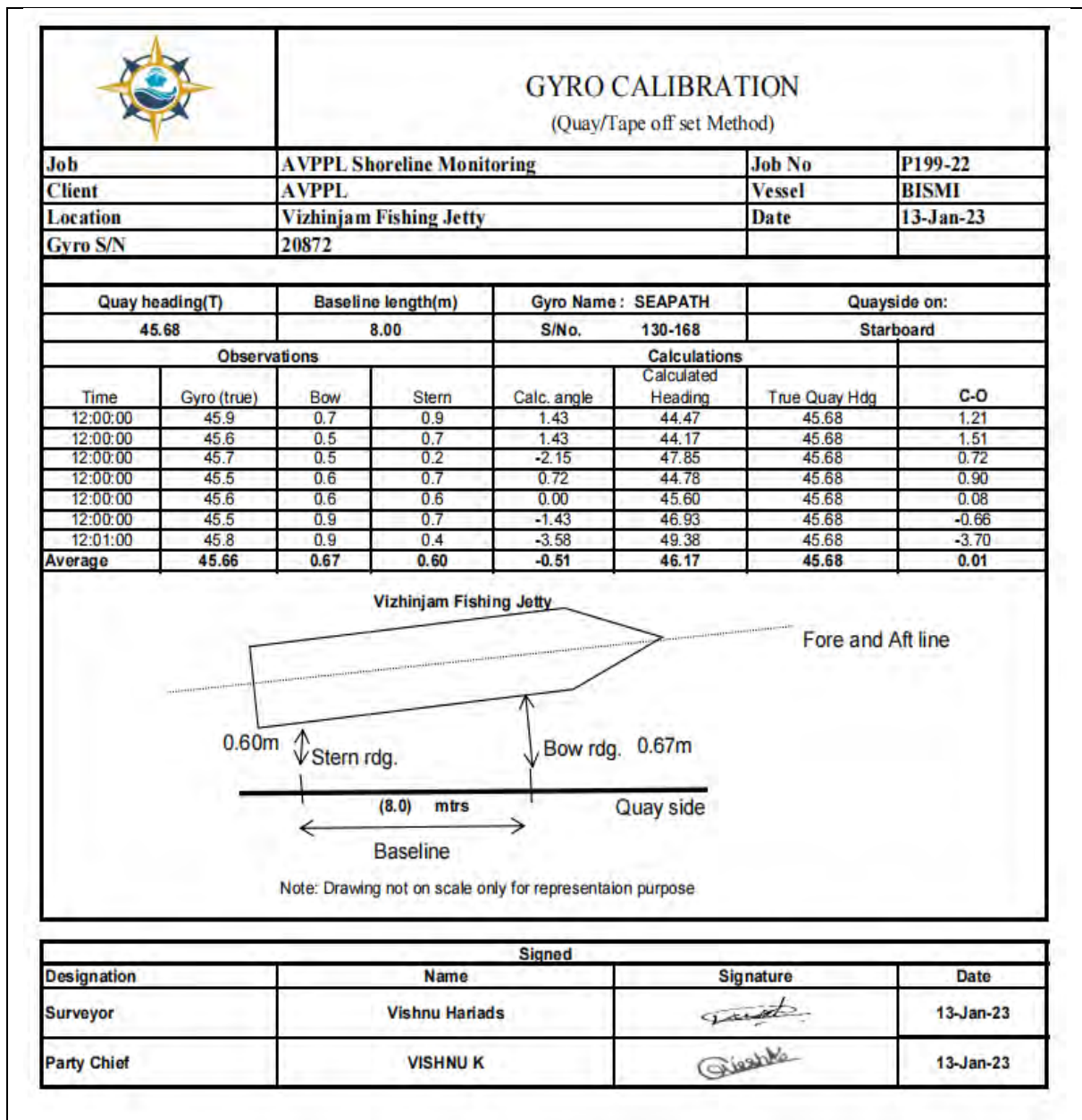


Figure 5-9: Gyrocompass Calibration on board MV Samuel 3

6 SURVEY RESULTS

The following table illustrates the data collection parameters along with duration and frequency of measurement.

①

Table 6-1: Summary table of data collection parameters

Parameter	Duration of Measurement	Frequency of Measurement
Tide	1 st Oct 2022 - 31 st Mar 2023	6 minutes
Wave height and direction	1 st Oct 2022 - 31 st Mar 2023	10 minutes
Current Measurements at 3 locations	Monsoon and Post Monsoon (30 days each)	10 minutes
Wind speed and direction	1 st Oct 2022 - 31 st Mar 2023	10 minutes
Temperature	1 st Oct 2022 - 31 st Mar 2023	10 minutes
Atmospheric Pressure	1 st Oct 2022 - 31 st Mar 2023	10 minutes
Relative Humidity	1 st Oct 2022 - 31 st Mar 2023	10 minutes
Rainfall	1 st Oct 2022 - 31 st Mar 2023	10 minutes

6.1 Tidal Measurements

The tides were observed near the Coast Guard jetty. The tide is referenced to the chart datum. The zero of the sensor was 5.1m below the jetty top, corresponding to a correction factor of 2.389m. On 29th December 2022, maintenance was carried out on the ATG system and the zero of the sensor was lowered to 5.06m below the jetty top. Hence the correction factor changed to 2.349m.

①





Figure 6-1: Location of TBM

The offset calculation of the Tidemaster tide gauge based on the „jetty top“ value is given in the figure below:

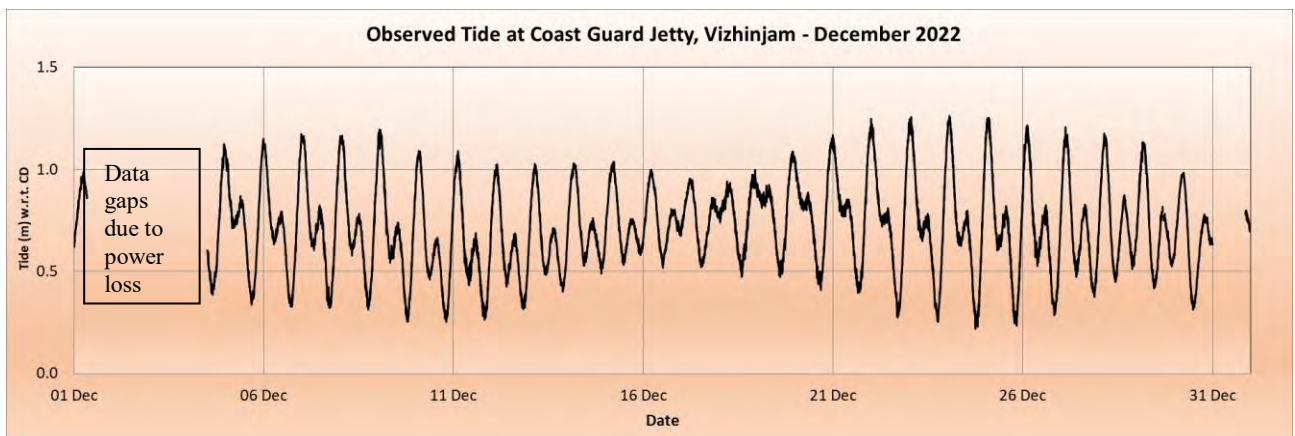
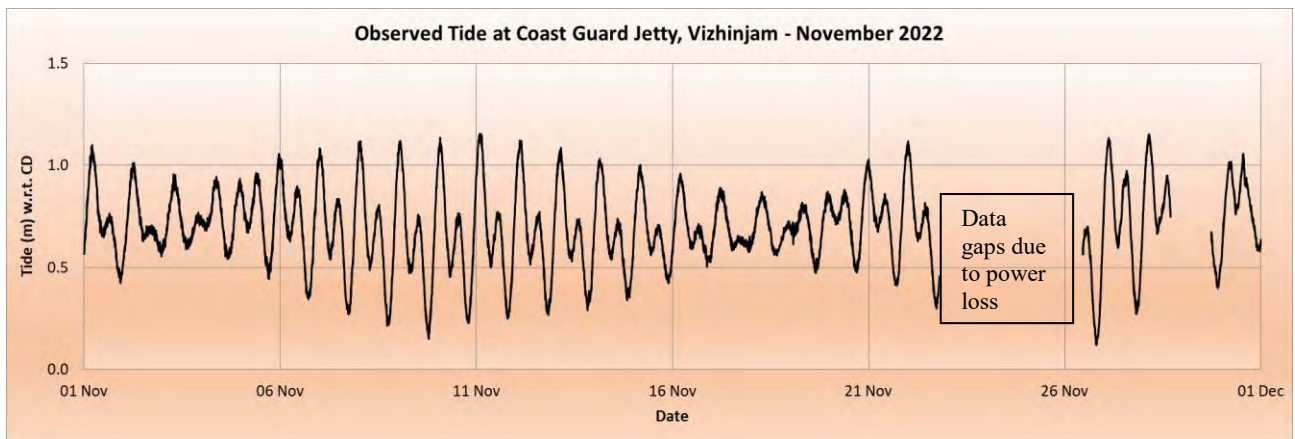
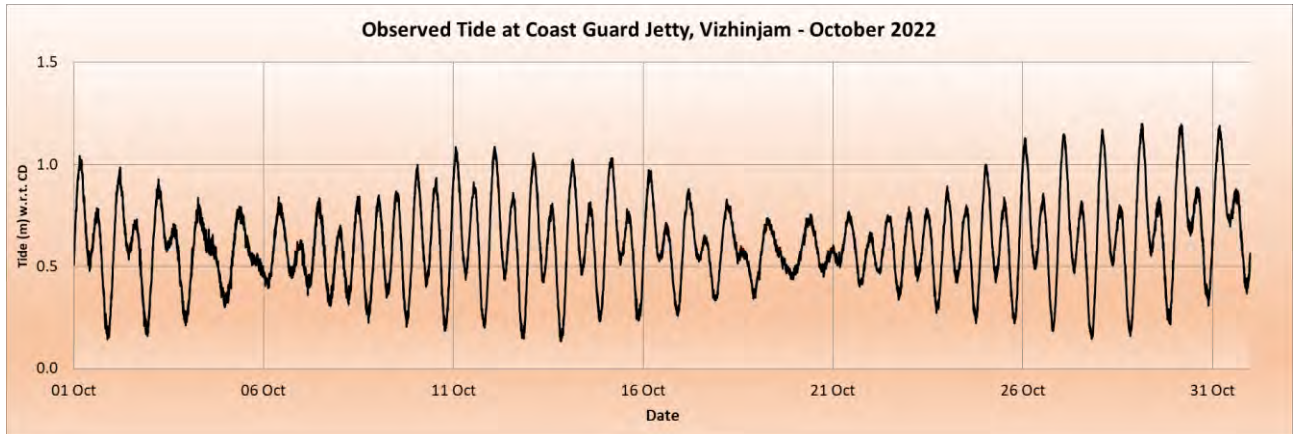
	TIDE GAUGE INSTALLATION		
Job Number	P199-22	Project	Shoreline Monitoring at Vizhinjam
Client	Adani Vizhinjam Port Pvt. Ltd.		
Location	Vizhinjam	Installation Date	29/12/2022
Tide Gauge Sr. No.	84143	Party Chief	Vishnu K.
Tide Gauge setup refers to:	<input checked="" type="checkbox"/> CD	<input type="checkbox"/> MSL	<input type="checkbox"/> LAT
Diagram			
Bench Mark details:			
Value of Bench Mark	2.711	Meters above the Chart Datum	
Levelled By	Vishnu K.		
Date	28/06/2022		
Checked the level from zero of the gauge to BM on: 29/12/2022			
Calculations:			
X, Length from Bench Mark to Zero of Tide Gauge	5.06 m		
Y, Level of Bench Mark above Datum	2.711 m		
Z, Tide Correction factor, Z=X - Y	2.349 m		
Tide height in m above Datum = Raw Tide reading - Z			
Signature:			
Party Chief	Vishnu K.		
Surveyor / Engineer	Vishnu Haridas		

DOC-SAC Tide Gauge Installation

Rev 0

Figure 6-2: Schematic Diagram of Valeport Tidemaster Tide Gauge

The tides observed are mixed semi-diurnal in nature, with the maximum range being observed in the springs. The representation of tide data collected, in the form of graphs is placed below.



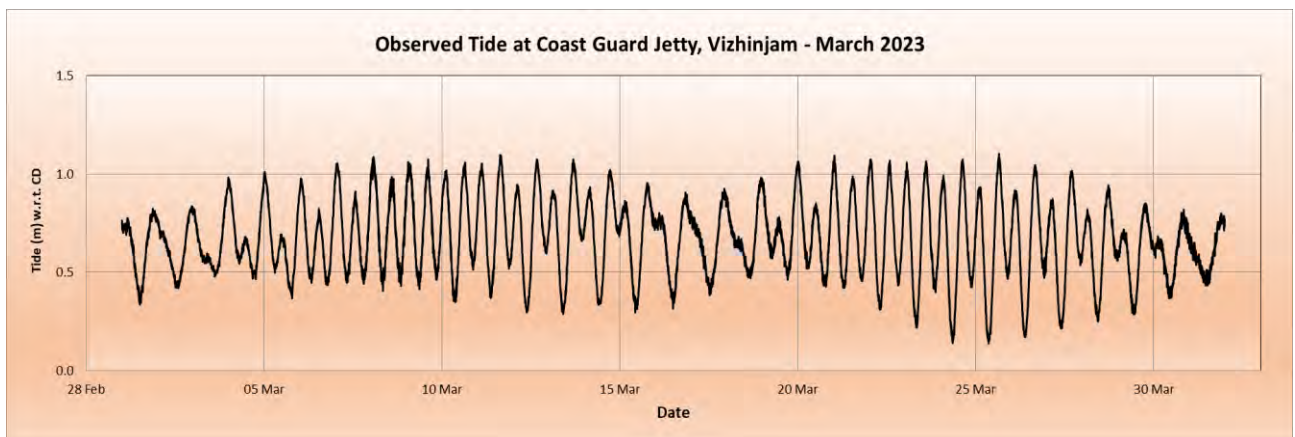
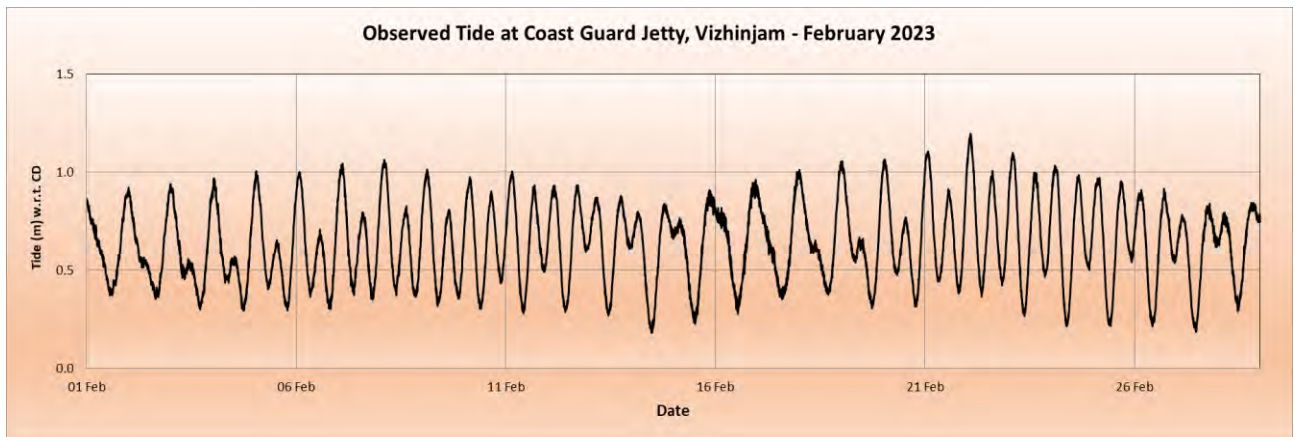
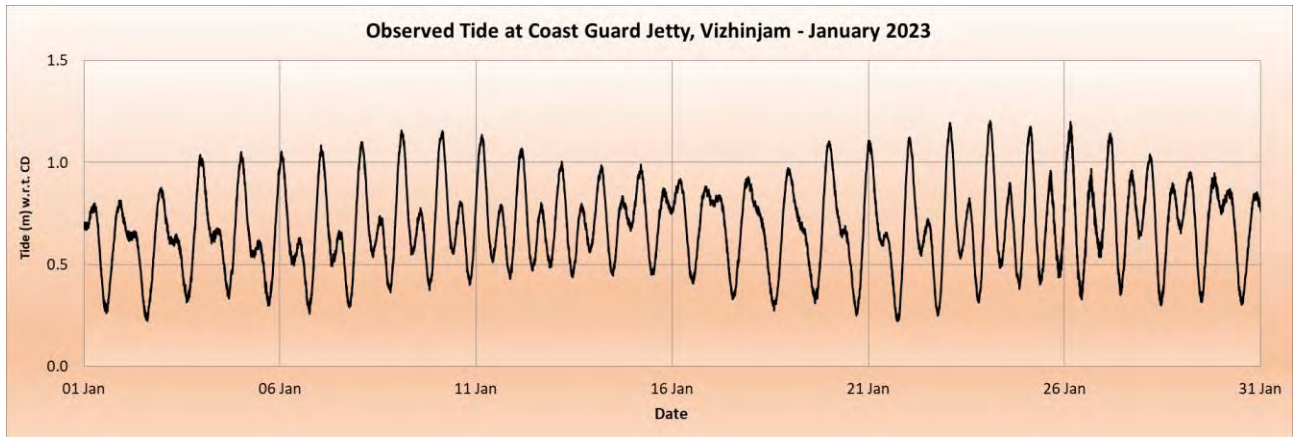


Figure 6-3: Time series of tide

6.2 Wave Measurements

The data from the WRB (provided by NIOT) was downloaded and processed to produce the time series and rose diagram, which are provided below:

Refer to the following rose plots of significant height (H_s) v/s direction for the entire period from October 2022 to March 2023:



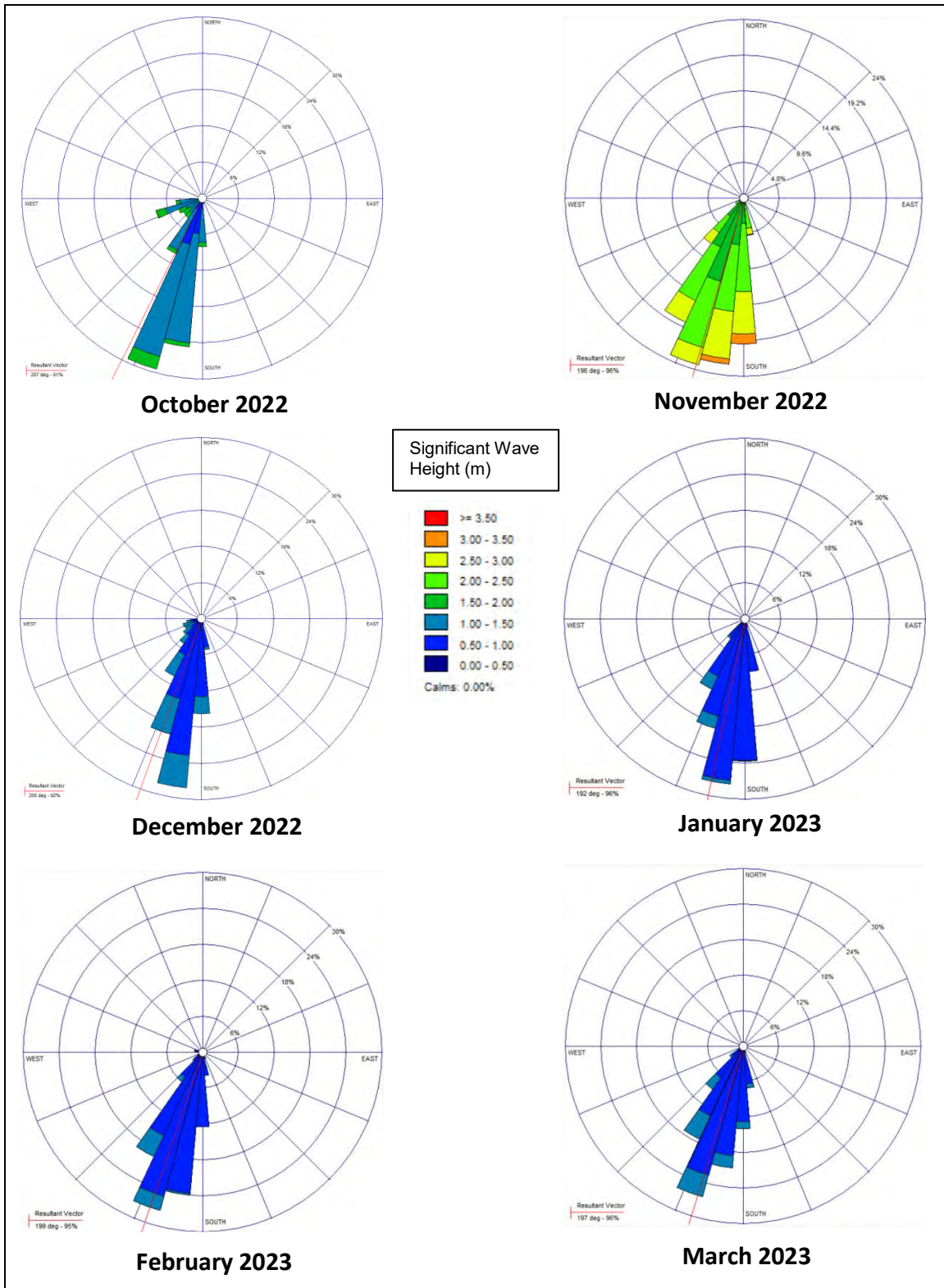


Figure 6-4: Wave Rose (Hs in metre v/s Direction)

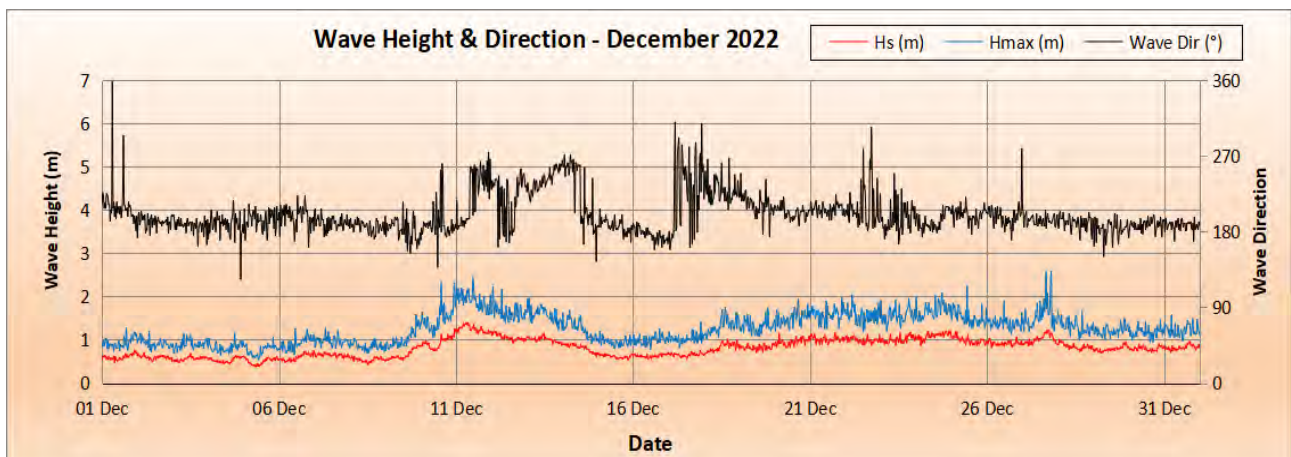
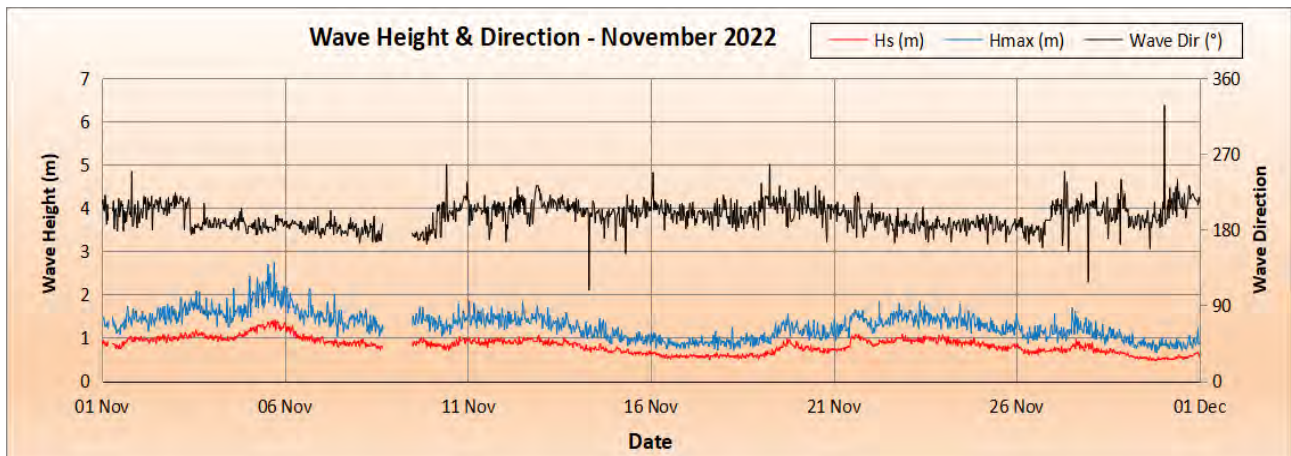
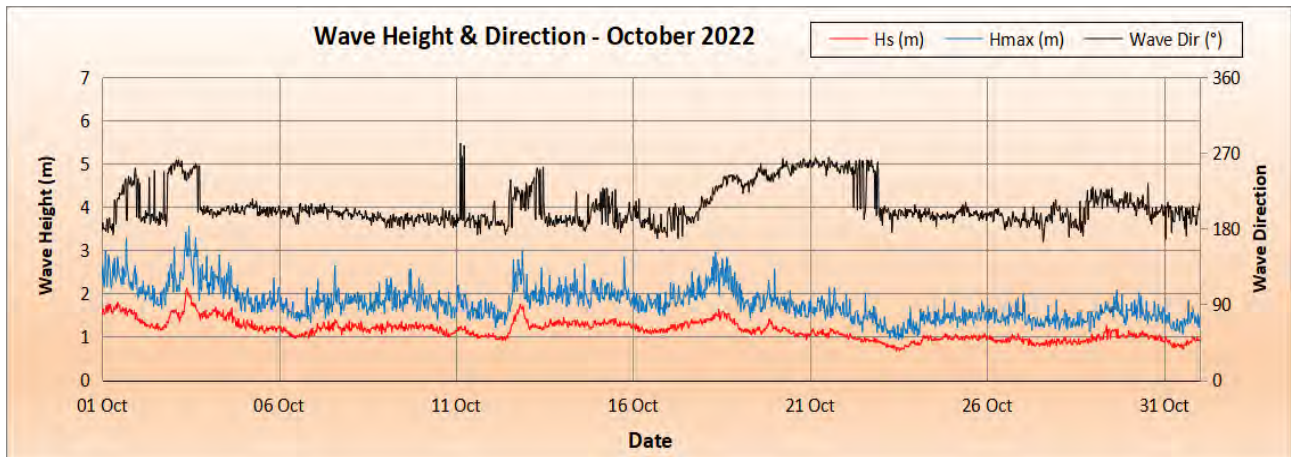
The following table provides the monthly maximum significant wave height (Hs) and wave period (Tp) observed during the period from October 2022 to March 2023.

Table 6-2: Monthly maximum Hs, Hmax and Tp

Maximum significant wave height (Hs), Hmax and Maximum wave period (Tp)				
Month	Hs (m)	Predominant Direction (°)	Hmax (m)	Tp (sec)
October 2022	2.12	207	3.55	18.18
November 2022	1.41	196	2.73	16.67
December 2022	1.39	200	2.57	20.00
January 2023	1.27	192	2.06	18.18
February 2023	1.40	199	2.31	20.00
March 2023	1.23	197	2.59	20.00

The above table indicates that with the retreat of monsoon, the wave heights decreased.

The time series of wave data from October 2022 to March 2023 is shown below.



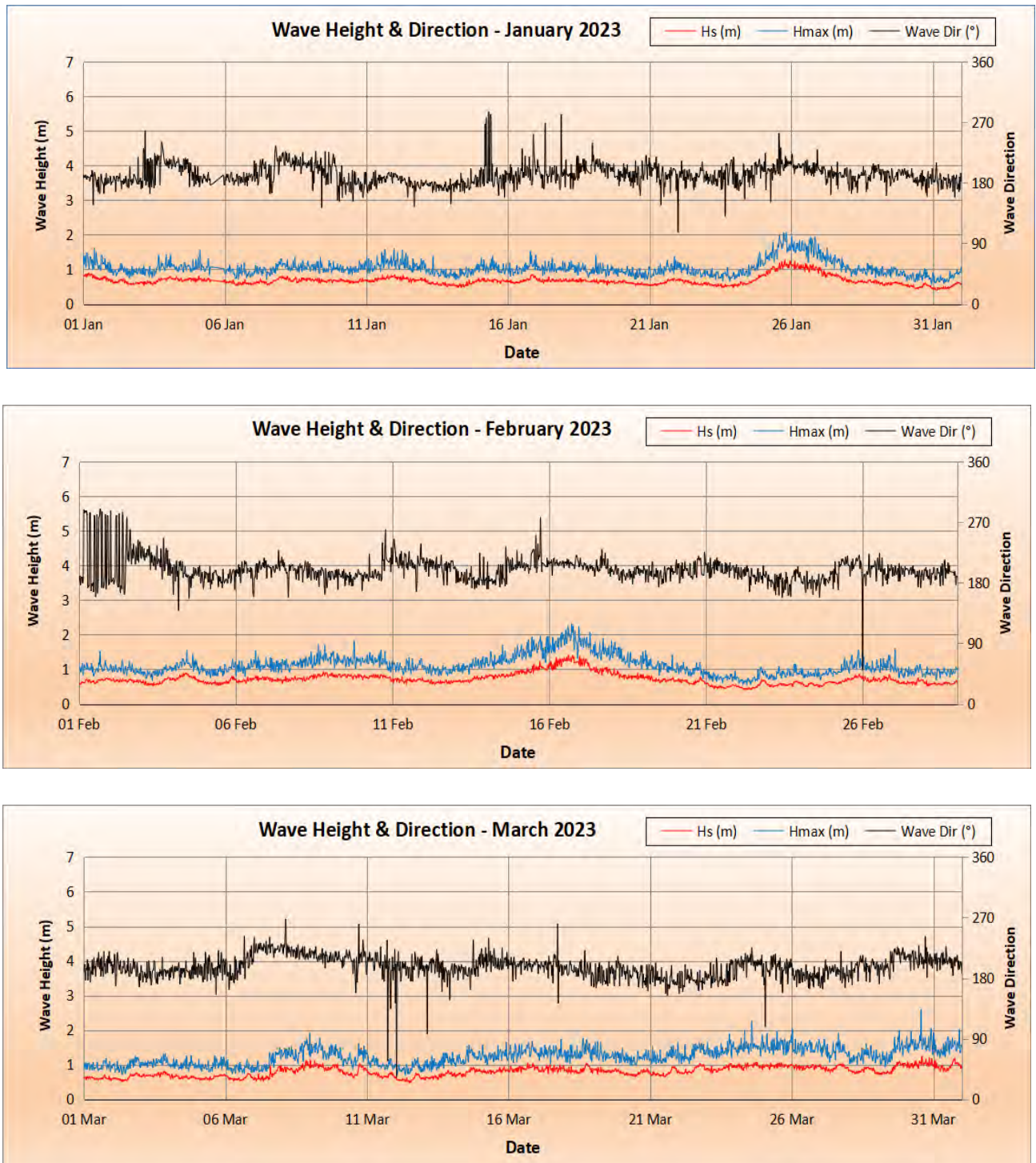


Figure 6-5: Time series of wave parameters



6.3 Current Measurements

6.3.1 Monsoon 2022

- ① Current meters were deployed at four locations during for monsoon 2022 period (June to September 2022) to measure the speed and direction of the current at three different levels, i.e., surface, mid-depth and near bottom.

The following table gives the deployment details of the ADCPs in the survey area for the monsoon 2022 season.

Table 6-3: ADCP mooring locations and observation period

Location	Water Depth (m)	Period of Observation (Monsoon 2022)	Latitude	Longitude	Frequency
P1 (Vizhinjam)	22.1	25 th May – (Pending)**	08° 21' 55.4"N	76° 58' 51.6"E	600 kHz
P2 (Poovar)	23.1	25 th May – 26 th June 2022	08° 17' 35.8"N	77° 04' 03.5"E	600 kHz
P3 (Pachalloor)	21.9	25 th May – 26 th June 2022	08° 24' 08.6"N	76° 56' 16.1"E	600 kHz
P4 (Mulloor)	22.9	25 th May – 26 th June 2022	08° 21' 42.3"N	76° 59' 33.9"E	600 kHz

**Note: The ADCP deployed at P1 (Vizhinjam) could not be recovered and hence no data is available.

Table 6-4: Maximum speed of surface currents

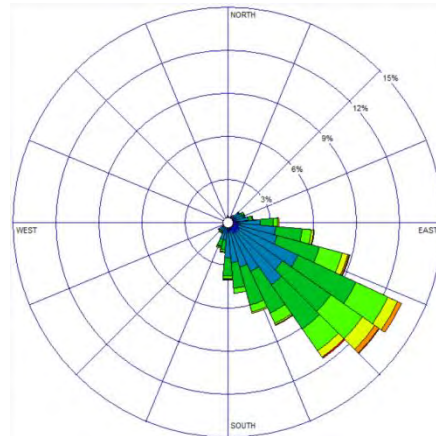
Maximum Surface Current Speed in cm/s, date and time				
Season	Location P1 (Vizhinjam)	Location P2 (Poovar)	Location P3 (Pachalloor)	Location P4 (Mulloor)
Monsoon 2022	-	89.6 05/06/2022 03:40	65.5 02/06/2022 01:50	53.4 02/06/2022 11:10

The current rose plot of surface current speed at three locations for the Monsoon 2022 period is shown below.



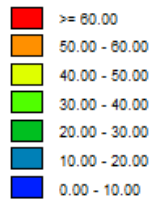
①

No data since the ADCP deployed at P1 couldn't be recovered.

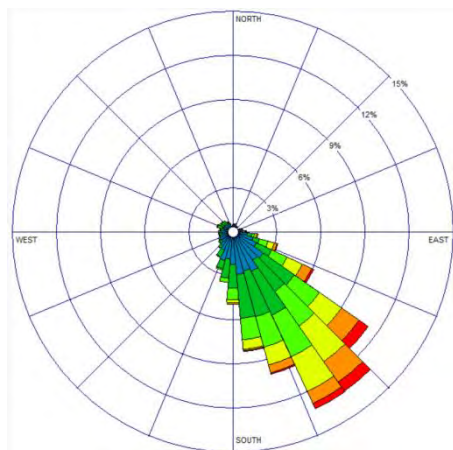


Vizhinjam

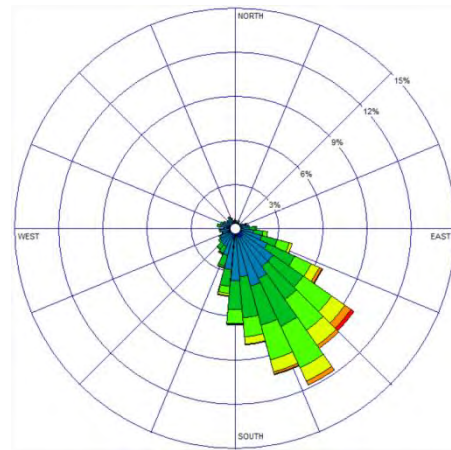
Current Speed (cm/sec)



Poovar



Pachalloor



Mulloor

Figure 6-6: Rose Plot (surface speed in cm/sec) – All locations

The rose plot reveals a flow parallel to the shore. During the observation period, the flow was predominantly towards the southeast in three locations.



6.3.2 Post Monsoon 2022

- ① Current meters were deployed at three locations during for post monsoon 2022 period from 28th February to 30th March 2023 to measure the speed and direction of the current at three different levels, i.e., surface, mid-depth and near bottom.

The following table gives the deployment details of the ADCPs in the survey area for the post monsoon 2022 season.

Table 6-5: ADCP mooring locations and observation period

Location	Water Depth (m)	Period of Observation (Post Monsoon 2022)	Latitude	Longitude	Frequency
P1 (Vizhinjam)	22.1	28 th Feb – 30 th Mar 2023	08° 21' 55.4"N	76° 58' 51.6"E	600 kHz
P2 (Poovar)	23.1	28 th Feb – 30 th Mar 2023	08° 17' 35.8"N	77° 04' 03.5"E	600 kHz
P3 (Pachalloor)	-	-	08° 24' 08.6"N	76° 56' 16.1"E	-
P4 (Mulloor)	22.9	28 th Feb – 30 th Mar 2023	08° 21' 42.3"N	76° 59' 33.9"E	600 kHz

Note: Since we had lost one ADCP during the Monsoon 2022 campaign, the observations were carried out only at 3 locations.

Table 6-6: Maximum speed of surface currents

Maximum Surface Current Speed in cm/s				
Season	Location P1 (Vizhinjam)	Location P2 (Poovar)	Location P3 (Pachalloor)	Location P4 (Mulloor)
Post monsoon 2022	99.8 10/03/2023 01:30	83.6 05/03/2023 19:50	-	85.7 05/03/2023 20:30

The current rose plot of surface current speed at three locations for the Post Monsoon 2022 period is shown below.



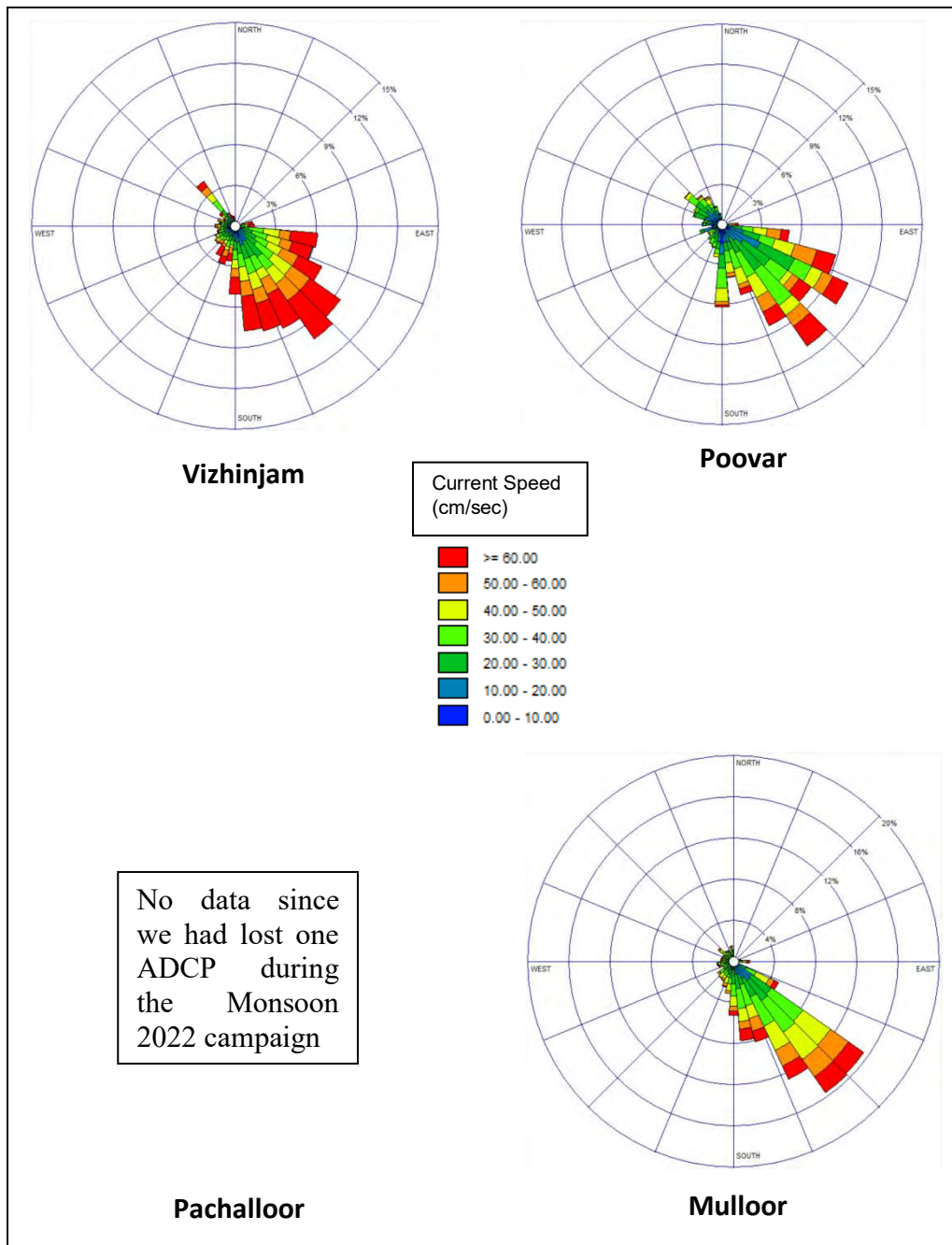


Figure 6-7: Rose Plot (surface speed in cm/sec) – All locations

The rose plot reveals a flow parallel to the shore. During the observation period, the flow was predominantly towards the southeast in three locations.

①

6.4 Measurement of Meteorological Parameters

The automatic weather station was installed on the terrace of the Port Control Office building. The wind data from October 2022 to March 2023 is compiled and presented in the form of rose plots below.

Note: The AWS system was re-installed on top of the Port Office building on 13th October 2022. Due to a technical issue with the data logger, the data gaps were present.



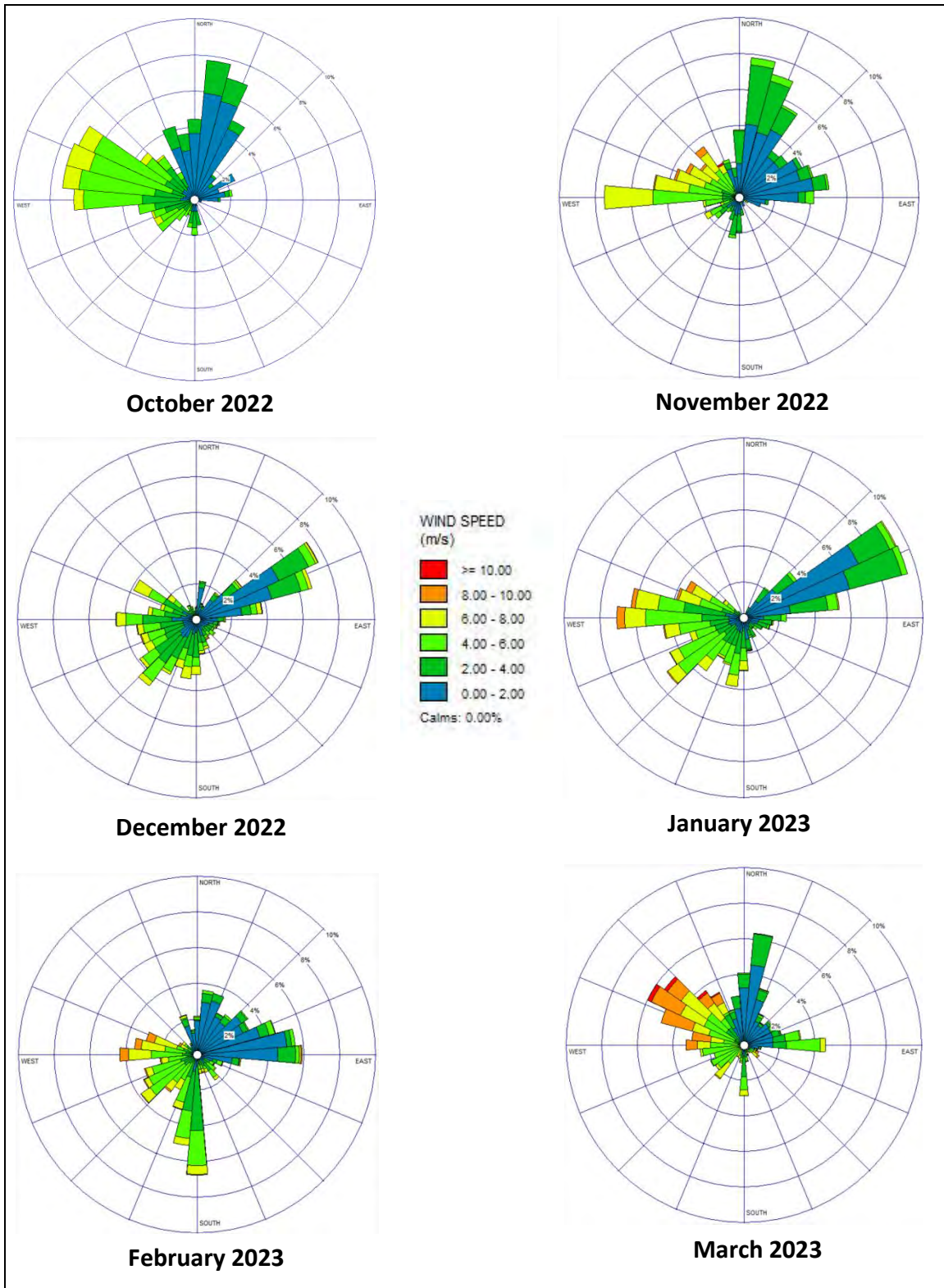


Figure 6-8: Wind rose (Speed in m/s vs direction)

The monthly maximum wind speed and predominant direction are provided in the tables below.

Table 6-7: Monthly maximum wind speed from landside

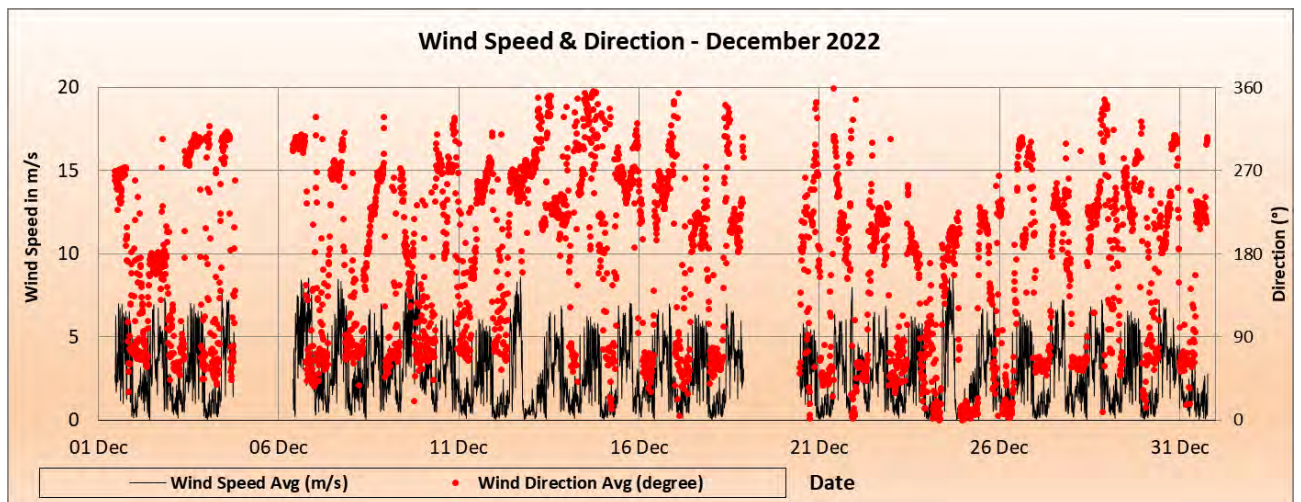
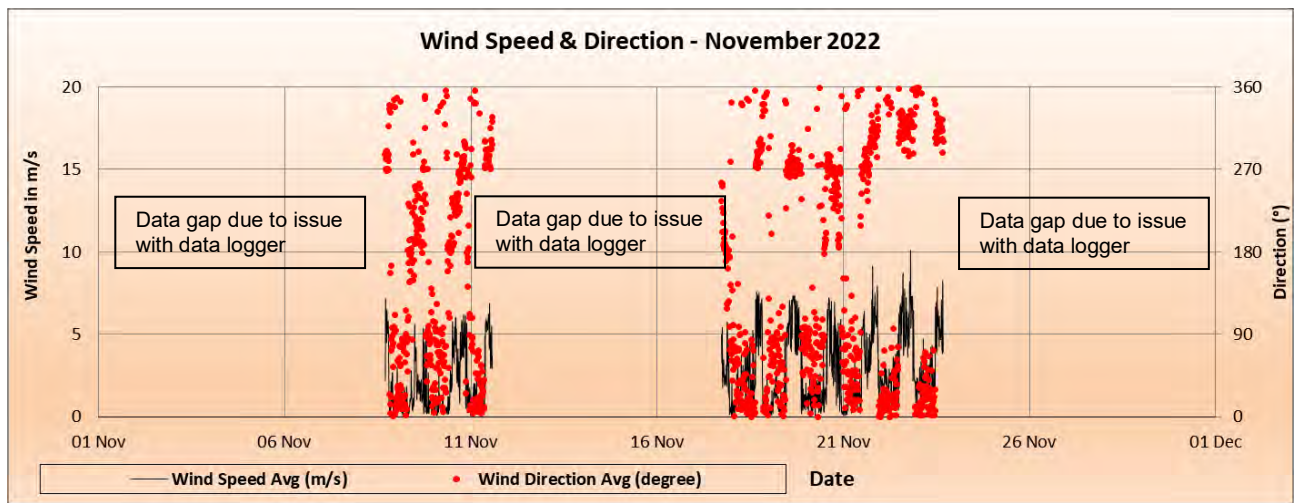
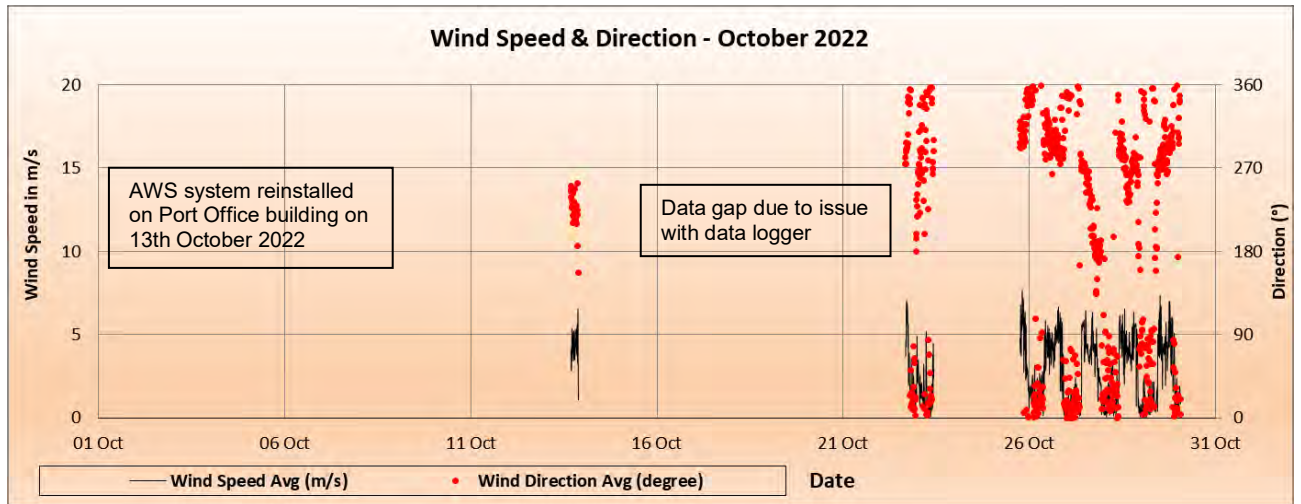
Month	Wind Speed (m/s)	Predominant Direction (°)
October 2022	5.37	134
November 2022	5.76	46
December 2022	8.80	70
January 2023	8.23	70
February 2023	9.09	75
March 2023	8.59	63

Table 6-8: Monthly maximum wind speed from seaside

Month	Wind Speed (m/s)	Predominant Direction (°)
October 2022	7.68	303
November 2022	10.08	279
December 2022	8.81	247
January 2023	8.69	255
February 2023	9.17	244
March 2023	13.73	294

The time series of wind data from October 2022 to March 2023 is shown below.





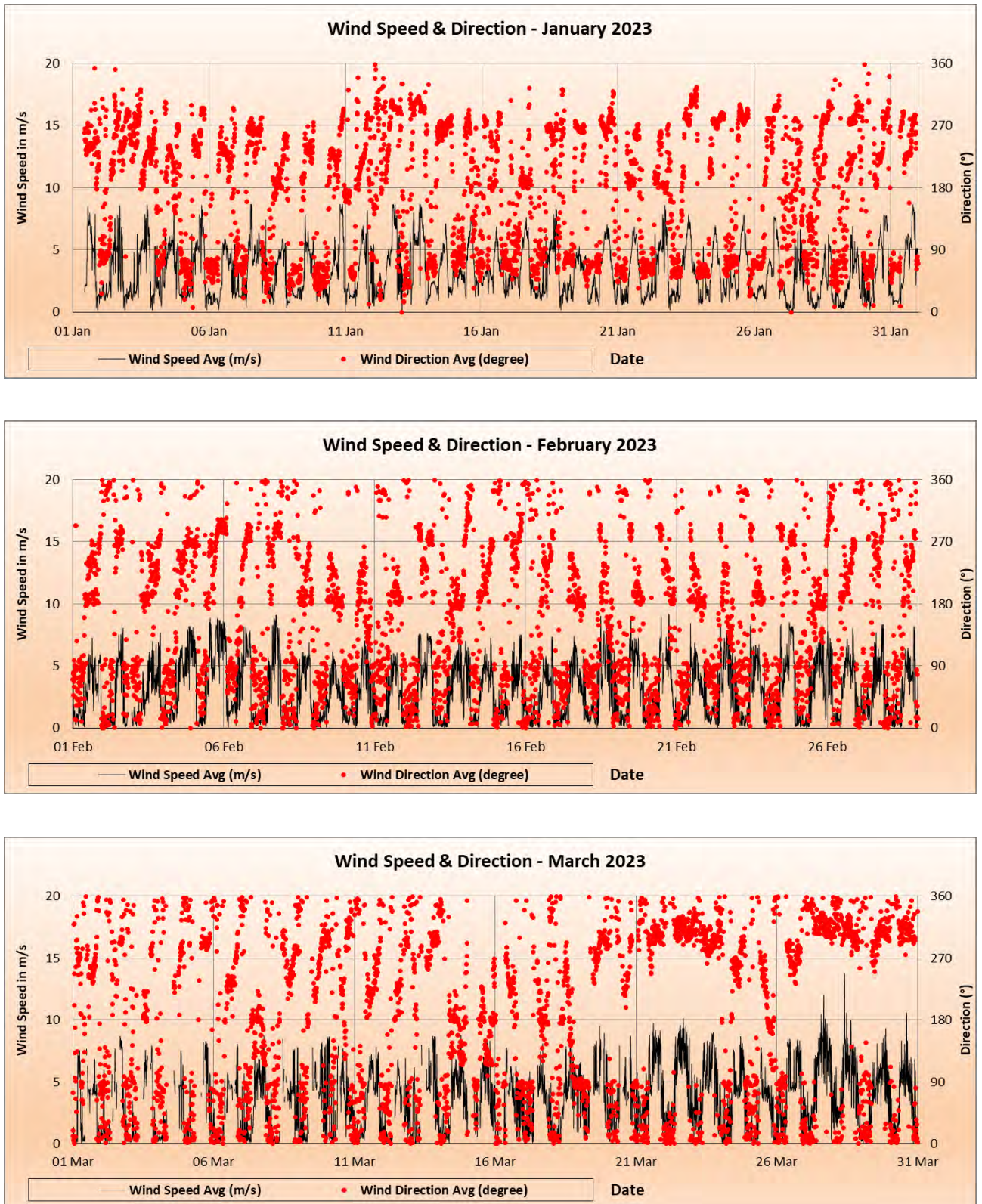


Figure 6-9: Time series of wind data



The percentage occurrence tables for atmospheric pressure, temperature and relative humidity for the period of October 2022 to March 2023 are shown below.

Table 6-9: Frequency distribution of atmospheric pressure

Frequency Distribution	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Atm. Pressure (mb)	Percentage Occurrence					
<1000	1.44	0.55	0.00	0.00	0.00	0.00
1000-1004	0.00	0.00	0.00	0.00	0.00	0.00
1004-1008	8.01	4.16	18.22	6.72	0.45	1.69
>1008	90.55	95.29	81.78	93.28	99.55	98.31
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 6-10: Frequency distribution of temperature

Frequency Distribution	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Temperature (°)	Percentage Occurrence					
20-24	0.39	3.85	6.34	2.61	7.31	0.00
24-28	73.49	62.69	66.35	74.10	45.33	34.25
28-32	26.12	33.46	27.31	23.28	47.31	65.72
>32	0.00	0.00	0.00	0.00	0.05	0.02
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 6-11: Frequency distribution of relative humidity

Frequency Distribution	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Rel. Humidity (%)	Percentage Occurrence					
50-60	1.31	1.26	1.43	0.34	11.63	3.38
60-70	0.66	14.53	19.60	0.23	22.52	17.07
70-80	26.51	31.74	38.76	0.16	37.08	60.27
>80	71.52	52.47	40.21	44.23	28.77	19.27
Total	100.00	100.00	100.00	100.00	100.00	100.00

The frequency histograms for atmospheric pressure, temperature and relative humidity for the period of October 2022 to March 2023 are shown below.

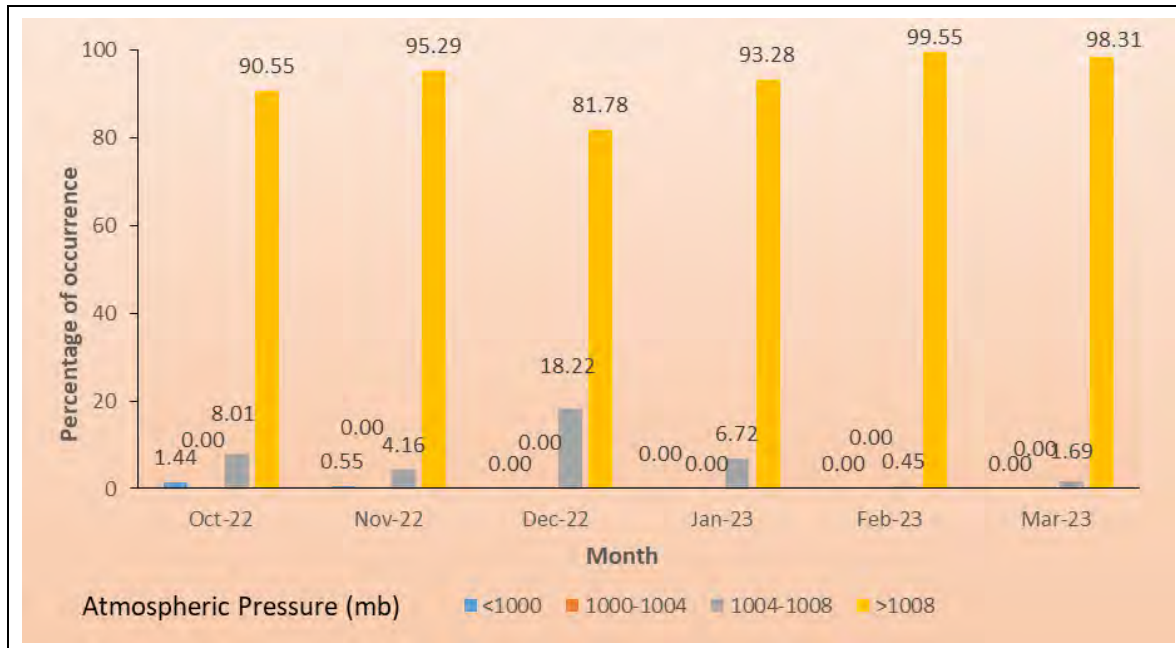


Figure 6-10: Histogram of atmospheric pressure

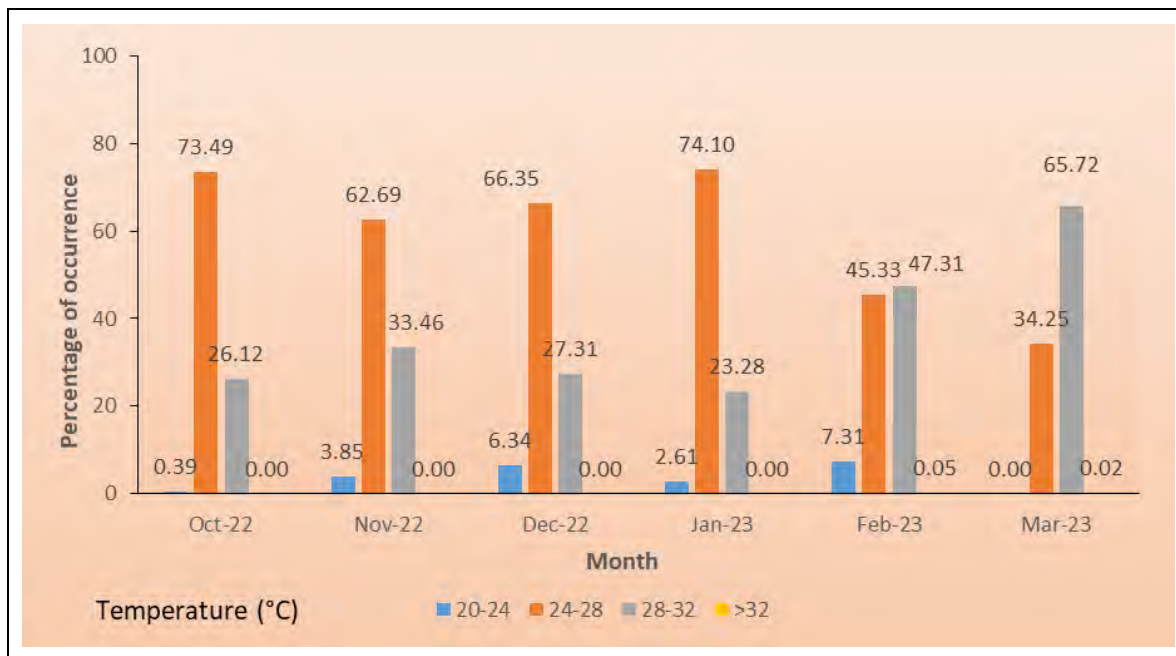


Figure 6-11: Histogram of temperature

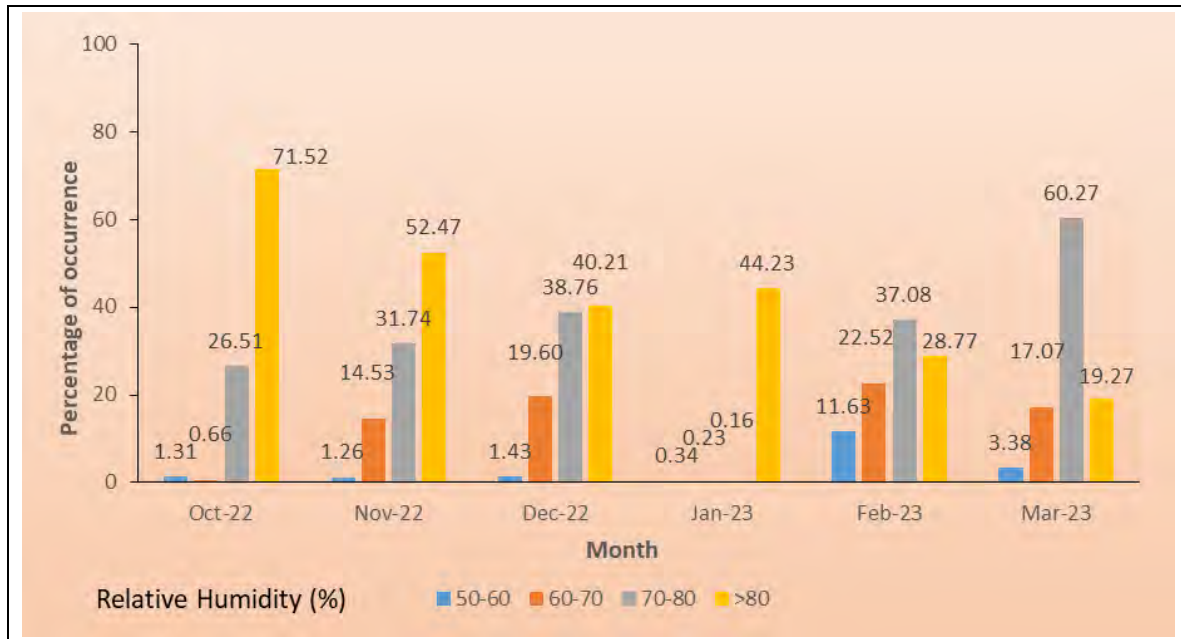


Figure 6-12: Histogram of relative humidity

The data reveals that the temperature increased rapidly from January to March 2023. The maximum occurrence of relative humidity readings greater than 80% was observed in the month of October 2022, gradually decreased towards March as a result of retreating monsoon. During the period of observation, the majority of atmospheric pressure readings were greater than 1008 mb.

6.5 Littoral Environment Observations

The LEO was to be carried out at 81 locations from October 2022 to March 2023. In the month of October 2022, 42 locations were covered, 37 locations in November 2022, 54 locations in December 2022, 79 locations in January 2023, 80 locations in February 2023 and 79 locations in March 2023. The locations in which the LEO could not be carried out were primarily due to increased opposition faced from the locals residing in those areas. The LEO plate was deployed at all the locations and the same was tracked for about five to ten minutes, as per the site conditions. The initial and final GPS positions were then used to calculate the SOG and COG. The estimated wave height, angle of wave, period and the stretch of breakers were also noted down in the log.

The along shore current followed a northerly trend in the post-monsoon 2022 period. The following table shows the maximum along shore current speed recorded in each month.

Table 6-12: Monthly maximum along shore current

Month	Max Speed (cm/s)	Predominant Direction	Line No.	Location
October 2022	15.71	North	CSP 69	Shangumugham
November 2022	39.73	North	CSP 74	Vettucaud
December 2022	26.59	North	CSP 69	Shangumugham
January 2023	35.4	North	CSP 24	Karumkulam
February 2023	34.51	North	CSP 70	Shangumugham
March 2023	38.37	North	CSP 54	Punthura

- ① A pictorial representation of the alongshore current direction during the Post Monsoon 2022 period is shown in the Google Earth image below.





Figure 6-13: Representation of surface current direction from October 2022 to March 2023

6.6 Photographic Documentation

Photographic documentation was to be carried out for all the 81 locations from October 2022 to March 2023, coinciding with the cross-shore profiling. Due to the local agitation, photographic documentation could not be carried in few locations during the period.

The latest photographs for the month of March 2023 are provided in **Annexure I**. As a common reference point, a flag was fixed at each of the cross-shore profiling alignments while taking the photograph. Using the RTK system, this point was staked during the photography.

6.7 Cross Shore Profiles

The cross-shore profiling for the period was carried out using RTK in the onshore region and a wide swath bathymetric system in the offshore region. The nearest depth which could be attained was about 4 to 5m due to the presence of waves breaking in the zone. The boat is not able to approach this zone, due to breakers nearshore considering the safety of personnel onboard.

There is a steep hill which lies on the CSP 35 line, due to which cross-shore profiling is not possible in the onshore area.

The following table provides the identification of CSP vis-à-vis the local name:



Table 6-13: CSP Location names

CSP NO.	LANDMARK	LOCATION	SITE CONDITION
CSP-01	CATHOLIC CRISMATIC PRAYER CENTER	EDAPPADU BEACH	Seawall, Groyne No. 1
CSP-02			Beach
CSP-03			Seawall
CSP-04	ST. MARY'S CHURCH	VALLAVILAY	Groyne Nos. 2 to 5 in the vicinity, Beach and Seawall
CSP-05			Groyne Nos. 6 to 8 in the vicinity, Beach and Seawall
CSP-06			Groyne Nos. 9 to 13 in the vicinity, Beach and Seawall
CSP-07	ST. NICOLAS' CHURCH	NEERODY	Groyne Nos. 14 to 16 in the vicinity, Beach and Seawall
CSP-08			Groyne Nos. 17 to 21 in the vicinity, Beach and Seawall
CSP-09			Groyne Nos. 22 to 24 in the vicinity, Beach and Seawall
CSP-10	SREE BHADRAKALI TEMPLE	POZHIYOOR	Groyne Nos. 25 to 27 in the vicinity, Beach and Seawall
CSP-11			Groyne Nos. 28 and 29 in the vicinity, Seawall
CSP-12			Seawall
CSP-13	ST. MATHEW'S CHURCH	PARUTHIYOOR	Seawall
CSP-14	CHURCH OF CHRIST		Seawall
CSP-15	POOVAR ISLAND RESORT	POOVAR BEACH SOUTH	Beach
CSP-16			Beach
CSP-17			Beach
CSP-18	POZHIKARA BEACH	POOVAR	Beach
CSP-19			Beach
CSP-20	ST. ANTONY'S CHAPEL	POOVAR BEACH NORTH	Beach
CSP-21			Beach
CSP-22	ST. ANTONY'S CHURH	KARUMKULAM	Beach
CSP-23			Beach
CSP-24			Beach
CSP-25			Beach
CSP-26			Beach
CSP-27	GOTHAMBU ROAD	PULLUVILA	Beach
CSP-28			Beach
CSP-29			Beach
CSP-30			Beach
CSP-31	ADIMALATHURA CATHOLIC CHURCH	ADIMALATHURA	Beach
CSP-32			Beach



CSP NO.	LANDMARK	LOCATION	SITE CONDITION
CSP-33			Beach
CSP-34			Beach
CSP-35	AZHIMALA TEMPLE	AZHIMALA	Rocky Area
CSP-35A	AZHIMALA TEMPLE	AZHIMALA	Beach
CSP-36	NAGAR BHAGAVATHY TEMPLE	MULLUR	Beach
CSP-37			Beach and Seawall
CSP-38	ADANI PORT RECLAMATION AREA	ADANI PORT OFFICE VIZHINJAM	Beach and Seawall
CSP-39			Beach and Seawall
CSP-40			Port Construction
CSP-40A			Beach and Seawall
CSP-41	VIZHINJAM LIGHT HOUSE	KOVALAM	Beach
CSP-42			Beach and Seawall
CSP-43			Beach and Seawall
CSP-44			Beach and Seawall
CSP-45			Beach and Seawall
CSP-46			Beach
CSP-47	SAMUDRA BEACH PARK		Beach and Seawall
CSP-48	MOSQUE		Beach and Seawall
CSP-49			Seawall
CSP-50	PANATHURA TEMPLE	PANATHURA	Seawall
CSP-51			Seawall
CSP-52			Groyne No. 30 in the vicinity, Seawall
CSP-53	PUNTHURA FISH MARKET	PUNTHURA	Groyne No. 31 in the vicinity, Beach
CSP-54			Beach
CSP-55			Beach
CSP-56			Seawall
CSP-57			Beach and Seawall
CSP-58	BEEMA PALLY	BEEMA PALLY	Beach and Seawall
CSP-59			Seawall
CSP-60			Beach and Seawall
CSP-61	CHERIYATHURA SPORTS GROUND	CHERIYATHURA	Groyne Nos. 38 to 42 in the vicinity, Beach and Seawall
CSP-62			Groyne Nos. 43 to 47 in the vicinity, Beach and Seawall
CSP-63	VALIYATHURA BRIDGE	VALIYATHURA	Groyne Nos. 48 to 51 in the vicinity, Seawall
CSP-64			Seawall, Valiyathura Bridge
CSP-65			Seawall
CSP-66			Beach and Seawall



CSP NO.	LANDMARK	LOCATION	SITE CONDITION
CSP-67			Beach and Seawall
CSP-68	SHANGUMUGHAM BEACH	SHANGUMUGHAM	Beach and Seawall
CSP-69			Beach and Seawall
CSP-70	ST. PETER'S CHURCH		Beach and Seawall
CSP-71			Beach and Seawall
CSP-72			Beach
CSP-73	VETTUCAUD CHURCH	VETTUCAUD	Beach and Seawall
CSP-74			Beach
CSP-75	VELI CHILDREN'S PARK		KOCHUVELI
CSP-76		Beach	
CSP-77		Beach	
CSP-78	ST. THOMAS' CHURCH	VALIYAVELI	Beach and Seawall
CSP-79			Beach and Seawall
CSP-80	CHRISTIAN BROTHEREN CHURCH	THUMBA	Beach
CSP-81			Beach

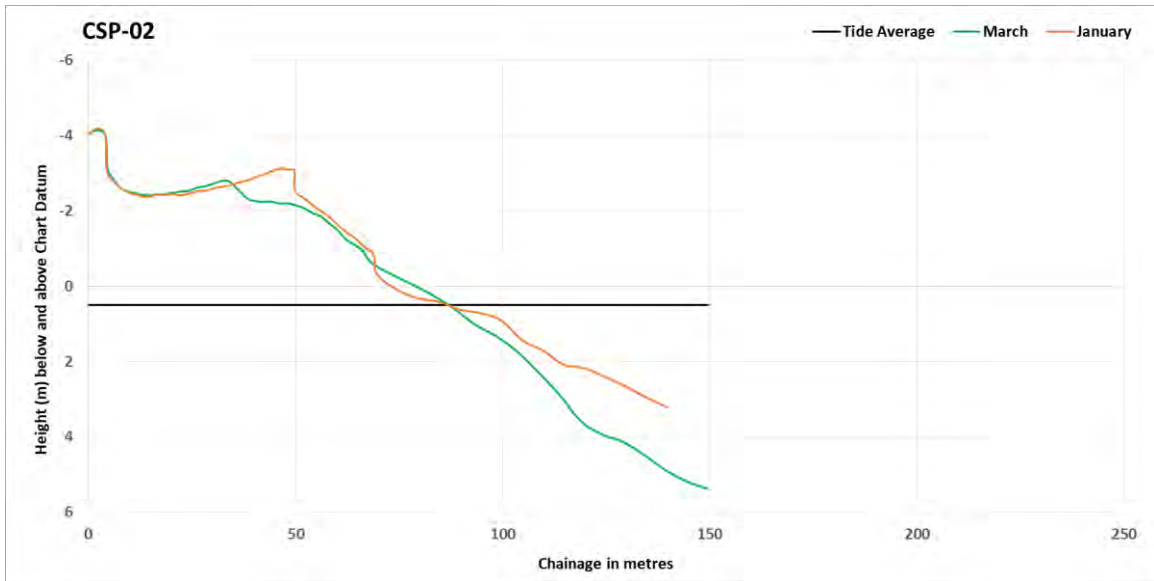
6.8 Near-shore (Sled Survey)

① Near-shore survey was carried out along along 7 CSP lines namely CSP 2 (Edappadu), 33, 34 (Adimalathura), 68, 69 (Shangumugham), 73 and 74 (Vettucaud) using pressure sensor during October 2022 to March 2023. CSP 2, 3, and 34 could not be approached due to the agitation and protests during October, December 2022 and February 2023. No near shore survey was carried out for the entire month of November 2022 as a result of the local protest.

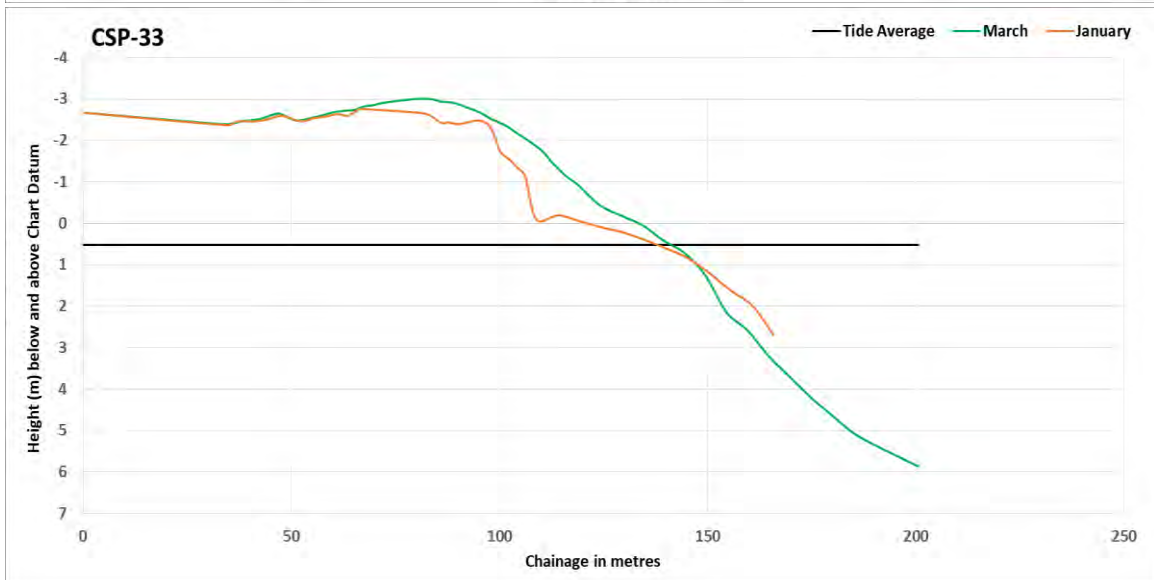
The graphs for the near-shore survey are provided below:

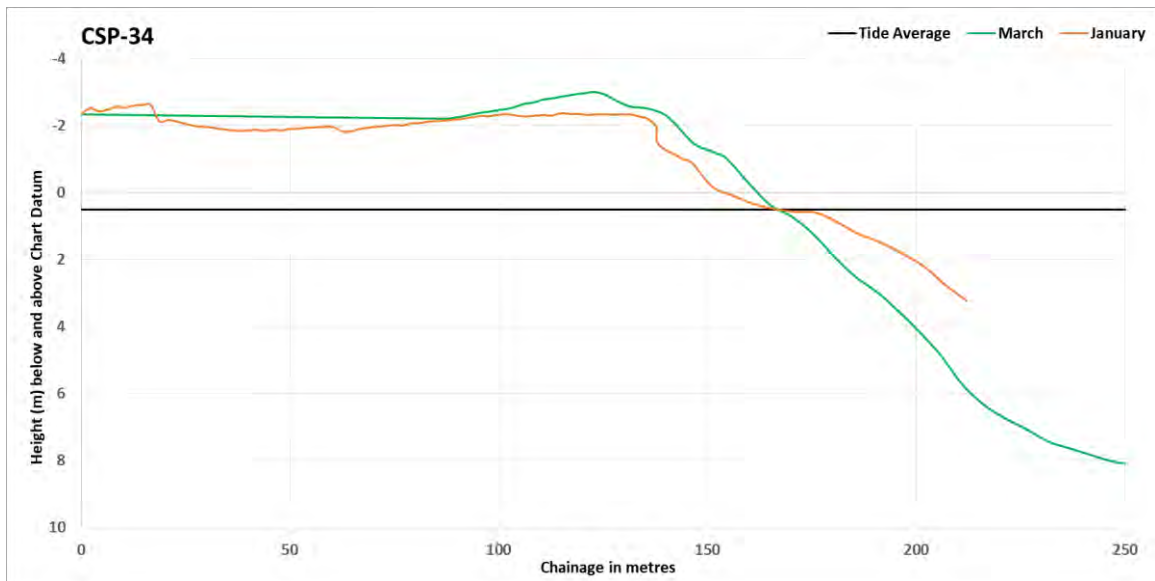


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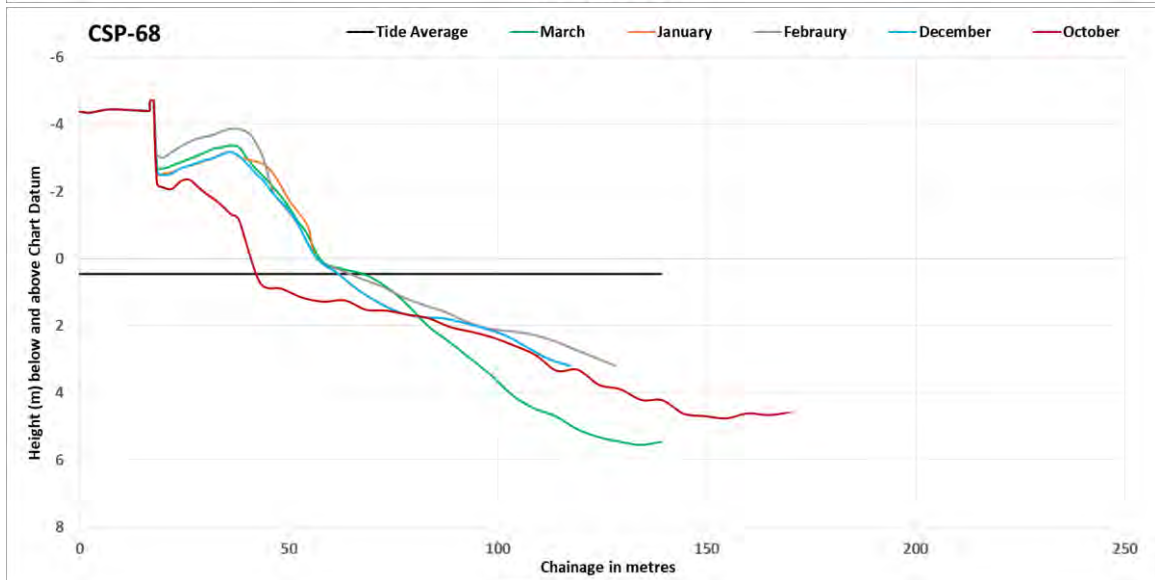


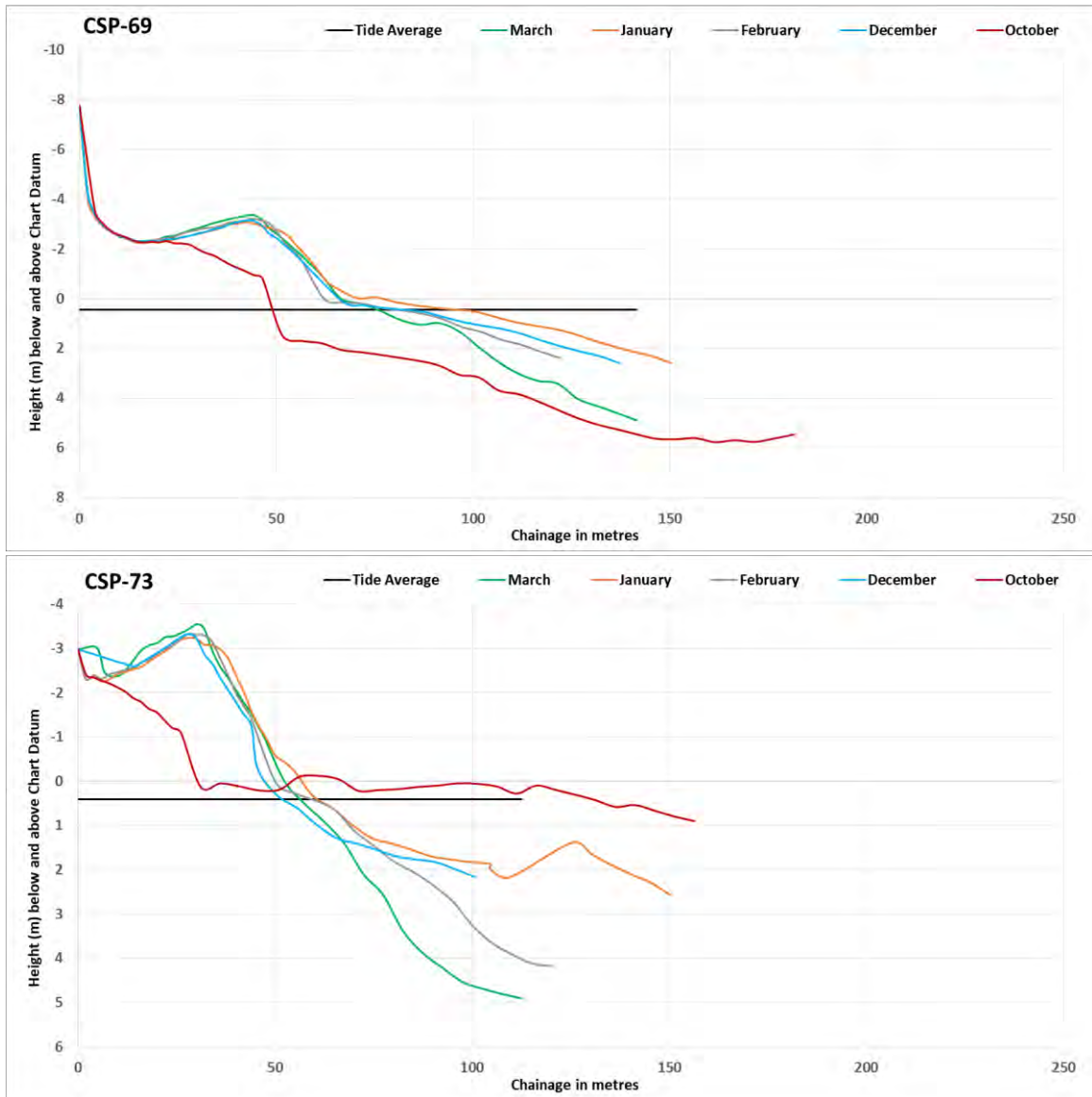
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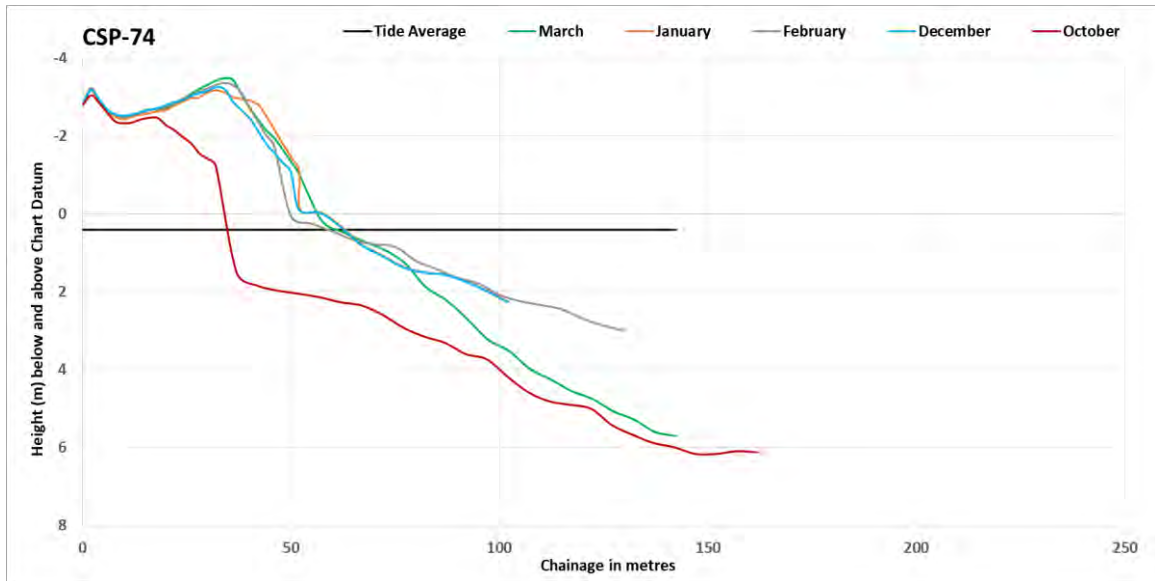


Figure 6-14: Graphs of near shore survey

6.9 Shoreline Monitoring Survey

The entire 41 km of shoreline was surveyed from October 2022 to March 2023. In the month of October 2022, locations 15 to 41 and 53 to 55 could not be approached for due to the agitation and protests, whereas in November 2022, locations 12 to 41 and 47 to 60 could not be approached, and in December 2022, locations 23 to 41 and 53 to 60 could not be surveyed. The survey was carried out using RTK system in GPS mode. This stretch extends from CSP-1 in the south (Eddapadu) to CSP-81 in the north (Thumba). A total of 51 groynes have been observed within the survey area. An overlay of month-on-month GPS survey charts is provided in **Annexure II**.

Table 6-14: Area wise number of groynes

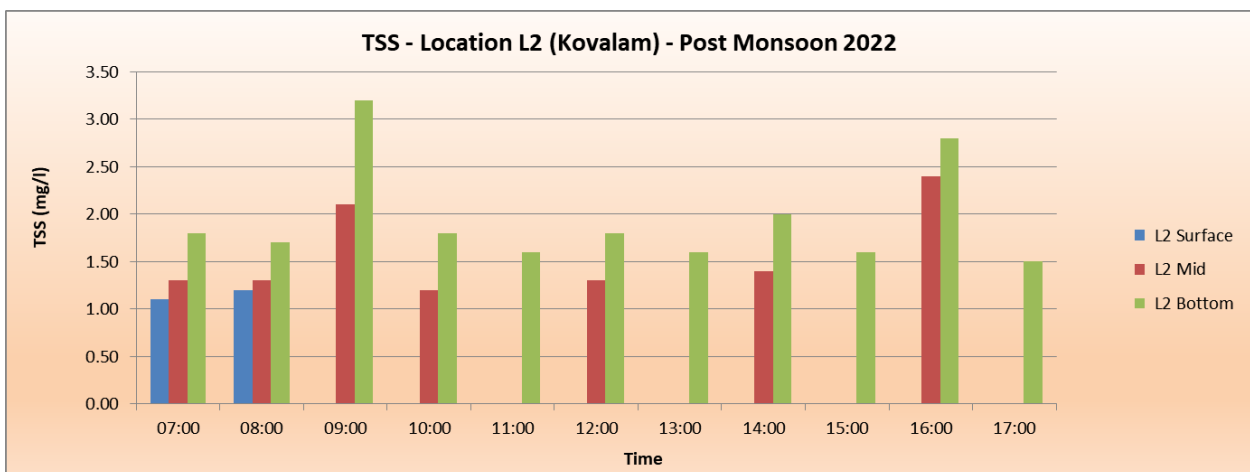
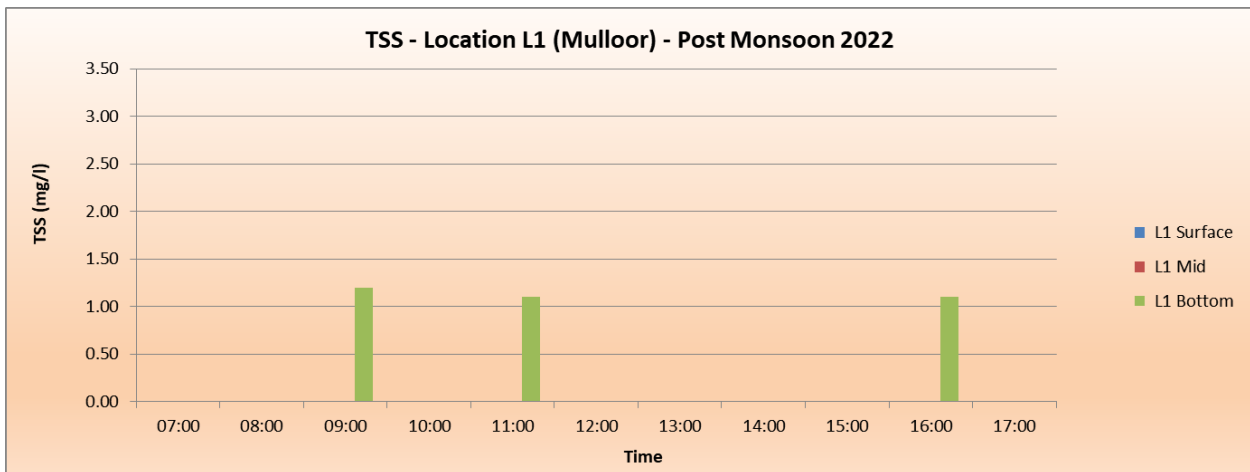
Area	Number of Groynes	North / South of the Port Area	Total no. of Groynes North/South of the port
Edappadu Beach	1	South	29 South
Vallavilay	12	South	
Neerody	11	South	
Pozhiyoor	5	South	
Panathura	1	North	22 North
Punthura	2	North	
Beemapally	4	North	
Cheriyathura	10	North	
Valiyathura	5	North	
Total number of groynes			51



6.10 Water Sampling

Water samples were collected from 4 locations, namely, L1 (Mulloor), L2 (Kovalam), L3 (Pachalloor) and L4 (Poovar) from three levels: surface, mid-depth and near bottom during the post monsoon season from 17th to 20th March 2023. The parameters measured were Total Suspended Solids (TSS), turbidity and salinity at NABL accredited laboratory in Kochi (Standard^s Environmental & Analytical Laboratories, Accreditation and Approval: NABL as per ISO 17025:2005).

The histograms for TSS (in mg/l) for the above-mentioned locations are provided below.



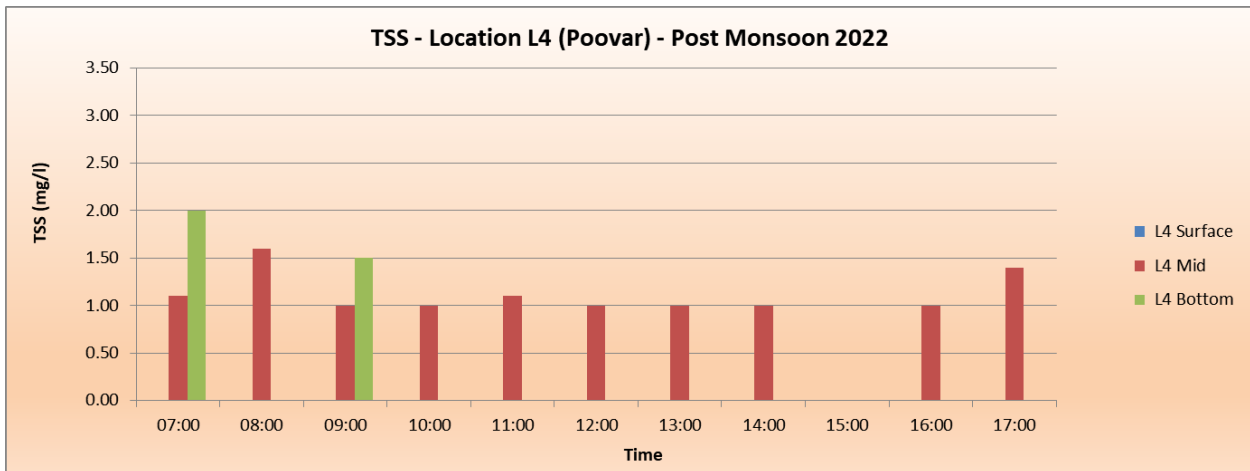
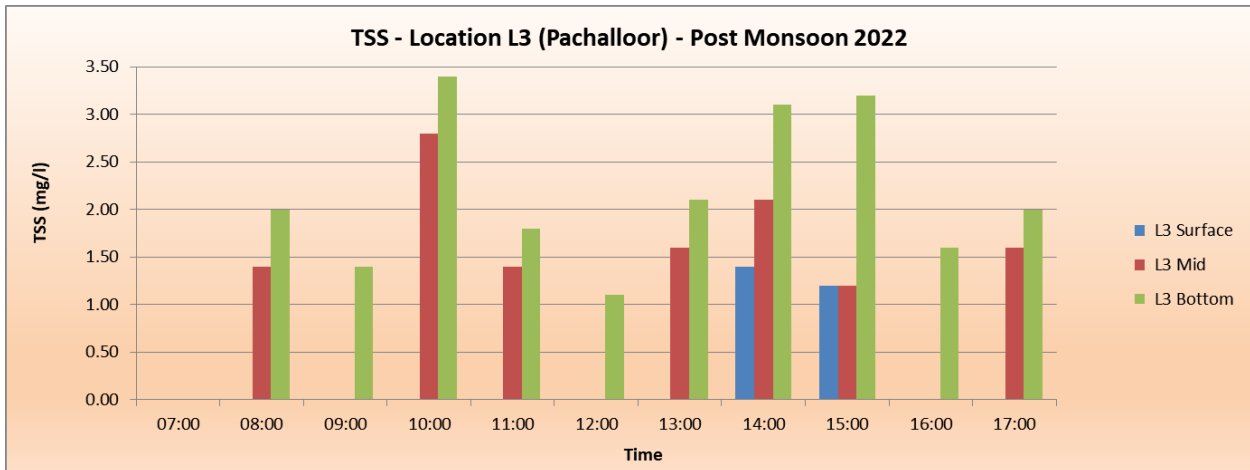
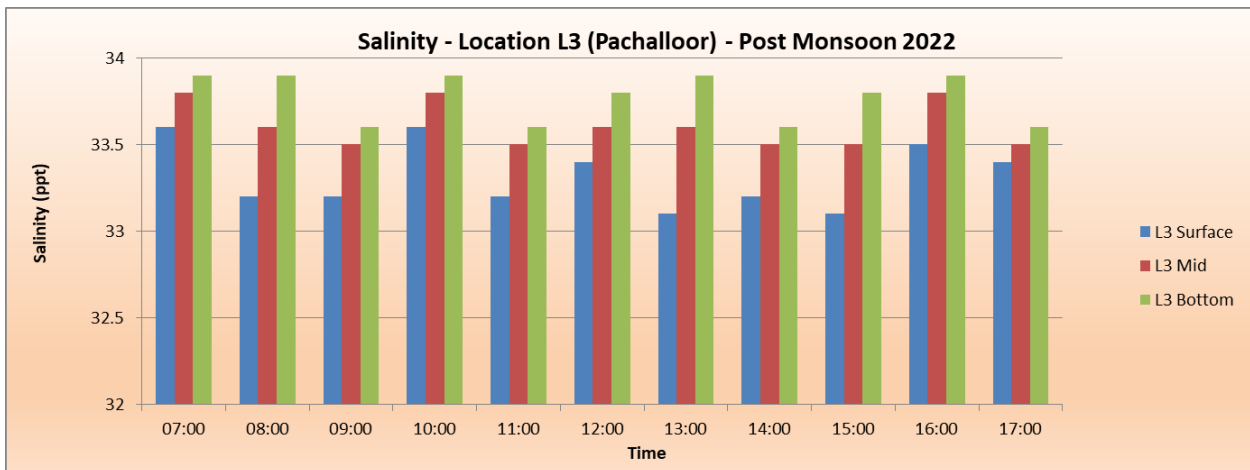
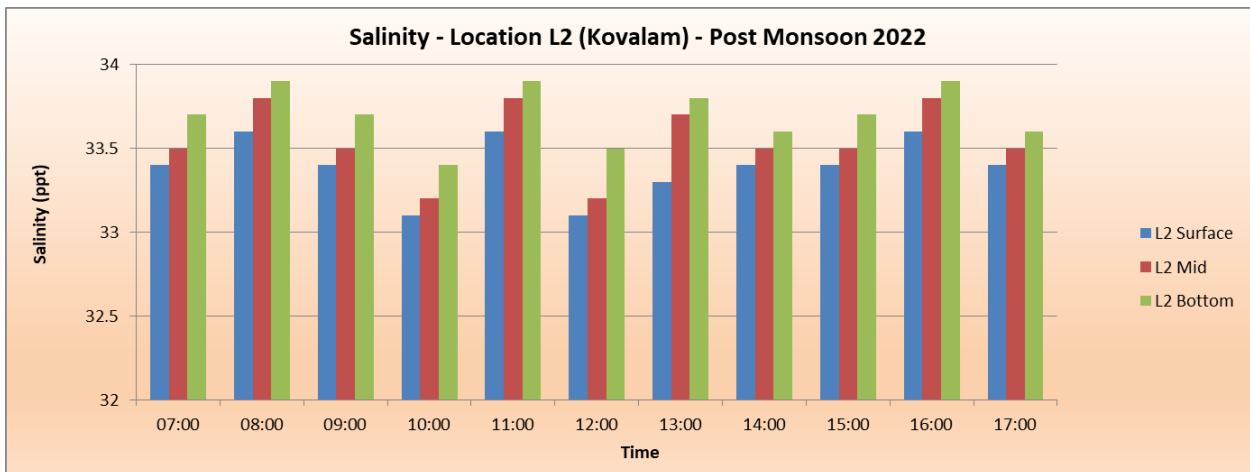
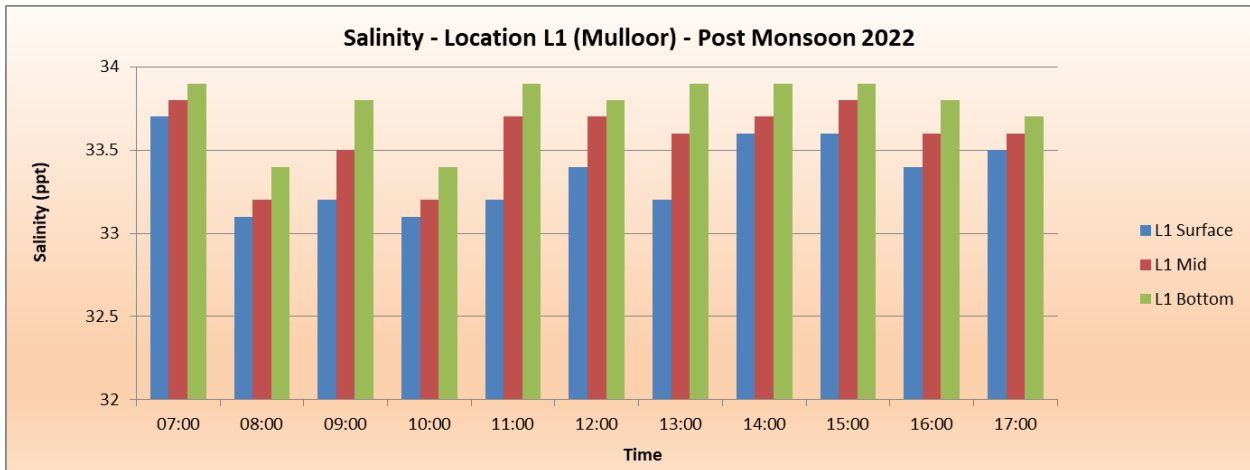


Figure 6-15: Time Series of TSS

The maximum TSS recorded was 3.4 mg/l near the bottom at Location L3 (Pachalloor).

Note: TSS values below 1 mg/l are Below Detectable Limit (BDL) of the system and are hence not shown on the bar charts.

The histograms for salinity at all three levels for all the locations are given as follows.



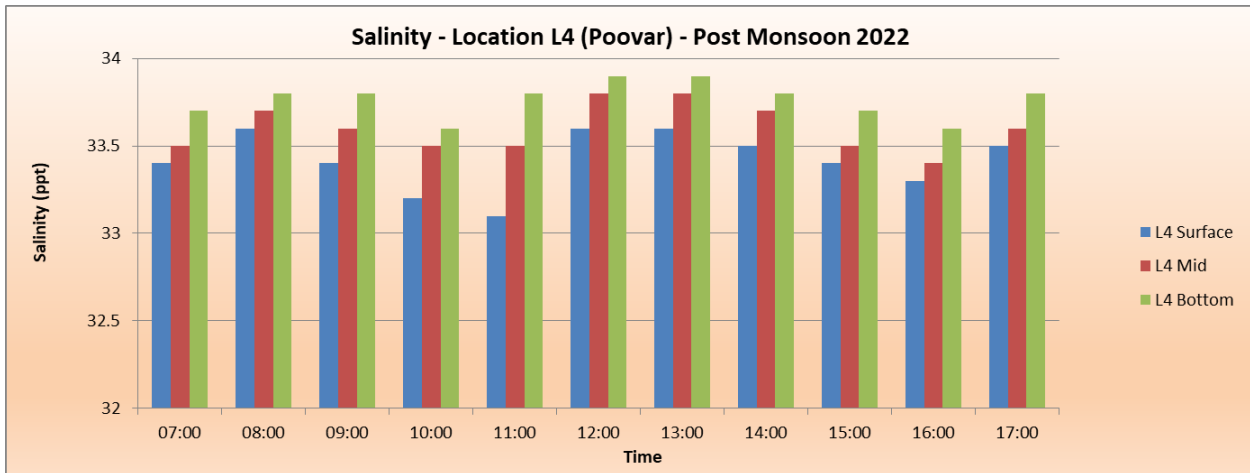
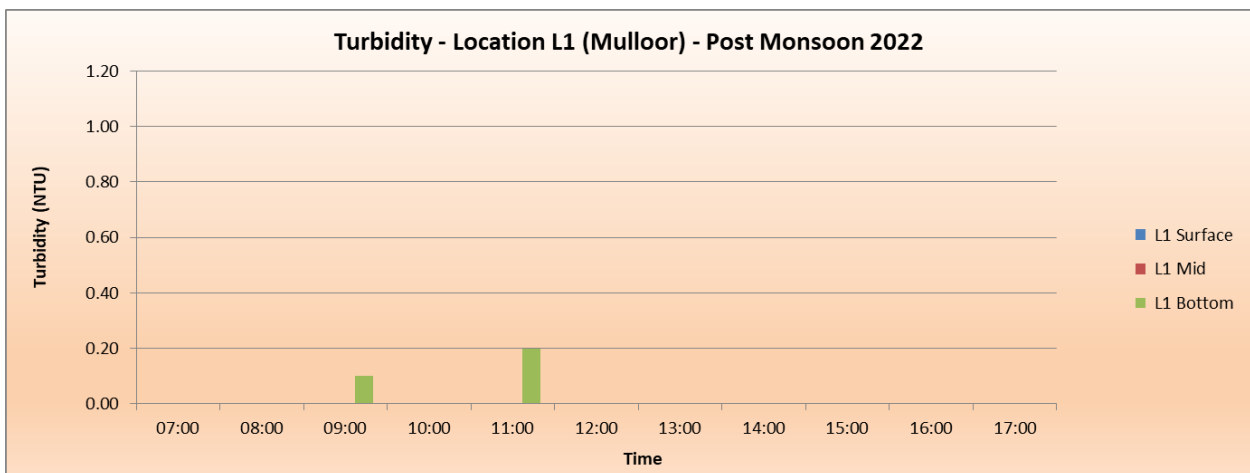


Figure 6-16: Time Series of salinity

The salinity at all locations is seen to be between 33.1 and 33.9 parts per thousand (ppt). The maximum salinity recorded was 33.9 ppt at all four locations near the bottom.

The histograms for turbidity at all levels for the locations are shown below. The maximum turbidity recorded was 1.1 NTU near the bottom at Location L3 (Pachalloor).

Note: Turbidity values below 0.1 NTU are Below Detectable Level (BDL) of the system and are hence not displayed on the bar charts.



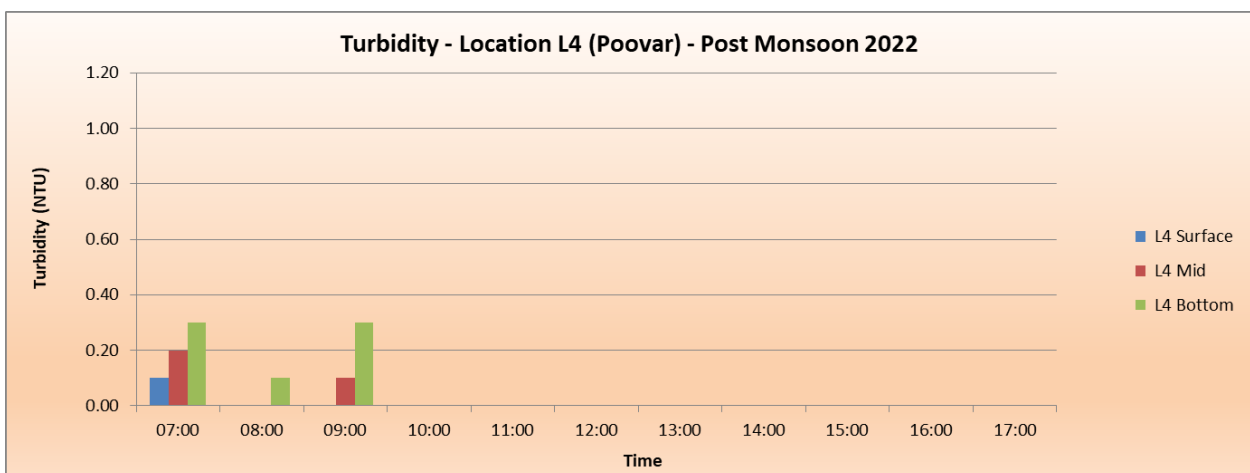
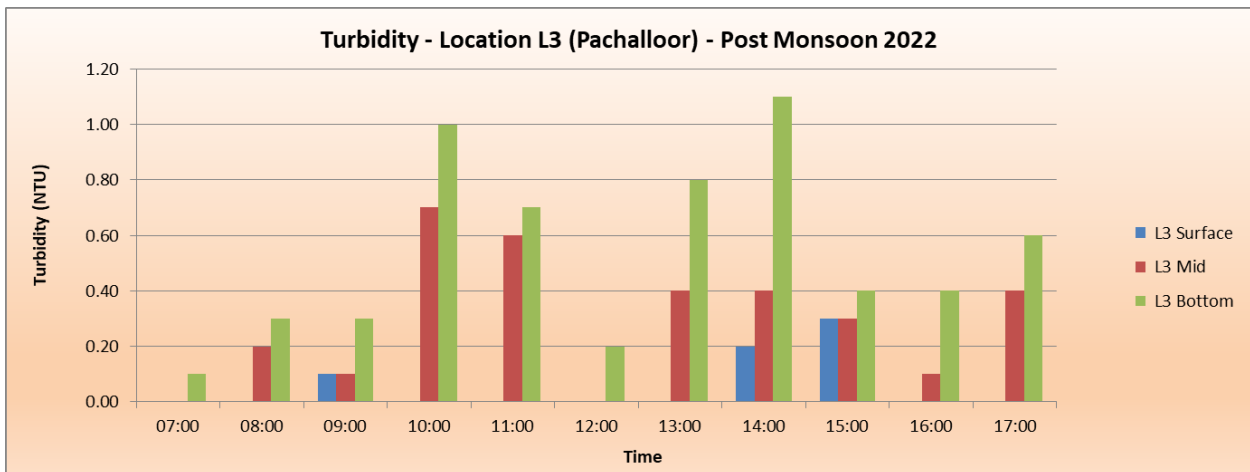
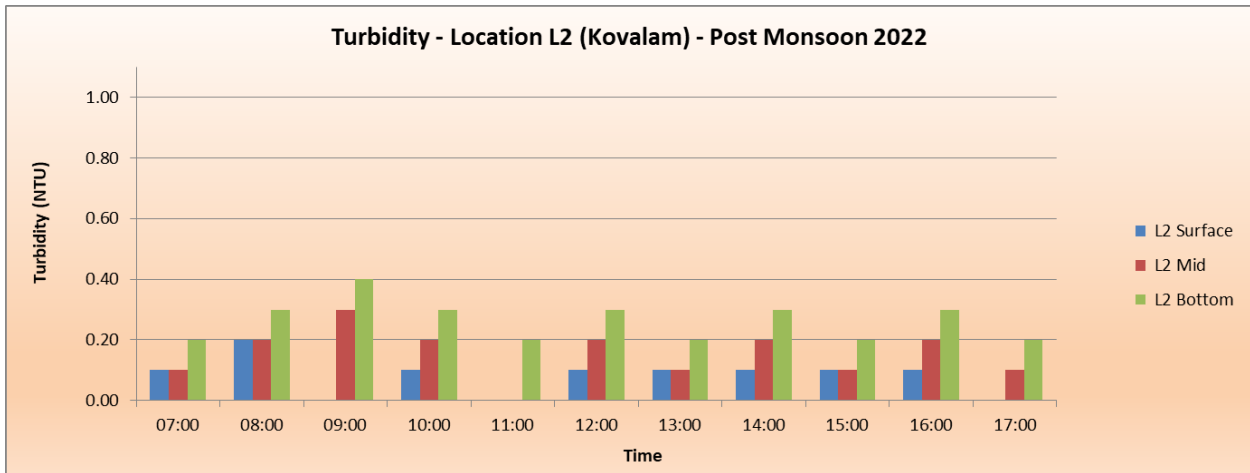


Figure 6-17: Time Series of Turbidity at water sampling locations

6.11 Beach Sampling

6.11.1 Monsoon 2022

①

Beach samples were collected from 45 out of the 81 locations for the monsoon 2022 period in the month of September 2022 and the results were available on October 2022. The samples which could not be collected due to lack of beach were BS-3, BS-48 to BS-52, BS-63, BS-65 and BS-66. Locations BS-23 to BS-41 and BS-53 to BS-60 could not be collected as a result of the ongoing agitation faced from the locals residing in these areas.

The following table shows the D50 value (in mm) of the sediments collected along with the soil classification as per Wentworth scale

Table 6-15: Beach sample soil classification

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-1	0	100	0	100	0.4970	Medium Sand
BS-2	0	100	0	100	0.4715	Medium Sand
BS-3	Not collected due to lack of beach					
BS-4	0	100	0	100	0.3975	Medium Sand
BS-5	0	100	0	100	0.4855	Medium Sand
BS-6	0	100	0	100	0.4970	Medium Sand
BS-7	0	100	0	100	0.5122	Coarse Sand
BS-8	0	100	0	100	0.3356	Medium Sand
BS-9	0	100	0	100	0.5944	Coarse Sand
BS-10	0	100	0	100	0.3212	Medium Sand
BS-11	0	100	0	100	0.5289	Coarse Sand
BS-12	0	100	0	100	0.5381	Coarse Sand
BS-13	0	100	0	100	0.3645	Medium Sand
BS-14	0	100	0	100	0.4779	Medium Sand
BS-15	0	100	0	100	0.3425	Medium Sand
BS-16	0	100	0	100	0.2767	Medium Sand
BS-17	0	100	0	100	0.2509	Medium Sand
BS-18	0	100	0	100	0.4313	Medium Sand
BS-19	0	100	0	100	0.2488	Fine Sand
BS-20	0	100	0	100	0.3039	Medium Sand
BS-21	0	100	0	100	0.3504	Medium Sand
BS-22	0	100	0	100	0.2917	Medium Sand
BS-23	Beach samples not collected as a result of resistance faced from the locals in these areas (local protests)					
BS-24						
BS-25						
BS-26						
BS-27						



Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-28						
BS-29						
BS-30						
BS-31						
BS-32						
BS-33						
BS-34						
BS-35						
BS-35A						
BS-36						
BS-37						
BS-38						
BS-39						
BS-40						
BS-40A						
BS-41						
BS-42	0	100	0	100	0.3151	Medium Sand
BS-43	0	100	0	100	0.2081	Fine Sand
BS-44	0	100	0	100	0.2049	Fine Sand
BS-45	0	100	0	100	0.4256	Medium Sand
BS-46	0	100	0	100	0.3717	Medium Sand
BS-47	0	100	0	100	0.3555	Medium Sand
BS-48	Not collected due to lack of beach					
BS-49	Not collected due to lack of beach					
BS-50	Not collected due to lack of beach					
BS-51	Not collected due to lack of beach					
BS-52	Not collected due to lack of beach					
BS-53	Beach samples not collected as a result of the resistance faced from the locals in these areas					
BS-54						
BS-55						
BS-56						
BS-57						
BS-58						
BS-59	Beach samples not collected as a result of the resistance faced from the locals in these areas					
BS-60						
BS-61	0	100	0	100	0.4087	Medium Sand
BS-62	0	100	0	100	0.3417	Medium Sand
BS-63	Not collected due to lack of beach					
BS-64	0	100	0	100	0.3430	Medium Sand
BS-65	Not collected due to lack of beach					
BS-66	Not collected due to lack of beach					
BS-67	0	100	0	100	0.4199	Medium Sand
BS-68	0	100	0	100	0.3356	Medium Sand



Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-69	0	100	0	100	0.4584	Medium Sand
BS-70	0	100	0	100	0.4257	Medium Sand
BS-71	0	100	0	100	0.4060	Medium Sand
BS-72	0	100	0	100	0.3825	Medium Sand
BS-73	0	100	0	100	0.4636	Medium Sand
BS-74	0	100	0	100	0.4198	Medium Sand
BS-75	0	100	0	100	0.3520	Medium Sand
BS-76	0	100	0	100	0.4669	Medium Sand
BS-77	0	100	0	100	0.4008	Medium Sand
BS-78	0	100	0	100	0.3699	Medium Sand
BS-79	0	100	0	100	0.3438	Medium Sand
BS-80	0	100	0	100	0.3311	Medium Sand
BS-81	0	100	0	100	0.3302	Medium Sand

The classification is based on Wentworth scale as provided below:

- Very fine Sand – 0.0625 to 0.125 mm
- Fine Sand – 0.125 to 0.250 mm
- Medium Sand – 0.250 to 0.500 mm
- Coarse Sand – 0.500 to 1.000 mm
- Very coarse Sand – 1.000 to 2.000 mm

The following graph shows the distribution of D50 value of the sediments collected in each location.

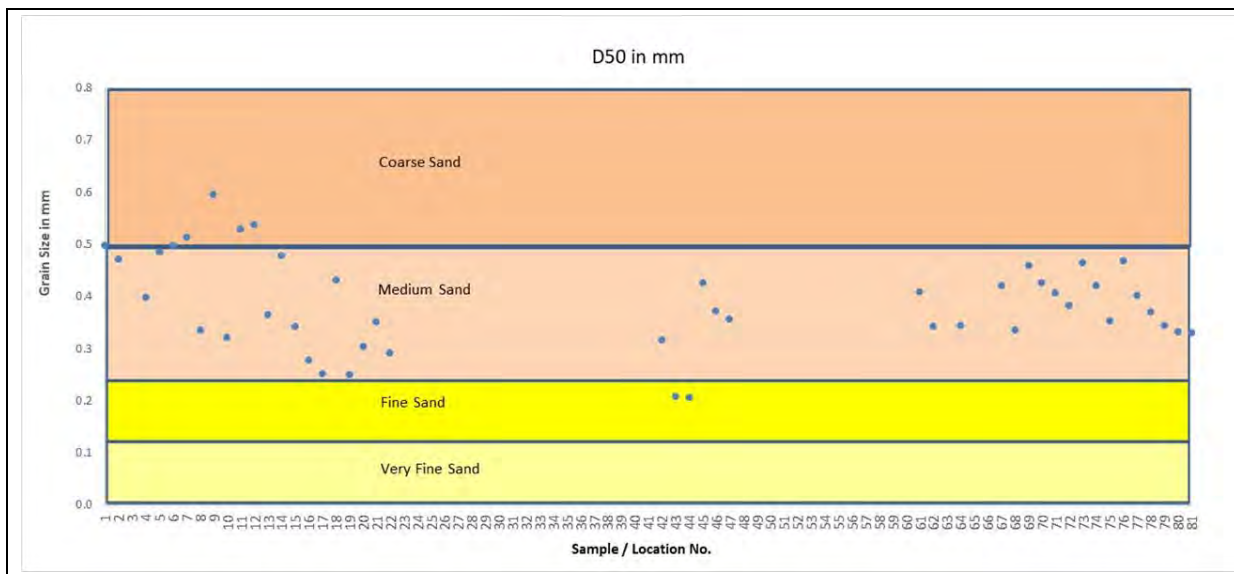


Figure 6-18: Distribution of D50 value of beach samples

The particle size distribution curves for beach samples collected a few locations are placed in the images below.

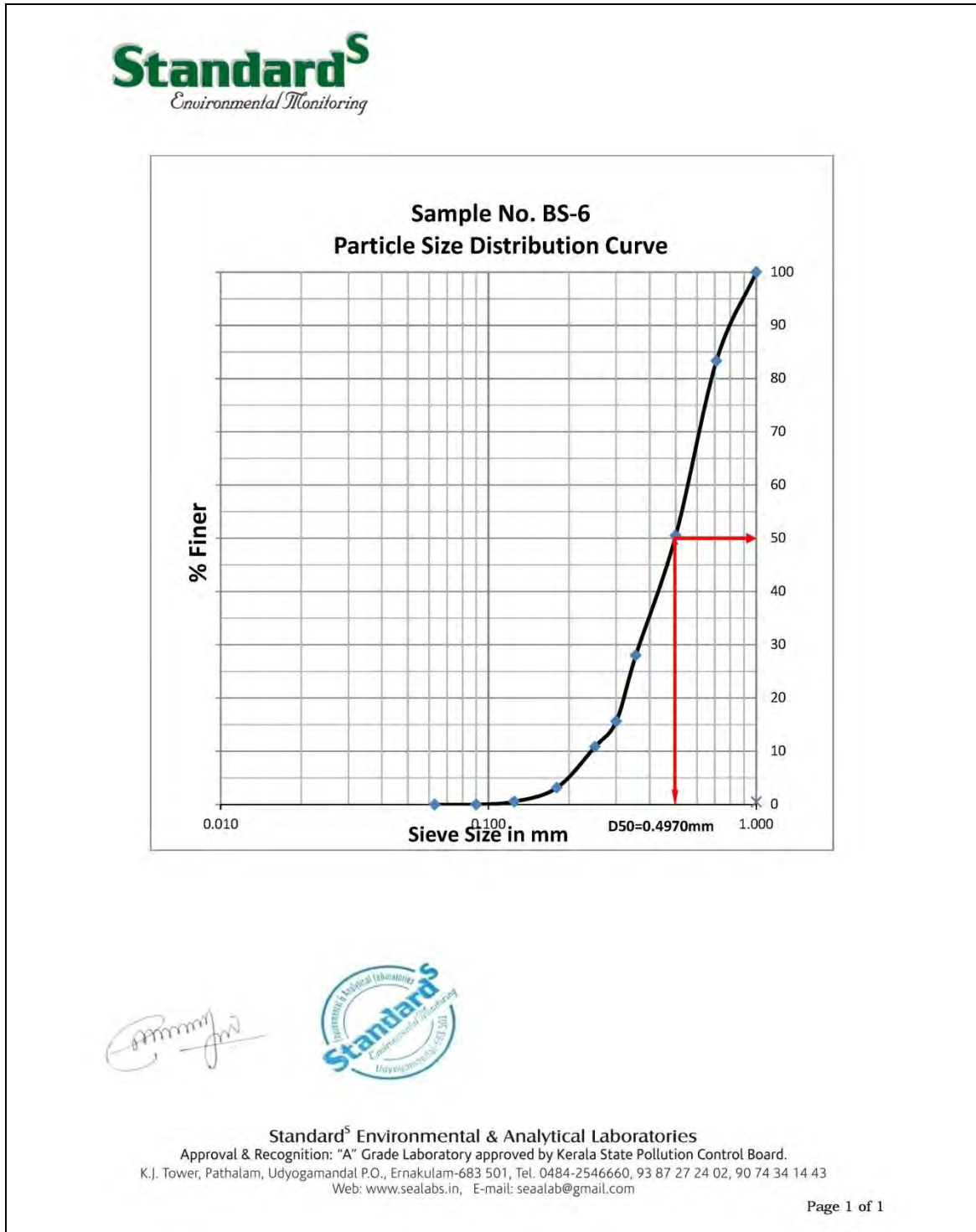


Figure 6-19: Grain size distribution curve for BS-6 (Monsoon 2022)

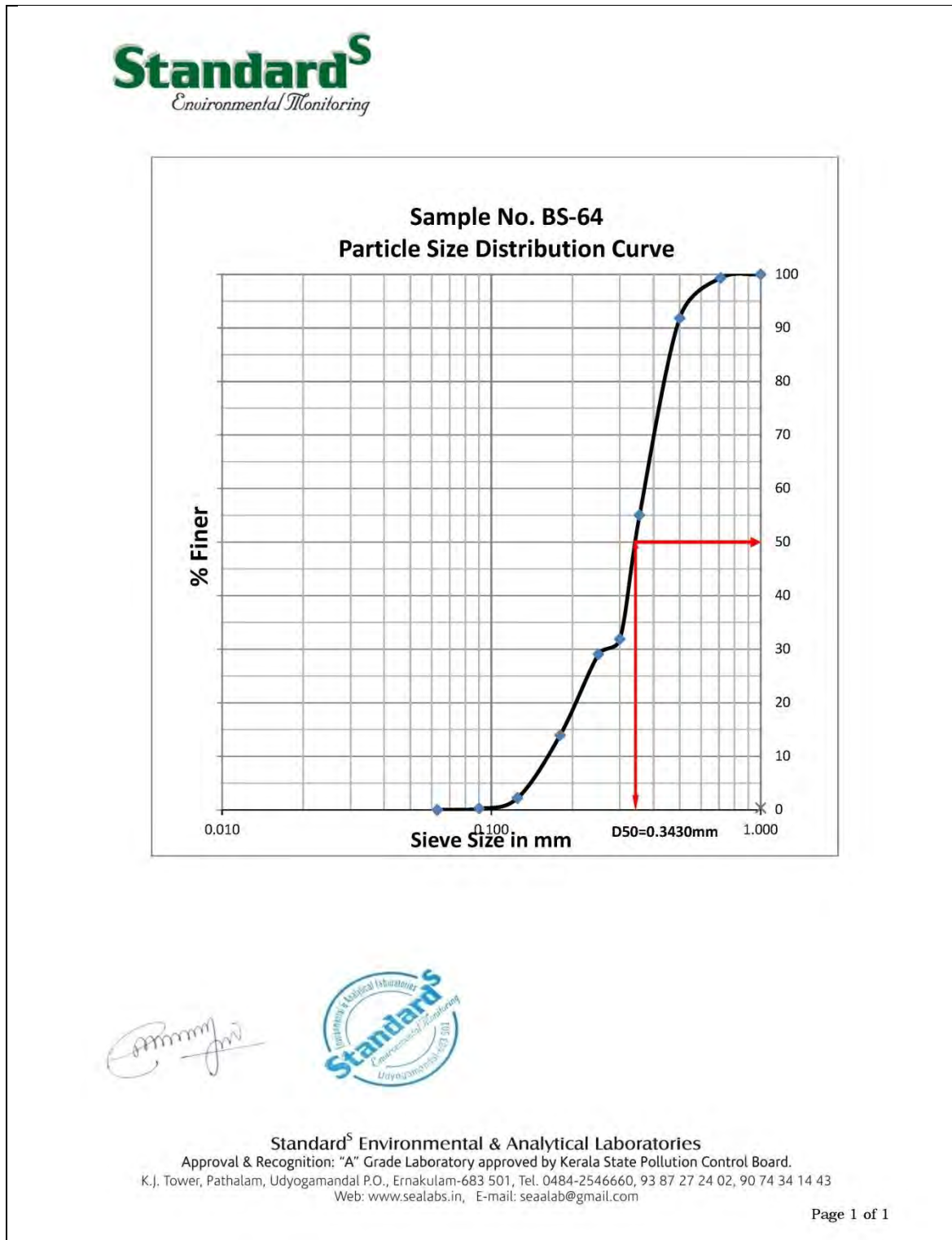
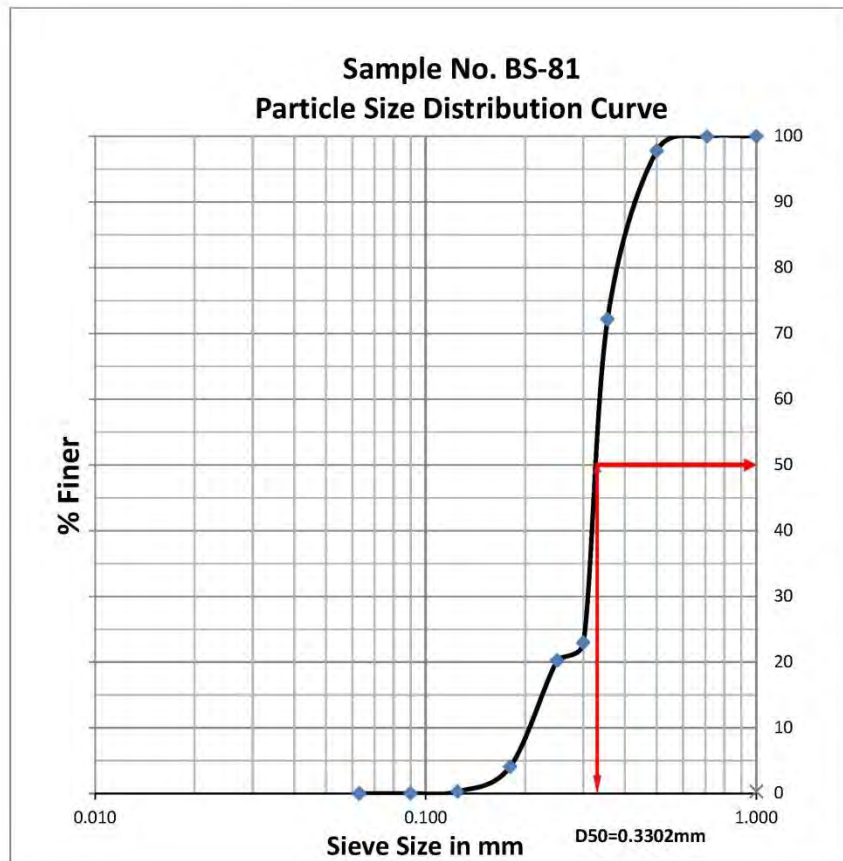


Figure 6-20: Grain size distribution curve for BS-64 (Monsoon 2022)



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Figure 6-21: Grain size distribution curve for BS-81 (Monsoon 2022)



6.11.2 Post Monsoon 2022

Beach samples were collected from 70 out of the 81 locations for the post-monsoon 2022 period in the month of January 2023. The samples which could not be collected due to lack of beach were BS-3, BS-11 to BS-13, BS-35, BS-49 to BS-51, BS-59, BS-63, and BS-64. Locations BS-29 and BS-30 could not be collected as a result of the ongoing agitation faced from the locals residing in these areas.

The following table shows the D50 value (in mm) of the sediments collected along with the soil classification as per Wentworth scale

Table 6-16: Beach sample soil classification (Post-monsoon 2022 period)

Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-1	0	100	0	100	0.3713	Medium Sand
BS-2	0	100	0	100	0.4601	Medium Sand
BS-3	Not collected due to lack of beach					
BS-4	0	100	0	100	0.3540	Medium Sand
BS-5	0	100	0	100	0.6144	Coarse Sand
BS-6	0	100	0	100	0.3079	Medium Sand
BS-7	0	100	0	100	0.4026	Medium Sand
BS-8	0	100	0	100	0.4890	Medium Sand
BS-9	0	100	0	100	0.4634	Medium Sand
BS-10	0	100	0	100	0.4183	Medium Sand
BS-11	Not collected due to lack of beach					
BS-12	Not collected due to lack of beach					
BS-13	Not collected due to lack of beach					
BS-14	0	100	0	100	0.3696	Medium Sand
BS-15	0	100	0	100	0.4644	Medium Sand
BS-16	0	100	0	100	0.4562	Medium Sand
BS-17	0	100	0	100	0.4815	Medium Sand
BS-18	0	100	0	100	0.5866	Coarse Sand
BS-19	0	100	0	100	0.5682	Coarse Sand
BS-20	0	100	0	100	0.5015	Coarse Sand
BS-21	0	100	0	100	0.4357	Medium Sand
BS-22	0	100	0	100	0.4049	Medium Sand
BS-23	0	100	0	100	0.3726	Medium Sand
BS-24	0	100	0	100	0.3739	Medium Sand
BS-25	0	100	0	100	0.4338	Medium Sand
BS-26	0	100	0	100	0.3429	Medium Sand
BS-27	0	100	0	100	0.4724	Medium Sand
BS-28	0	100	0	100	0.4328	Medium Sand
BS-29	Beach samples not collected as a result of the resistance faced from the locals in these areas					
BS-30						
BS-31	0	100	0	100	0.5502	Coarse Sand



Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-32	0	100	0	100	0.4675	Medium Sand
BS-33	0	100	0	100	0.4675	Medium Sand
BS-34	0	100	0	100	0.4878	Medium Sand
BS-35	Not collected due to lack of beach					
BS-35A	0	100	0	100	0.3191	Medium Sand
BS-36	0	100	0	100	0.4373	Medium Sand
BS-37	0	100	0	100	0.4836	Medium Sand
BS-38	0	100	0	100	0.4883	Medium Sand
BS-39	0	100	0	100	0.5917	Coarse Sand
BS-40	0	100	0	100	0.6994	Coarse Sand
BS-40A	0	100	0	100	0.6341	Coarse Sand
BS-41	0	100	0	100	0.6788	Coarse Sand
BS-42	0	100	0	100	0.2253	Fine Sand
BS-43	0	100	0	100	0.3030	Medium Sand
BS-44	0	100	0	100	0.3393	Medium Sand
BS-45	0	100	0	100	0.3920	Medium Sand
BS-46	0	100	0	100	0.3095	Medium Sand
BS-47	0	100	0	100	0.3487	Medium Sand
BS-48	0	100	0	100	0.3460	Medium Sand
BS-49	Not collected due to lack of beach					
BS-50	Not collected due to lack of beach					
BS-51	Not collected due to lack of beach					
BS-52	0	100	0	100	0.3669	Medium Sand
BS-53	0	100	0	100	0.4152	Medium Sand
BS-54	0	100	0	100	0.3113	Medium Sand
BS-55	0	100	0	100	0.3483	Medium Sand
BS-56	0	100	0	100	0.3251	Medium Sand
BS-57	0	100	0	100	0.3430	Medium Sand
BS-58	0	100	0	100	0.3597	Medium Sand
BS-59	Not collected due to lack of beach					
BS-60	0	100	0	100	0.3897	Medium Sand
BS-61	0	100	0	100	0.3956	Medium Sand
BS-62	0	100	0	100	0.3782	Medium Sand
BS-63	Not collected due to lack of beach					
BS-64	Not collected due to lack of beach					
BS-65	0	100	0	100	0.3740	Medium Sand
BS-66	0	100	0	100	0.4109	Medium Sand
BS-67	0	100	0	100	0.4054	Medium Sand
BS-68	0	100	0	100	0.4190	Medium Sand
BS-69	0	100	0	100	0.4133	Medium Sand
BS-70	0	100	0	100	0.3777	Medium Sand
BS-71	0	100	0	100	0.3845	Medium Sand
BS-72	0	100	0	100	0.4050	Medium Sand
BS-73	0	100	0	100	0.3996	Medium Sand



Sample Name	Gravel %	Sand %	Mud%	Total	D50 (mm)	Classification
BS-74	0	100	0	100	0.3845	Medium Sand
BS-75	0	100	0	100	0.3702	Medium Sand
BS-76	0	100	0	100	0.3619	Medium Sand
BS-77	0	100	0	100	0.3701	Medium Sand
BS-78	0	100	0	100	0.3529	Medium Sand
BS-79	0	100	0	100	0.3809	Medium Sand
BS-80	0	100	0	100	0.3508	Medium Sand
BS-81	0	100	0	100	0.3836	Medium Sand

The classification is based on Wentworth scale as provided below:

- Very fine Sand – 0.0625 to 0.125 mm
- Fine Sand – 0.125 to 0.250 mm
- Medium Sand – 0.250 to 0.500 mm
- Coarse Sand – 0.500 to 1.000 mm
- Very coarse Sand – 1.000 to 2.000 mm

The following graph shows the distribution of D50 value of the sediments collected in each location during the post monsoon 2022 period.

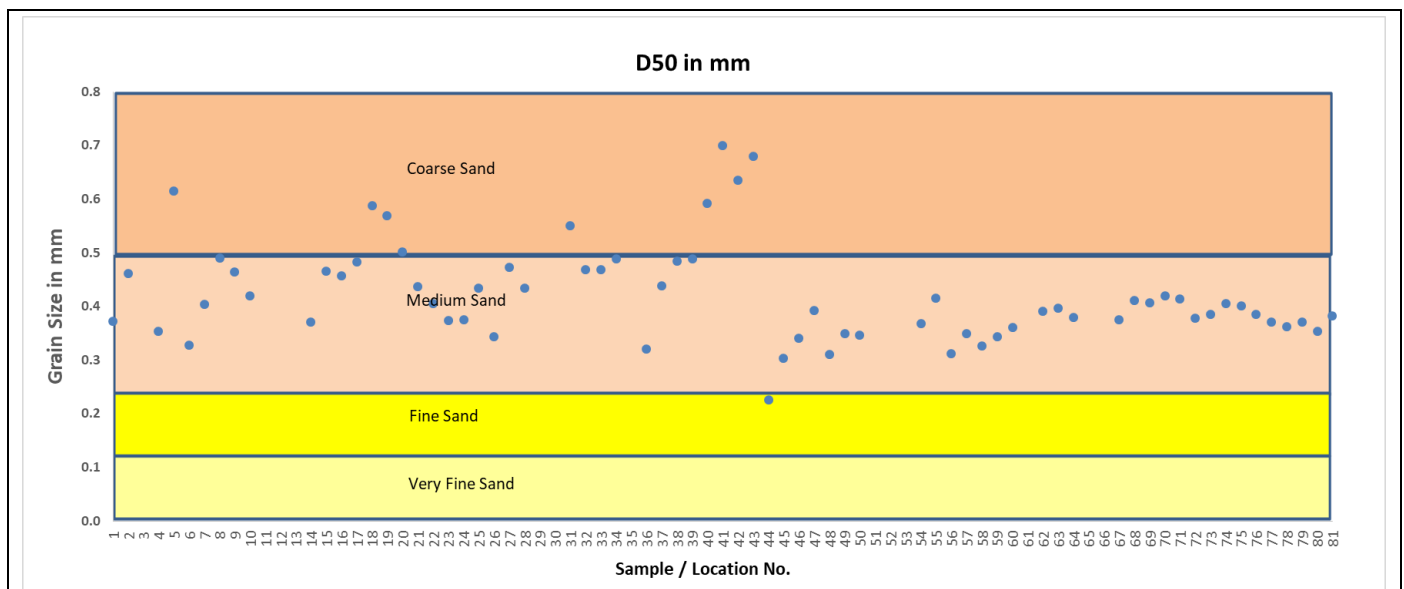
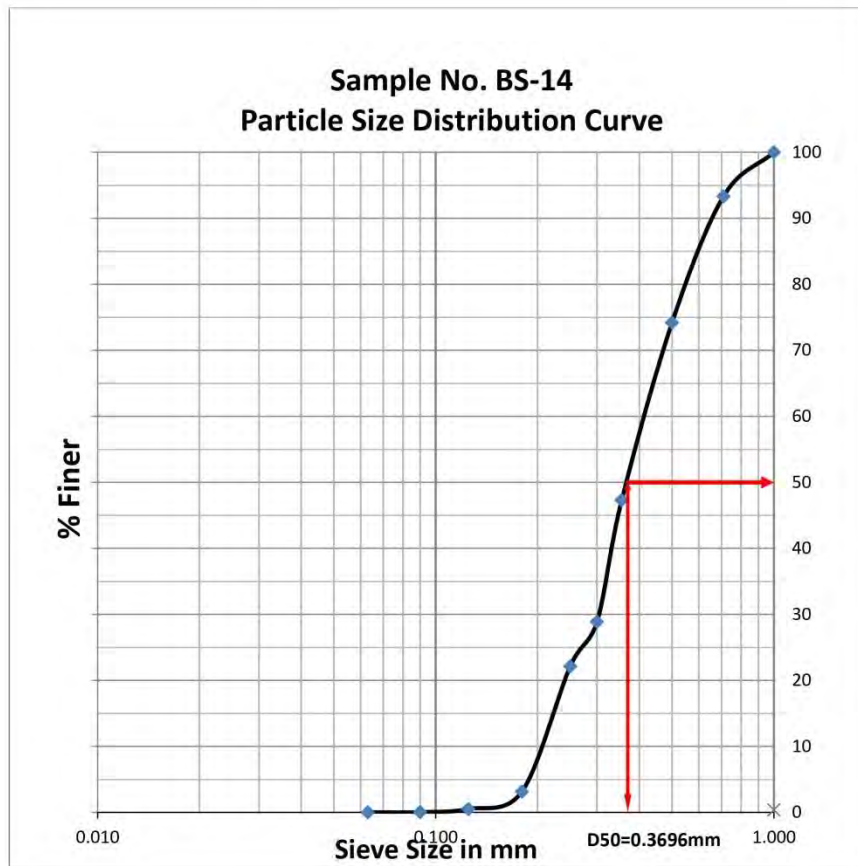


Figure 6-22: Distribution of D50 value of beach samples (Post monsoon 2022 period)

The particle size distribution curves for beach samples collected a few locations are placed in the images below.

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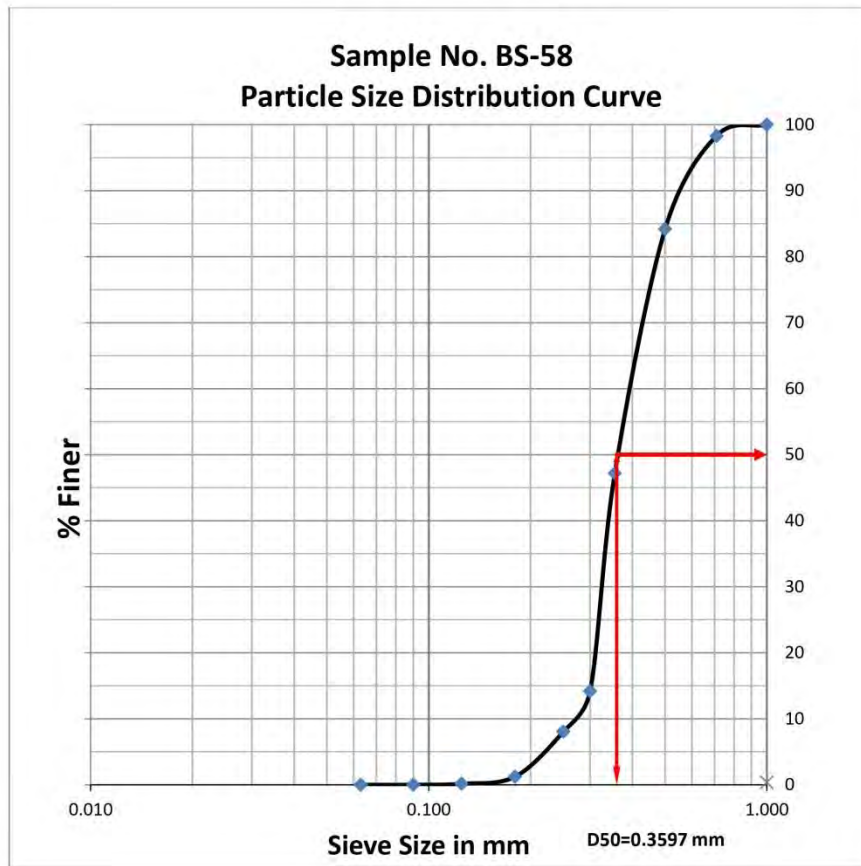
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Figure 6-23: Grain size distribution curve for BS-14 (Post monsoon 2022)



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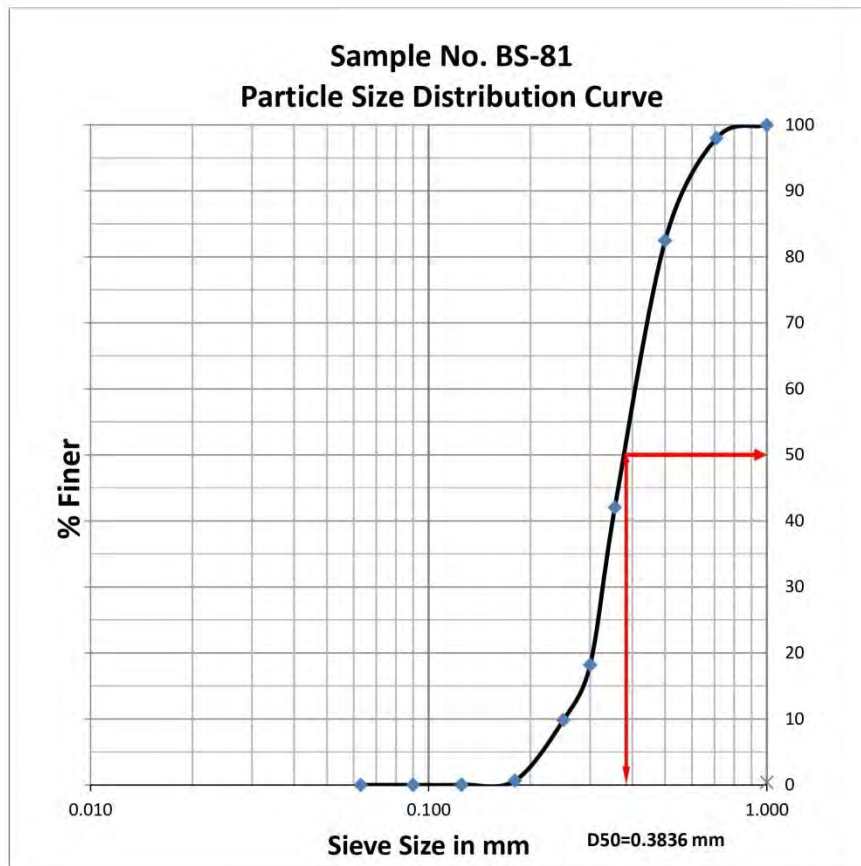

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Figure 6-24: Grain size distribution curve for BS-58 (Post monsoon 2022)



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Figure 6-25: Grain size distribution curve for BS-81 (Post monsoon 2022)



6.12 Bathymetry

Survey Location

The following image shows the coverage of the area surveyed using R2Sonic 2020 multibeam echo sounder.

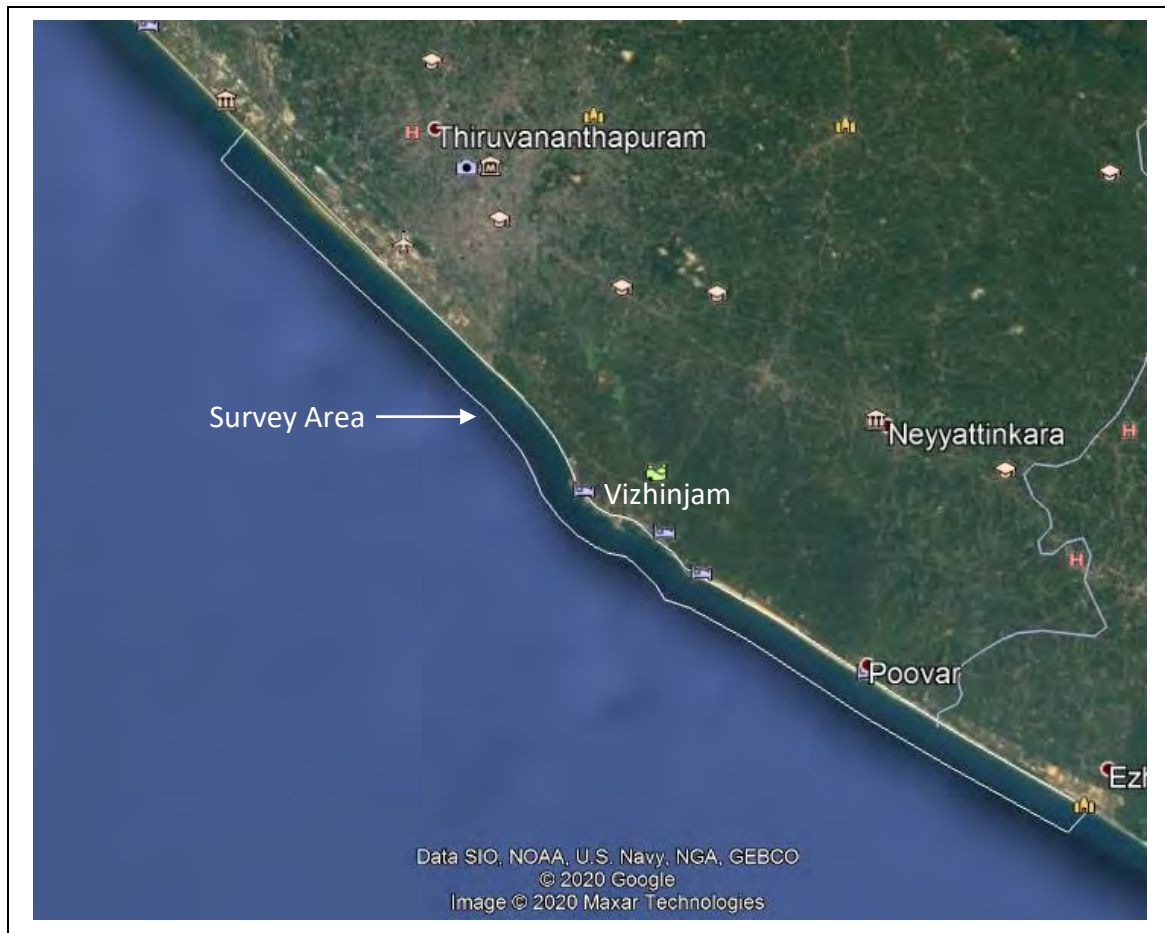


Figure 6-26: Bathymetry area coverage

Line Plan and Survey Methodology

The survey lines were planned at intervals of 25m parallel to the coast up to the depth of 20m. The vessel was positioned using a Trimble DGPS system which also provided the heading. The vessel tracks and offset positions were recorded digitally and the data from the multibeam echo sounder was logged digitally within the Hypack acquisition software.

Prior to commencement of the survey, the DGPS and gyrocompass calibrations were carried out when the survey vessel was berthed at the Vizhinjam Fishing Jetty. The multibeam echo sounder was calibrated by conducting the patch test. The bathymetric data was reduced to Chart Datum (CD) by using the observed tides from the tide



gauge installed at the Coast Guard Jetty. A Valeport Sound Velocity Probe (SVP) was used to measure the speed of sound of in the water column. Motion compensation was achieved by the DMS-05 Motion Reference Unit (MRU). Quality checks were constantly performed at every step of the data processing. Data was processed using Hypack software. Calibration values obtained from the patch test were applied to the acquired data along with the required sound velocity profile and tide data for creation of final xyz file.

Results

The bathymetric survey of the area about 13 km long, with 6.5 km towards the north and 6.5 km towards the south of the port, could be carried out up to the 20m contour using a multibeam echo sounder.

The maximum depth recorded by multibeam echo sounder is 24.8m below CD in the northern part of the survey area at few locations along the western boundary. The seabed is seen to slope gently towards the southwest.



7 WEATHER

①

During the month of October 2022, the weather was unfavourable for survey operations. The weather was conducive to the survey operations for the rest of the period.

8 REFERENCES

The following documents/web sites were referenced during the preparation of the report.

- AVPPL Service order 5700267194 dated 3rd May 2019
- Web site <https://www.vizhinjamport.in/home.html>, and <https://www.vizhinjamport.in/download/Feasibility-Report.pdf>
- WMO manual, section 5.2.2
- SAC Project Execution Plan SAC/P167-19/PEP AVPPL
- Monthly survey reports from October 2022 to March 2023

9 CONCLUSIONS

The following conclusions were made during this phase of the project:

1. Tide was mixed semi diurnal with a maximum range being observed during spring tide.
2. The significant wave heights decreased after the month of October 2022. The maximum wind speeds were blowing from the northwesterly direction.
3. The current direction was predominantly towards southeast in all locations during Monsoon and Post Monsoon observations.
4. The long-shore current speed was recorded in a northerly direction in the post monsoon months.
5. The salinity was in the range of of 33.1 and 33.9 ppt for the water samples collected in post monsoon 2022 period.
6. The maximum Total Suspended Solids recorded was 3.4 mg/l near the bottom at Location L3 (Pachalloor) for the Post monsoon 2022 period.
7. The maximum turbidity recorded at the water sampling locations was 1.1 NTU near the bottom of Location L3 (Pachalloor) during the Post monsoon 2022 period.



8. The beach samples consisted mainly of coarse to medium sand during both the seasons.
9. The seabed is seen to slope gently towards the southwest. The maximum depth recorded by multibeam echo sounder is 24.8m below CD in the northern part of the survey area at few locations along the western boundary.

10 ACKNOWLEDGEMENTS

During the course of project, the support received from AVPPL staff is highly appreciated and acknowledged. The guidance received throughout the project from NIOT scientists is also hereby appreciated. The boat crew and all others, who had supported us during the project is also acknowledged.



Annexure I

Photo Documentation at CSP Locations - March 2023



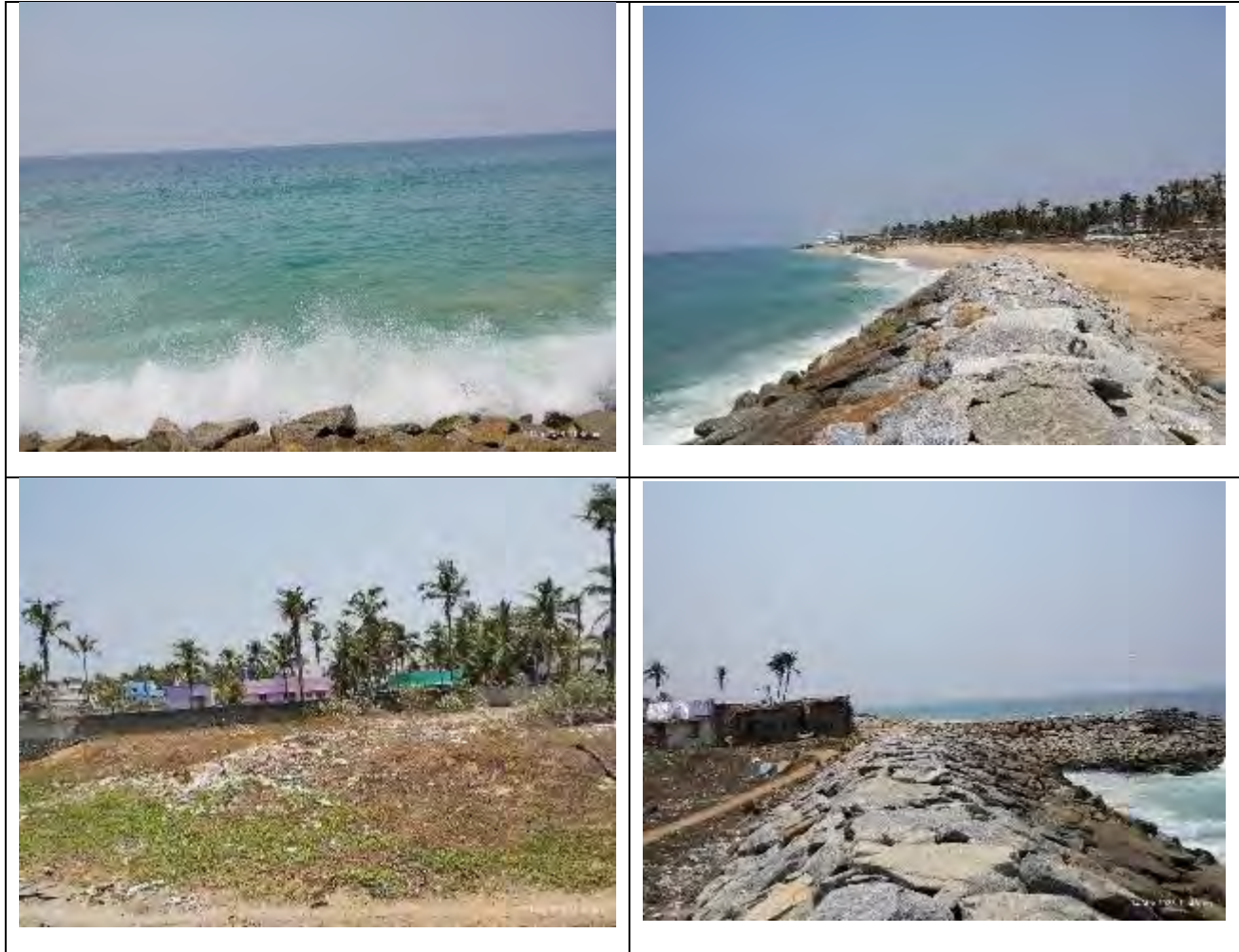


Figure 1- March CSP 01

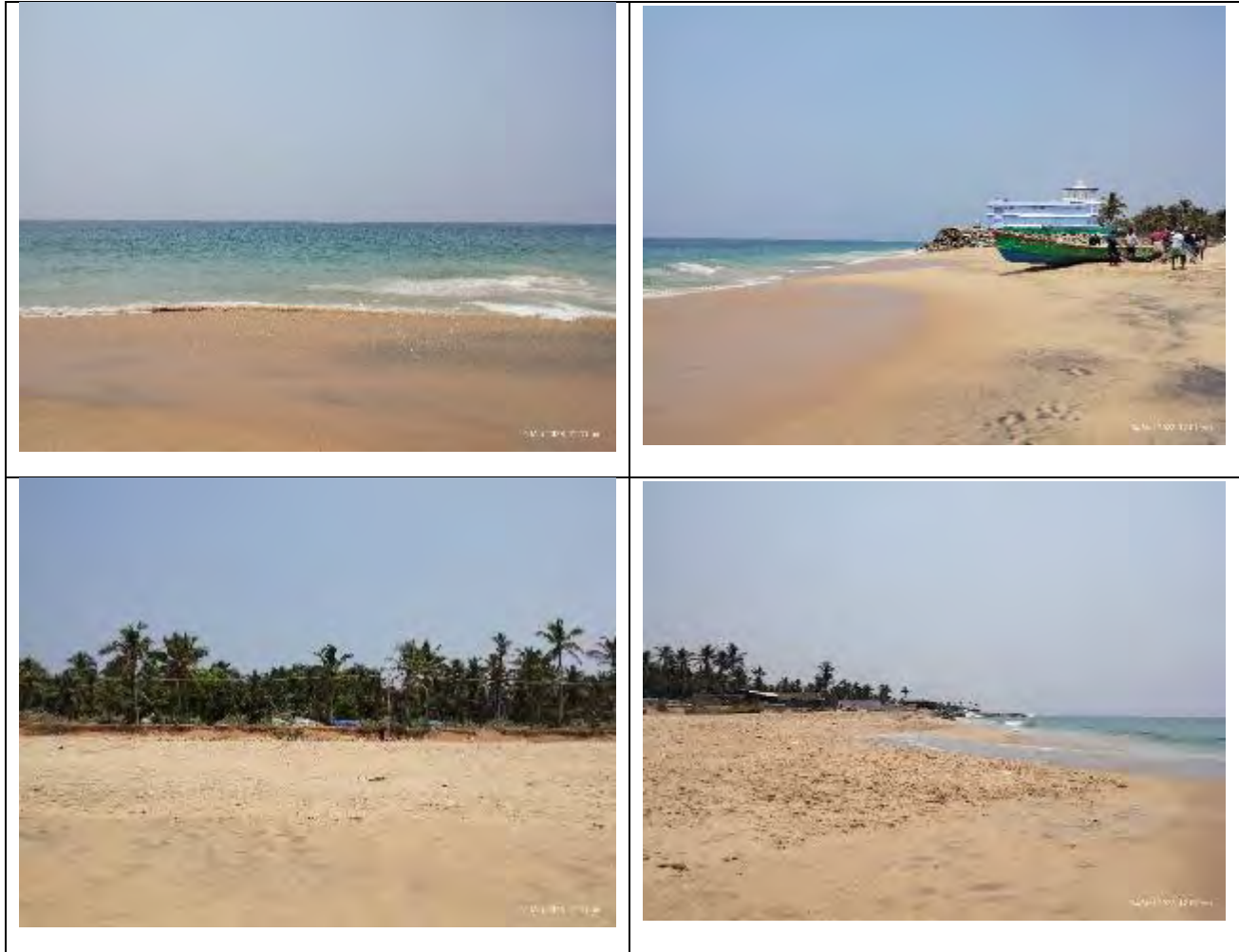


Figure 2- March CSP 02

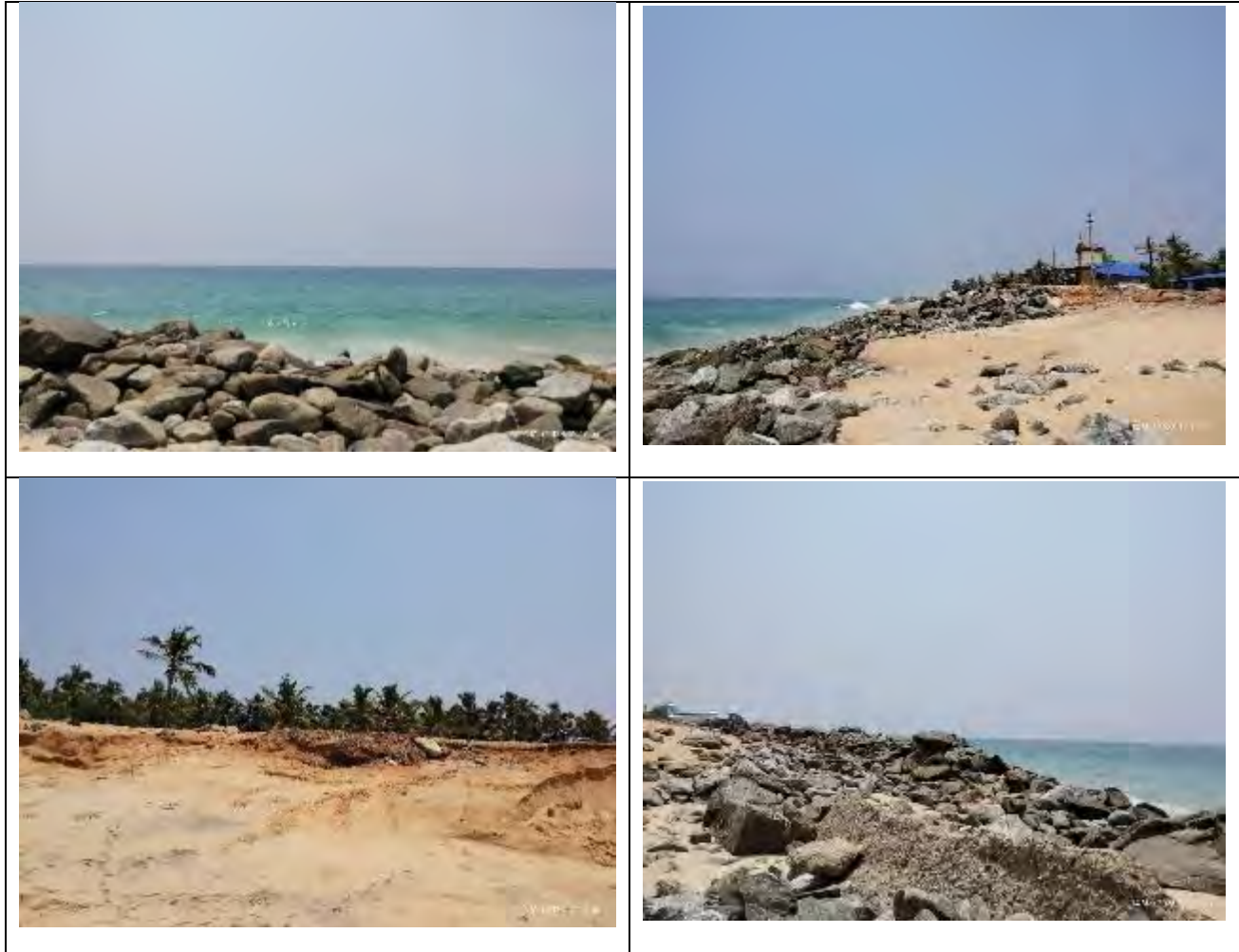


Figure 3- March CSP 03

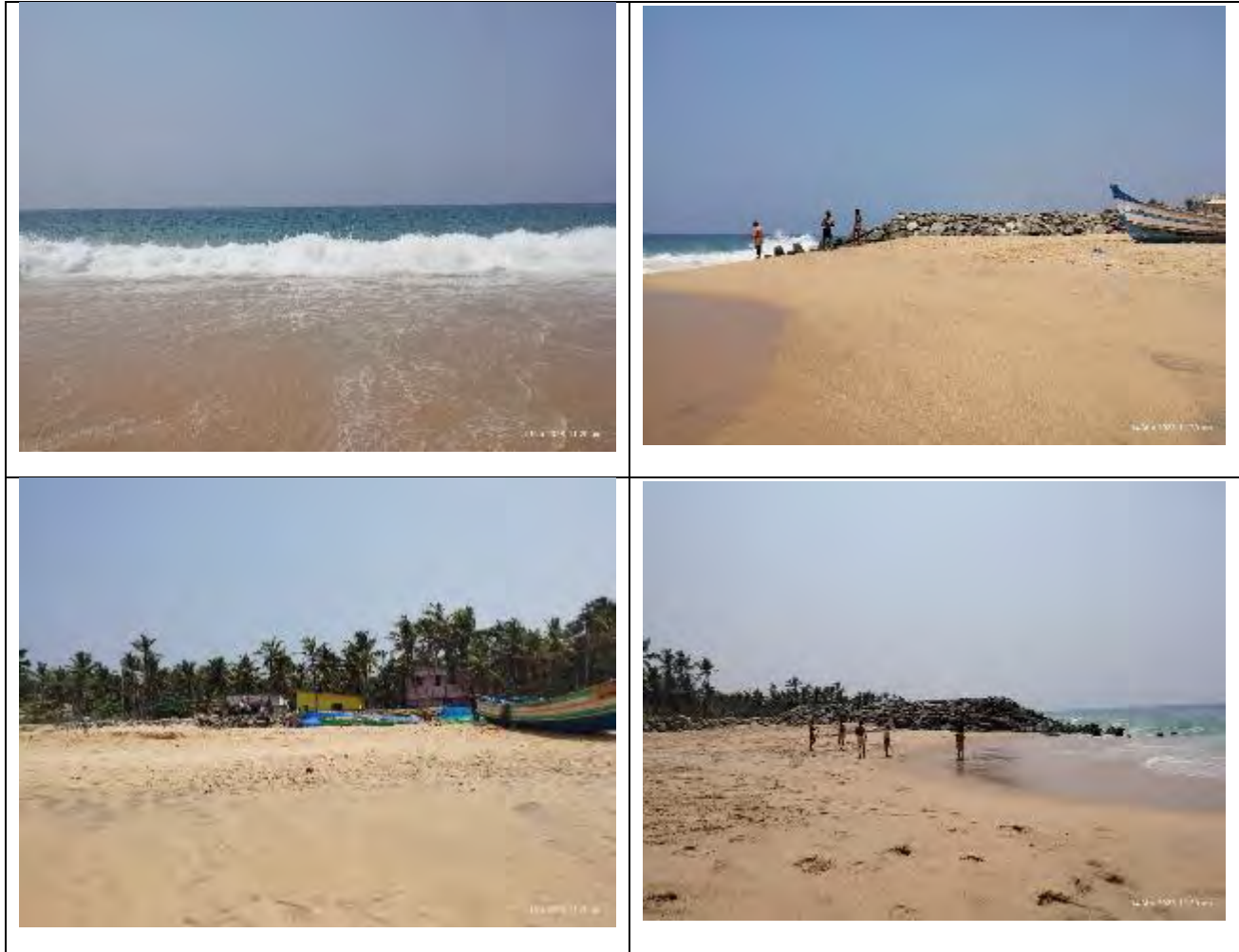


Figure 4- March CSP 04

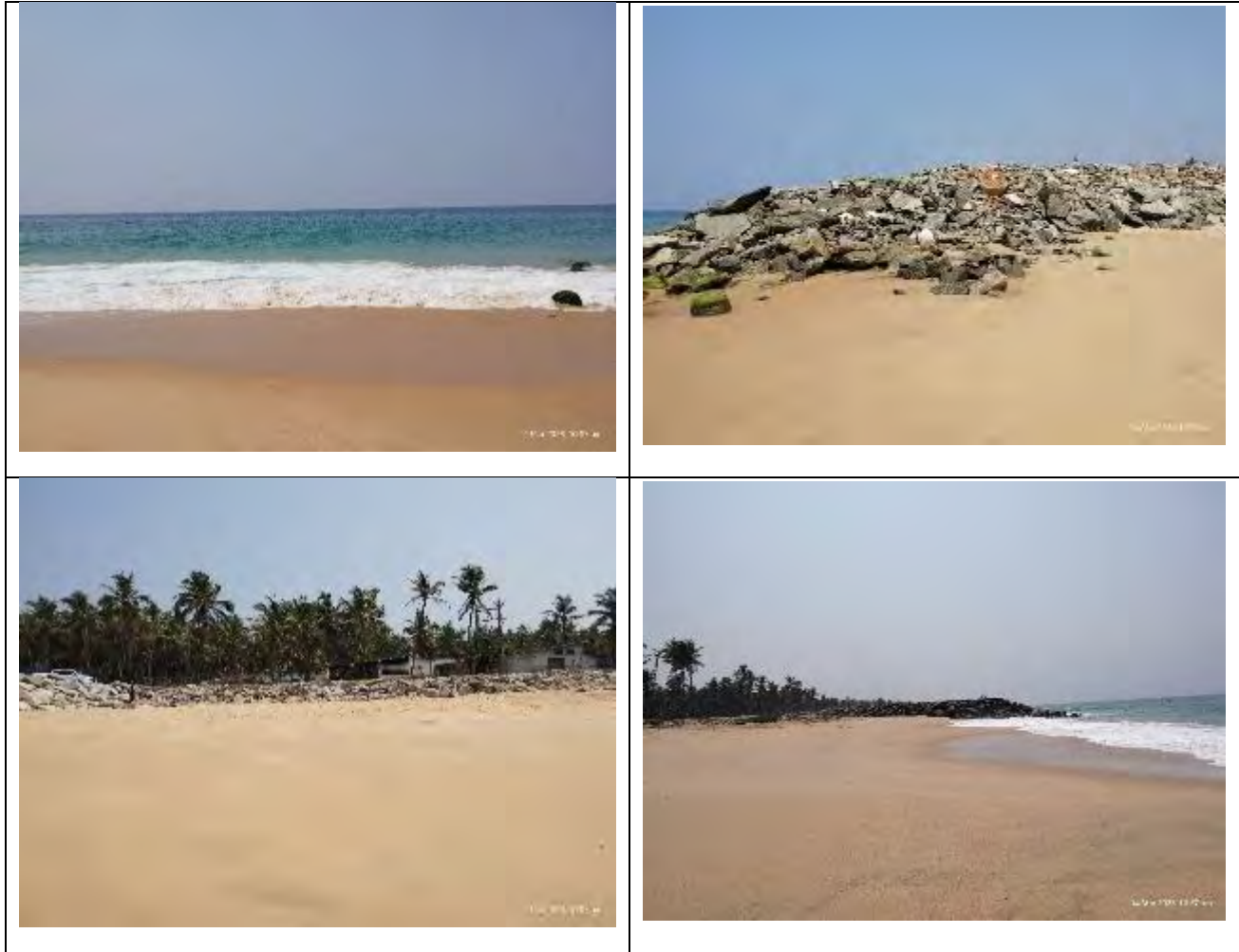


Figure 5- March CSP 05

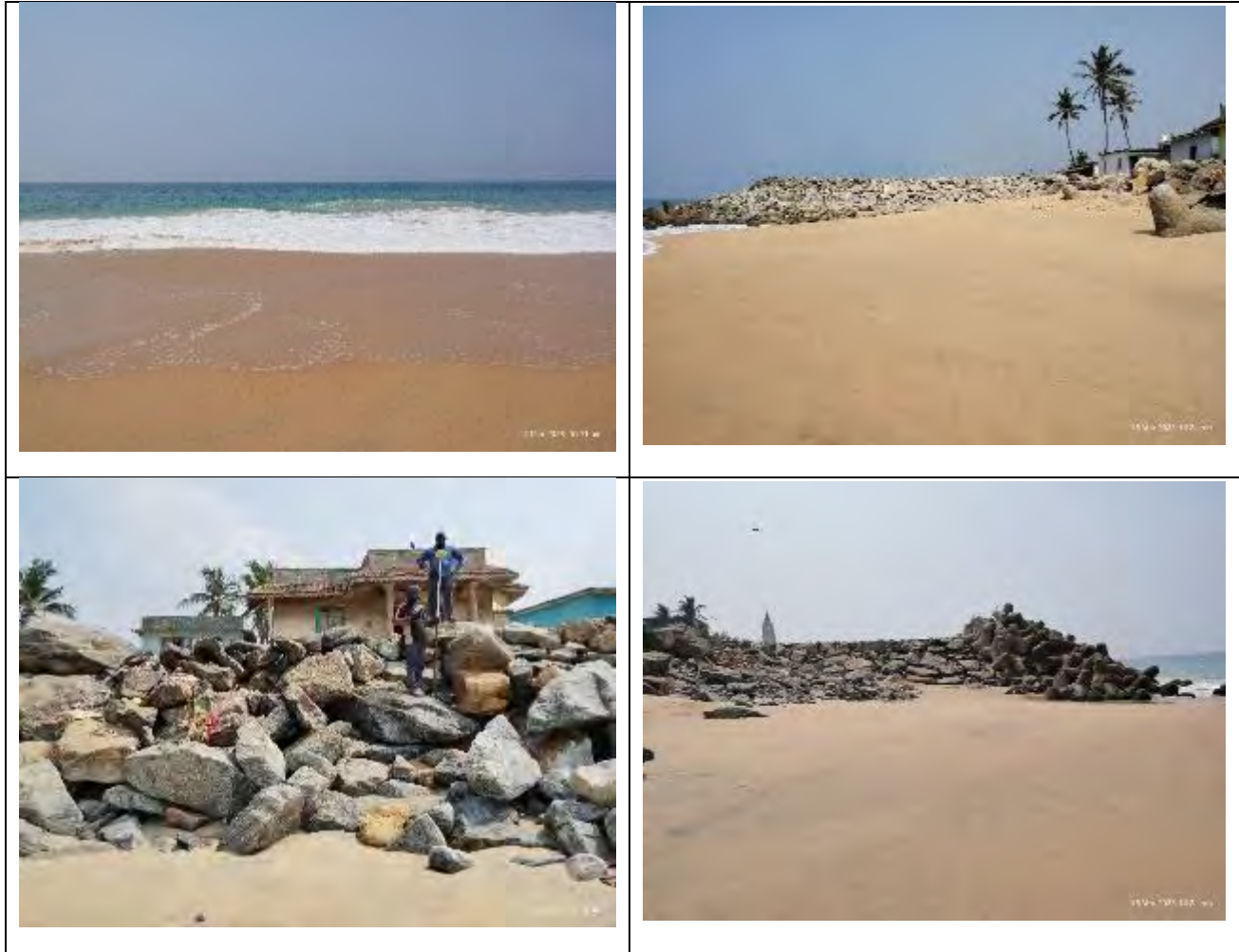


Figure 6- March CSP 06

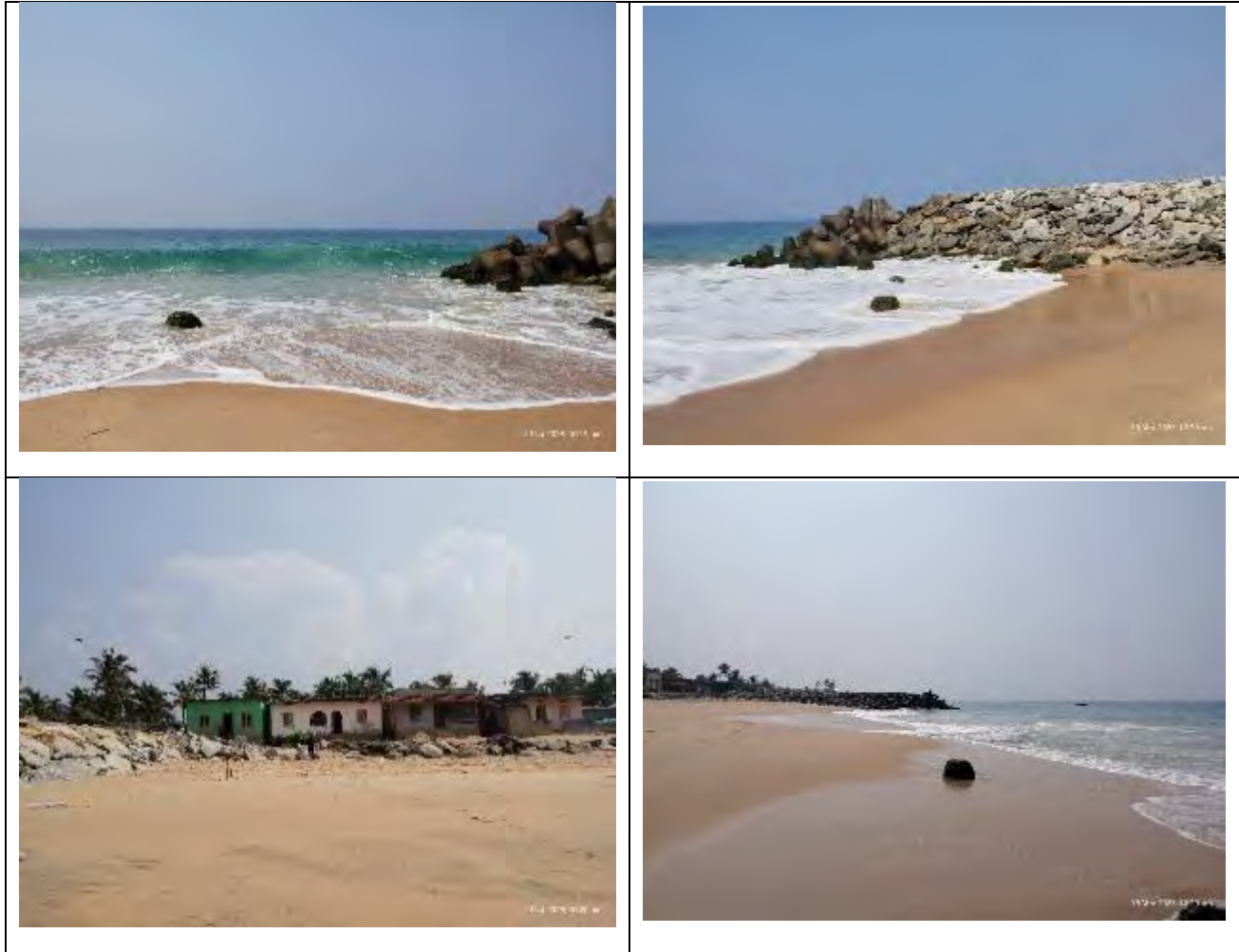


Figure 7- March CSP 07

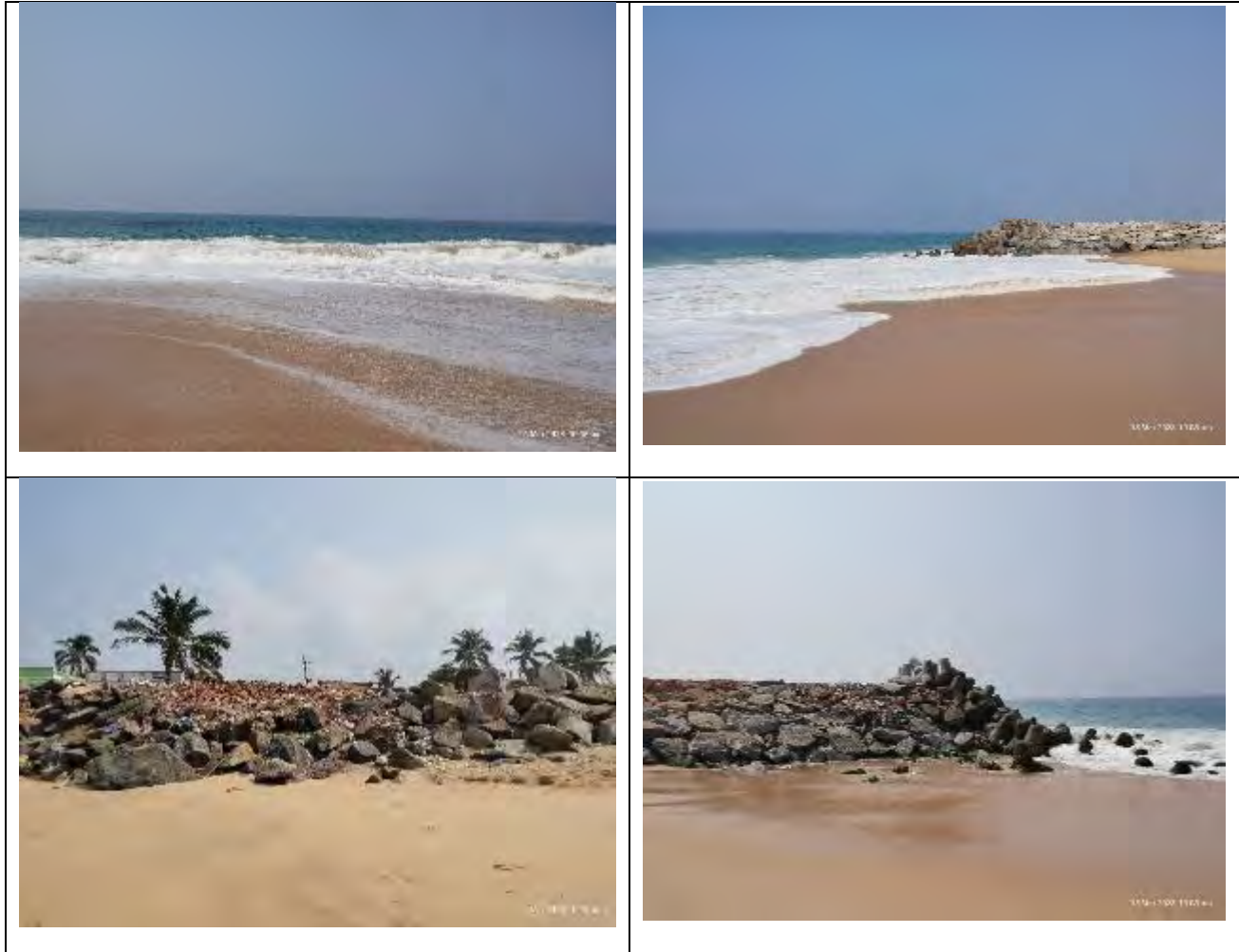


Figure 8- March CSP 08

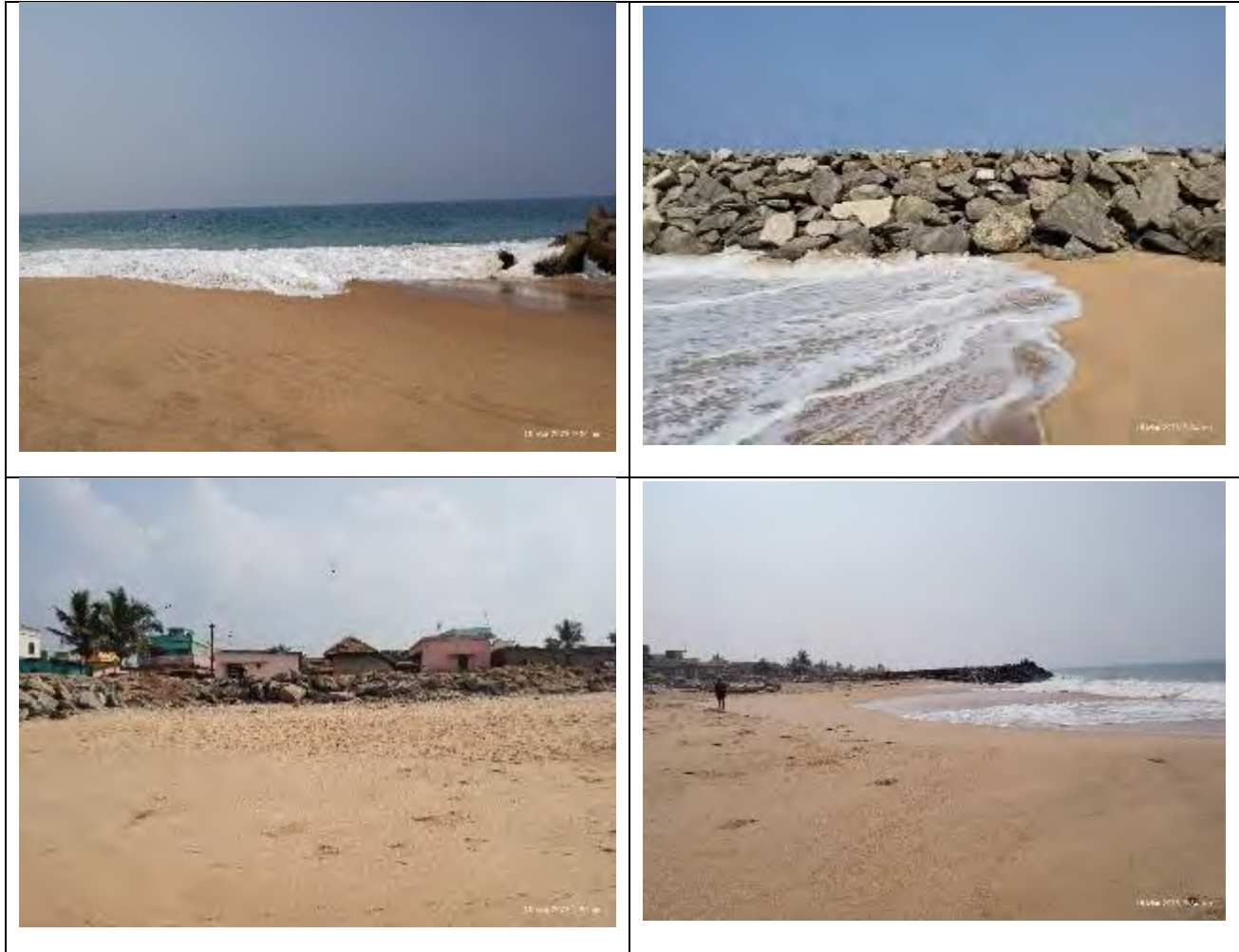


Figure 9- March CSP 09

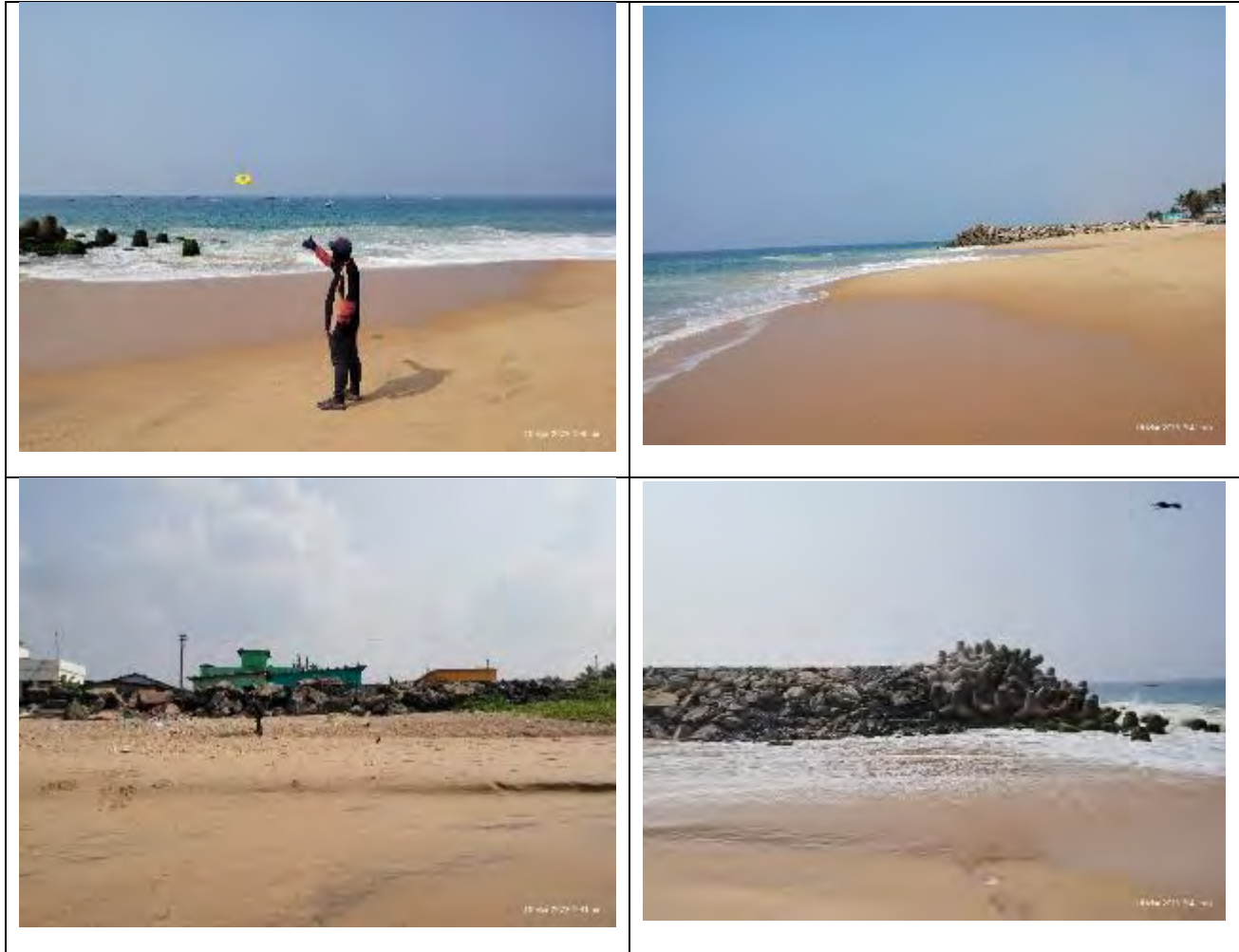


Figure 10- March CSP 10

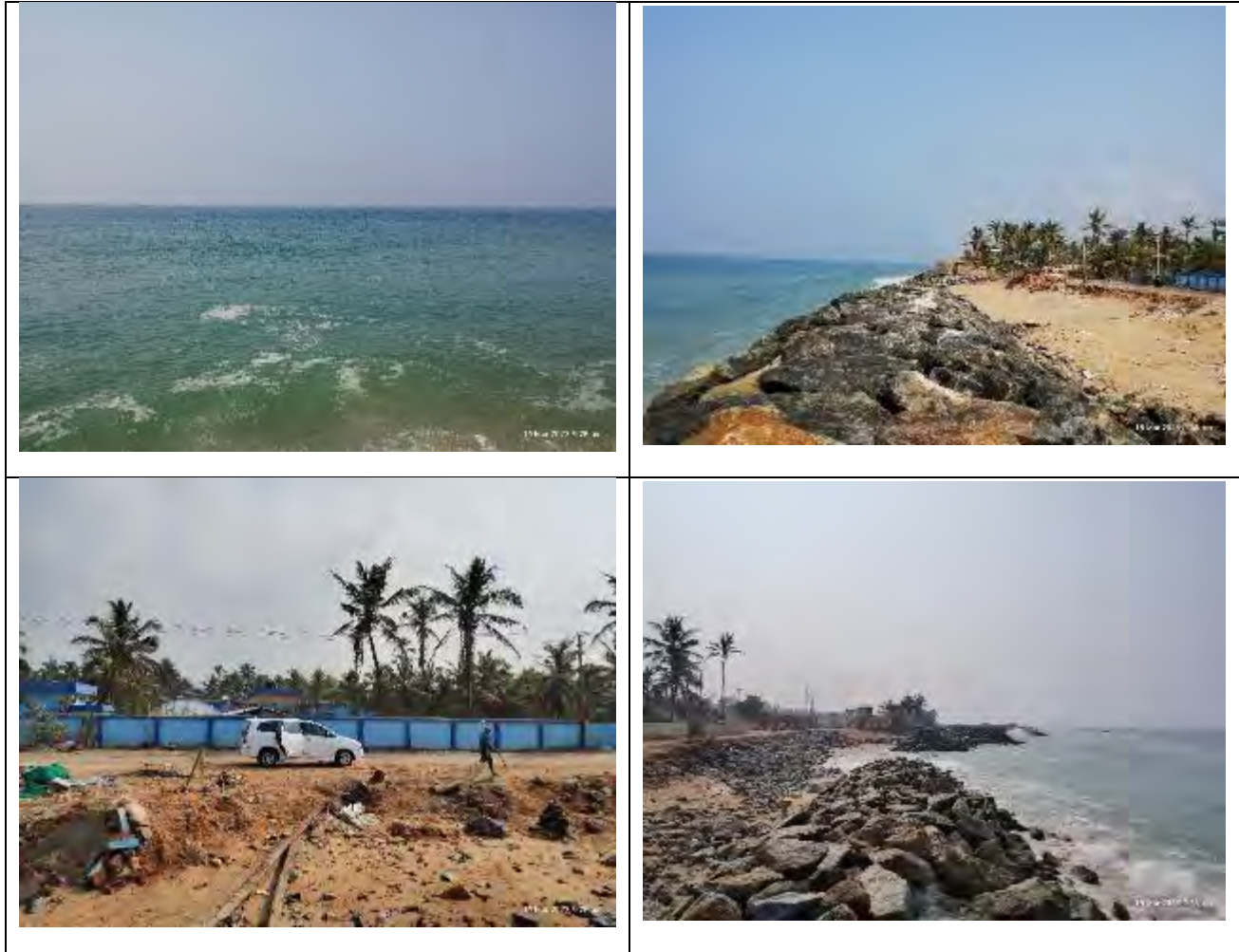


Figure 11- March CSP 11

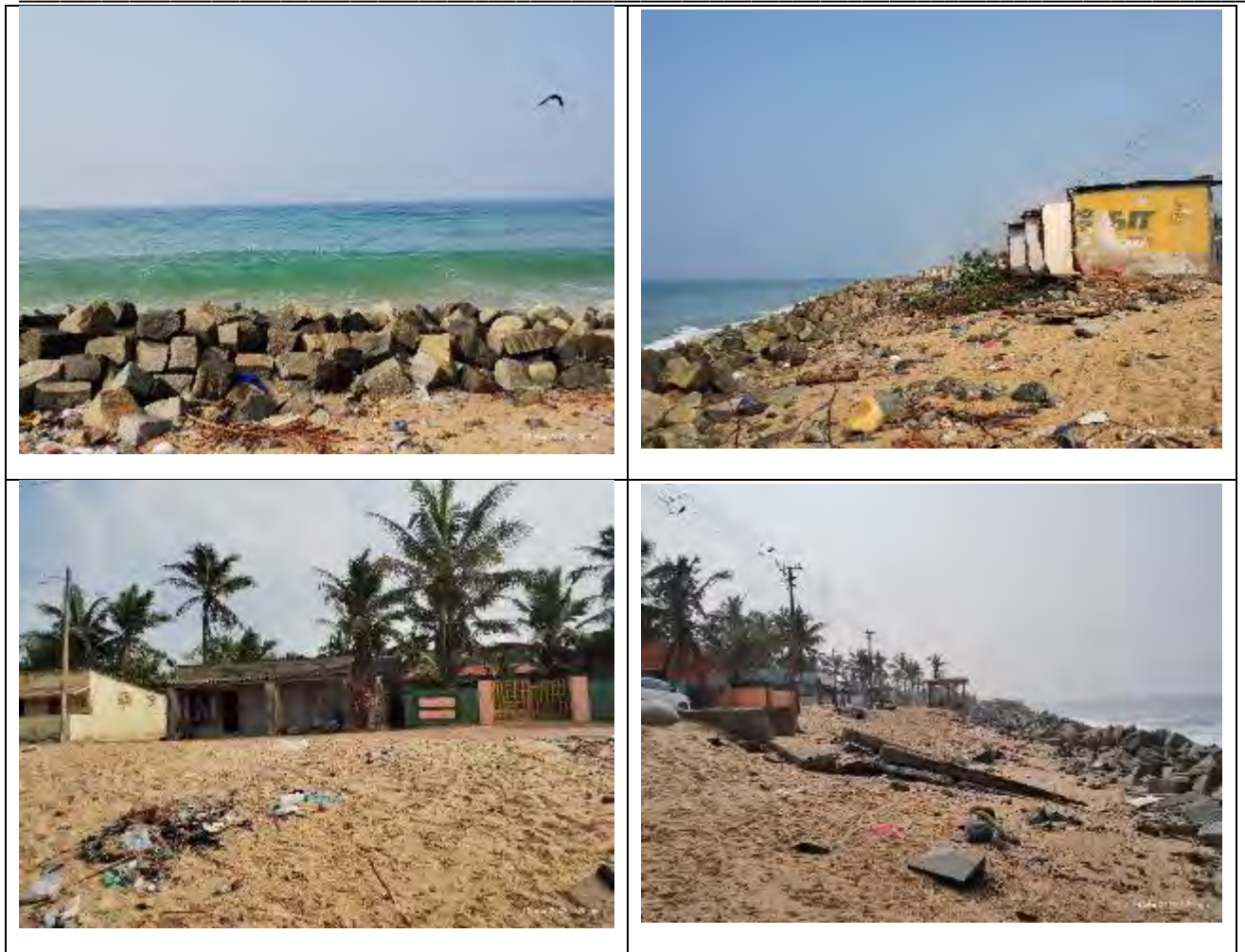


Figure 12- March CSP 12



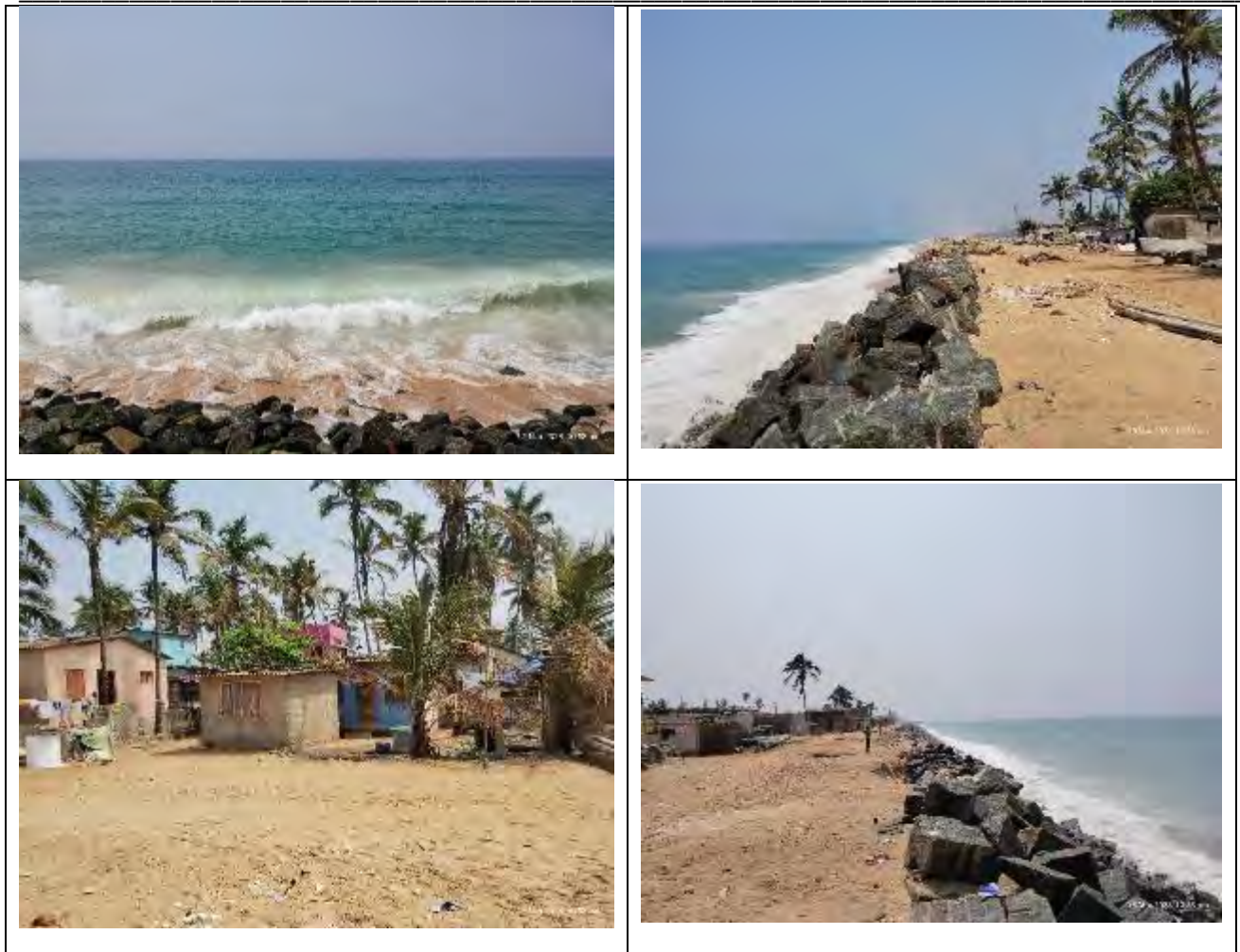


Figure 14- March CSP 14

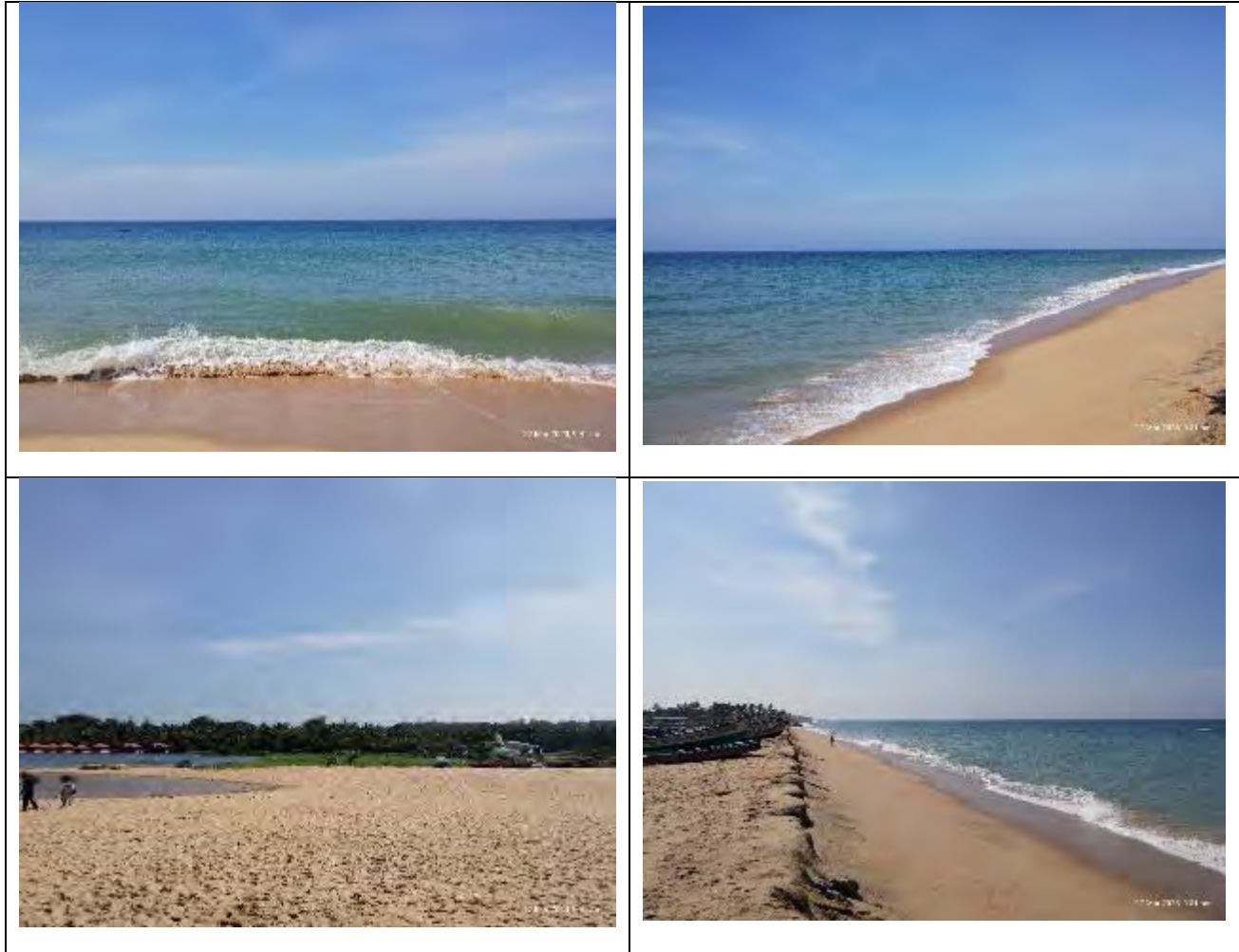


Figure 15- March CSP 15

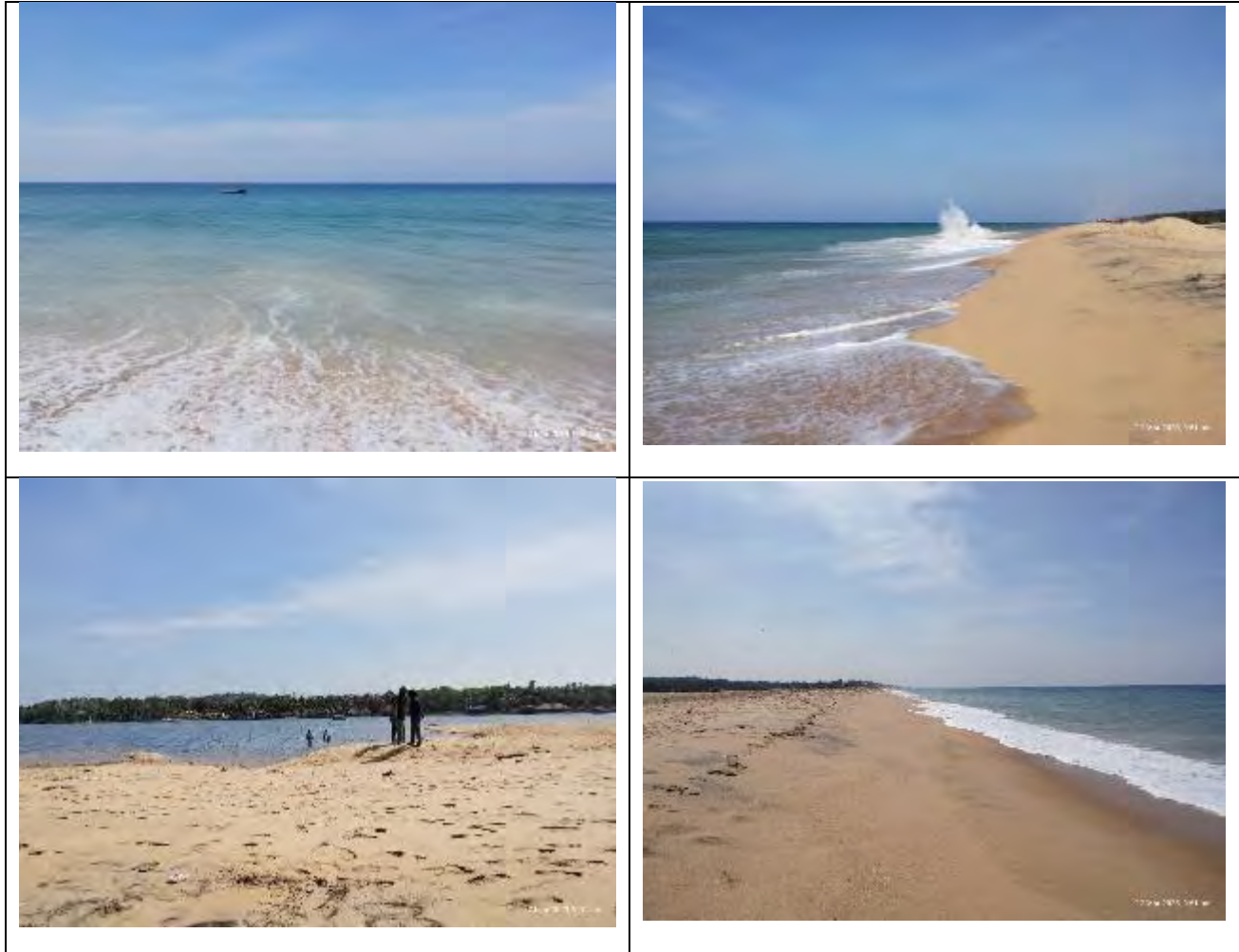


Figure 16- March CSP 16

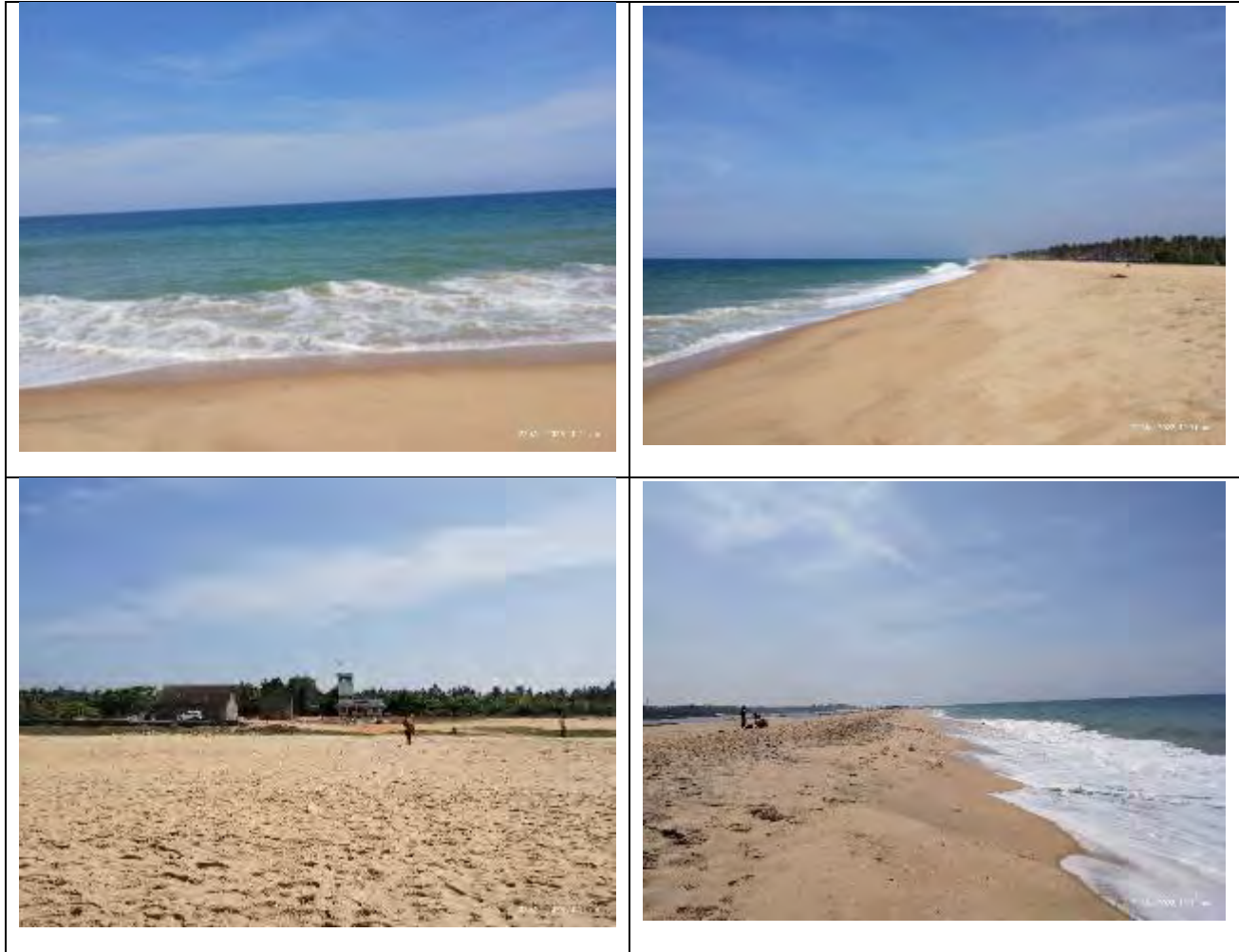


Figure 17- March CSP 17

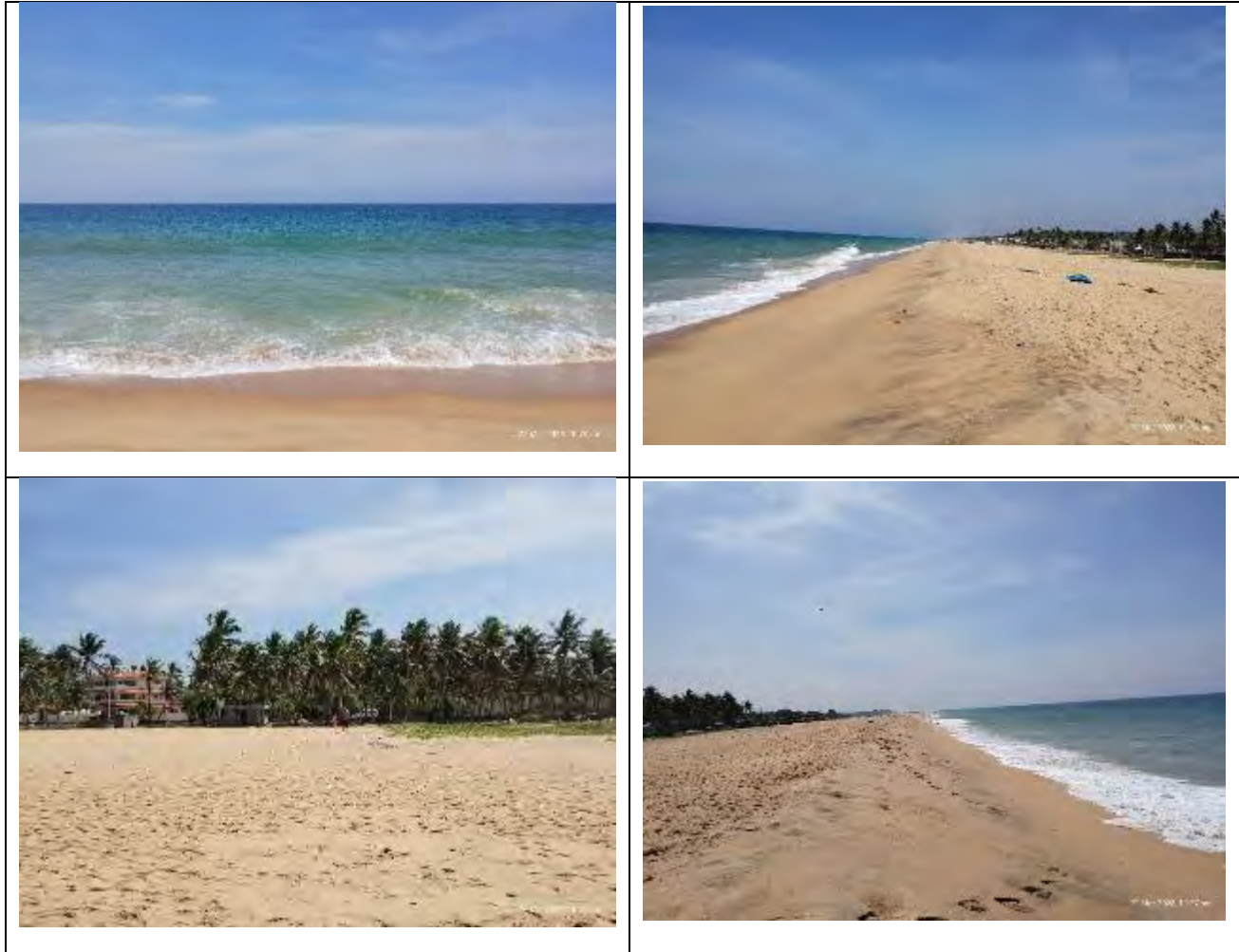


Figure 18- March CSP 18

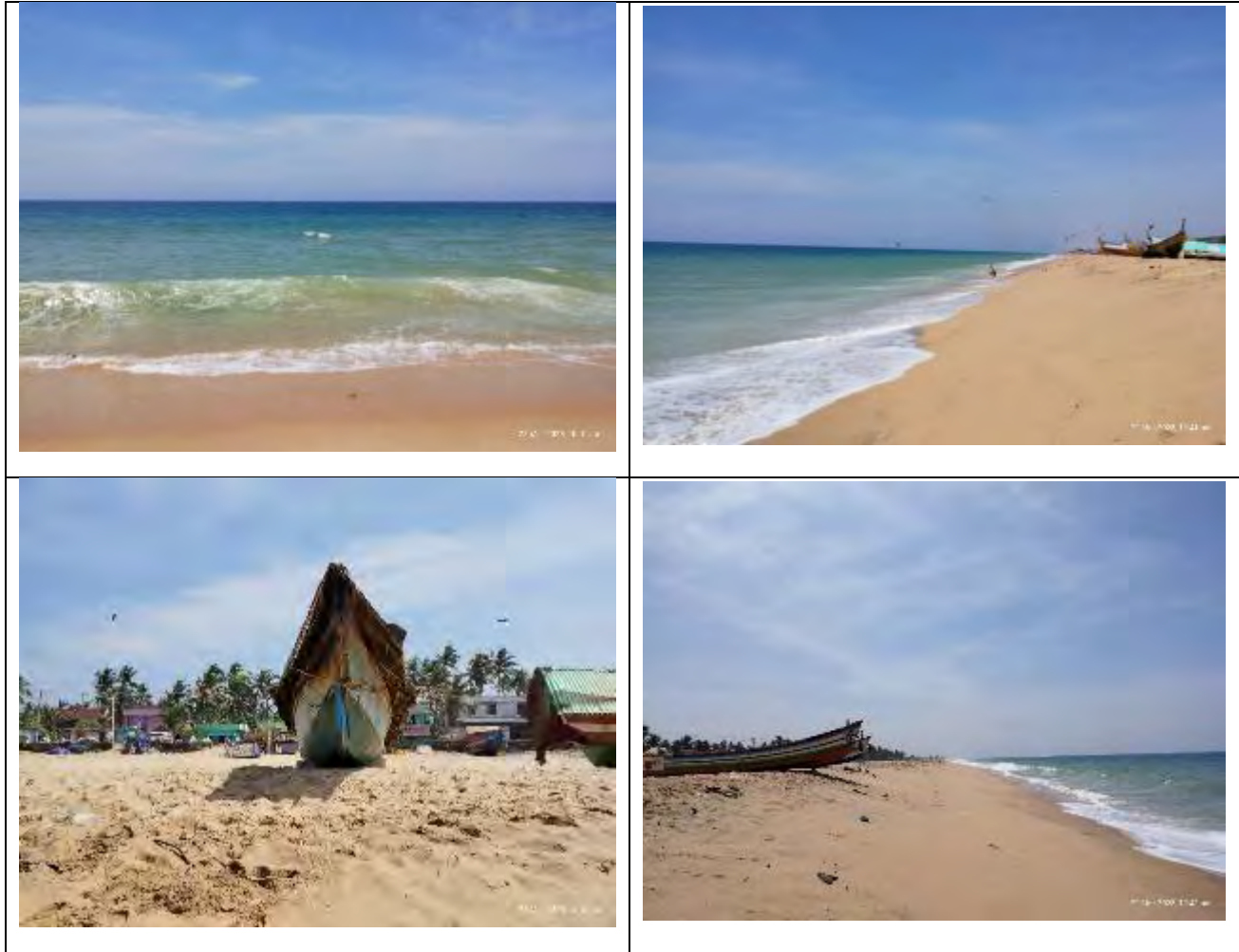


Figure 19- March CSP 19

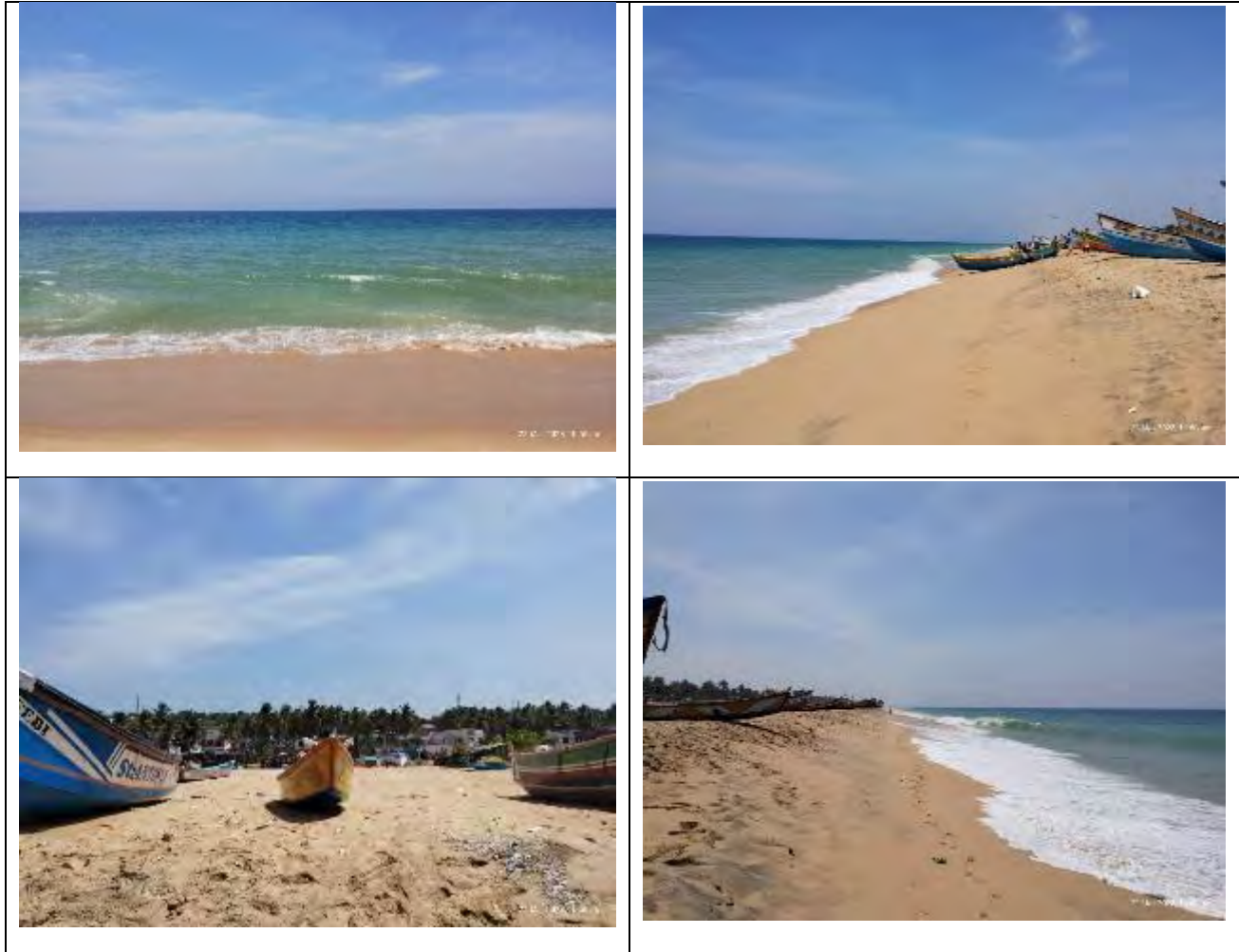


Figure 20- March CSP 20

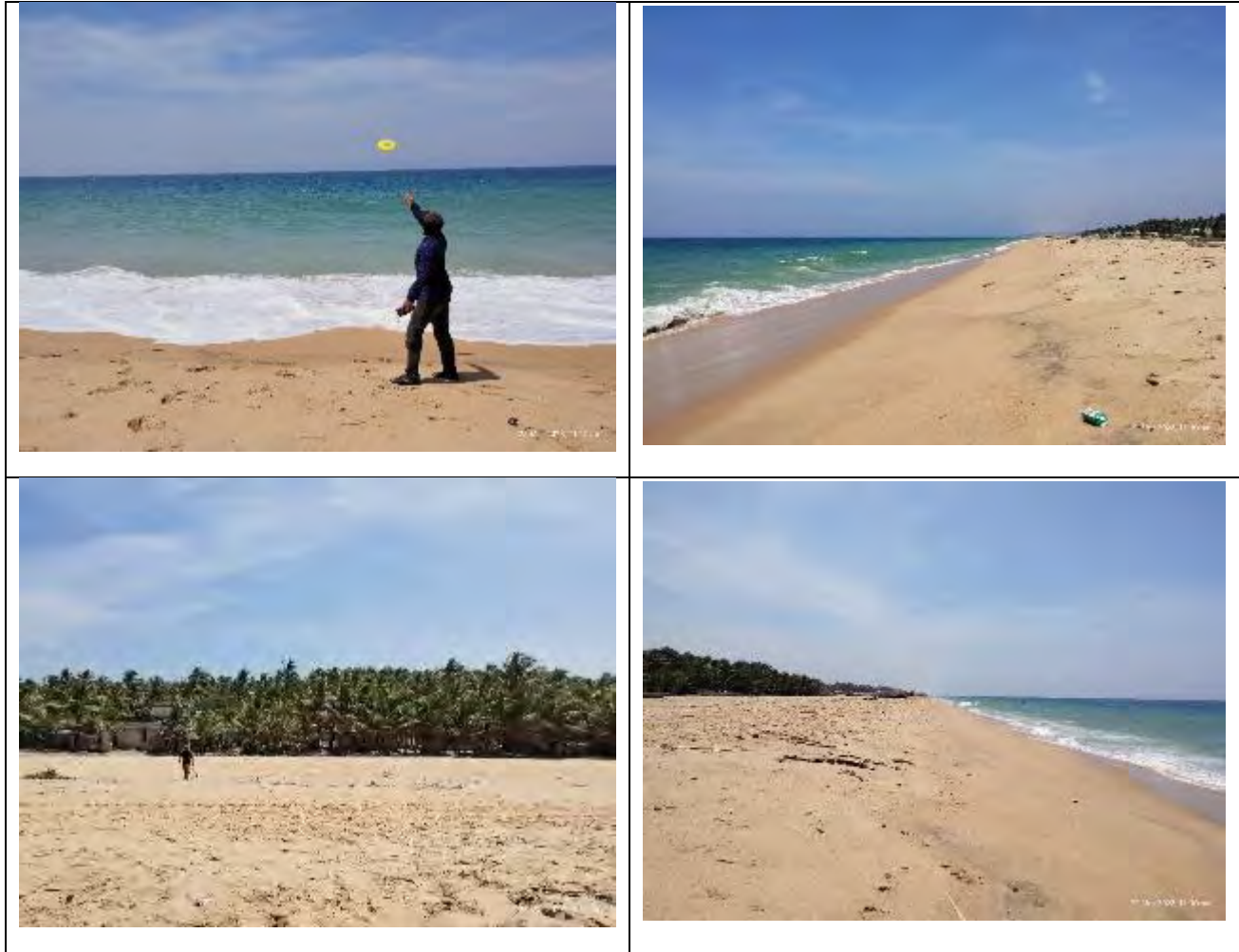


Figure 21- March CSP 21

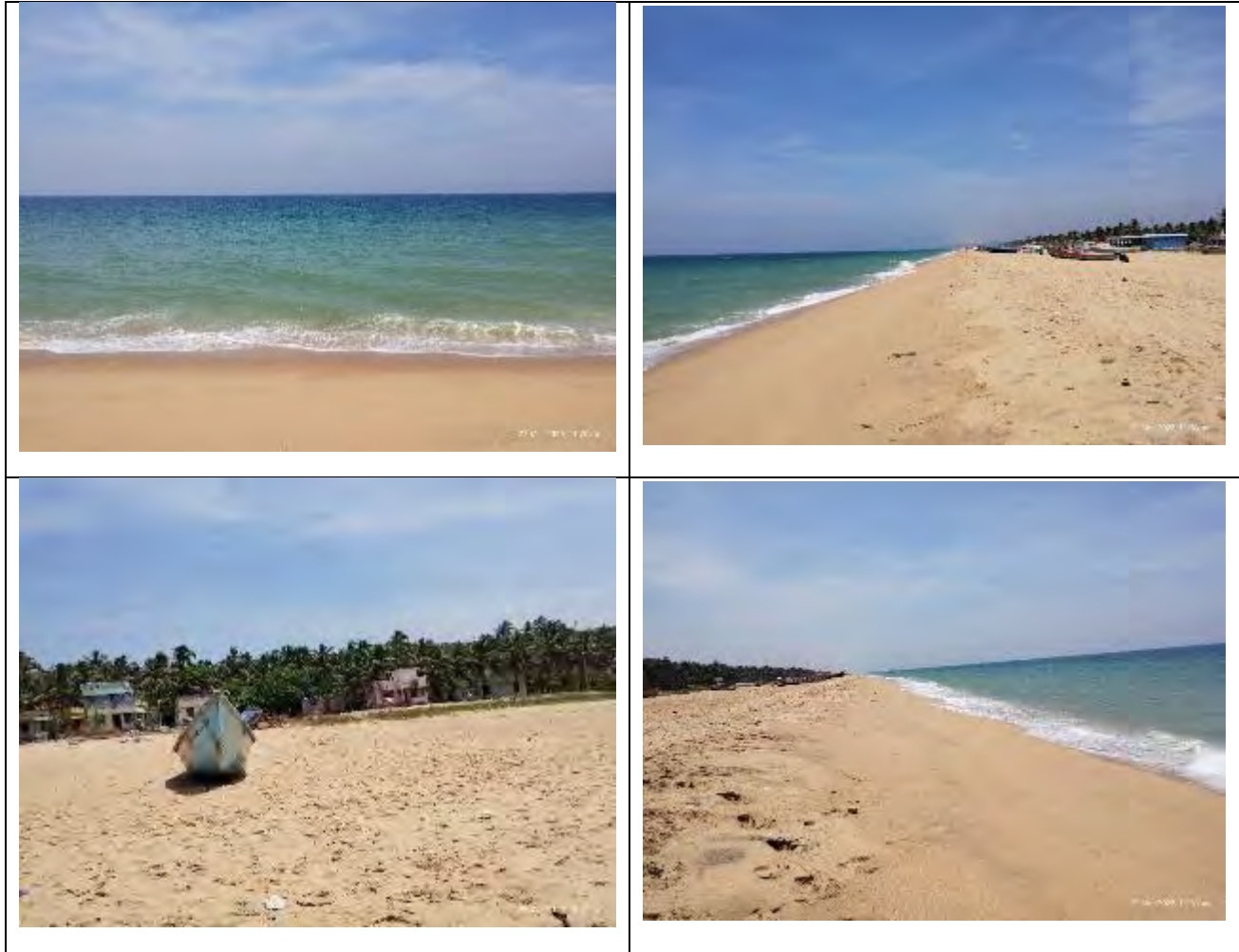


Figure 22- March CSP 22

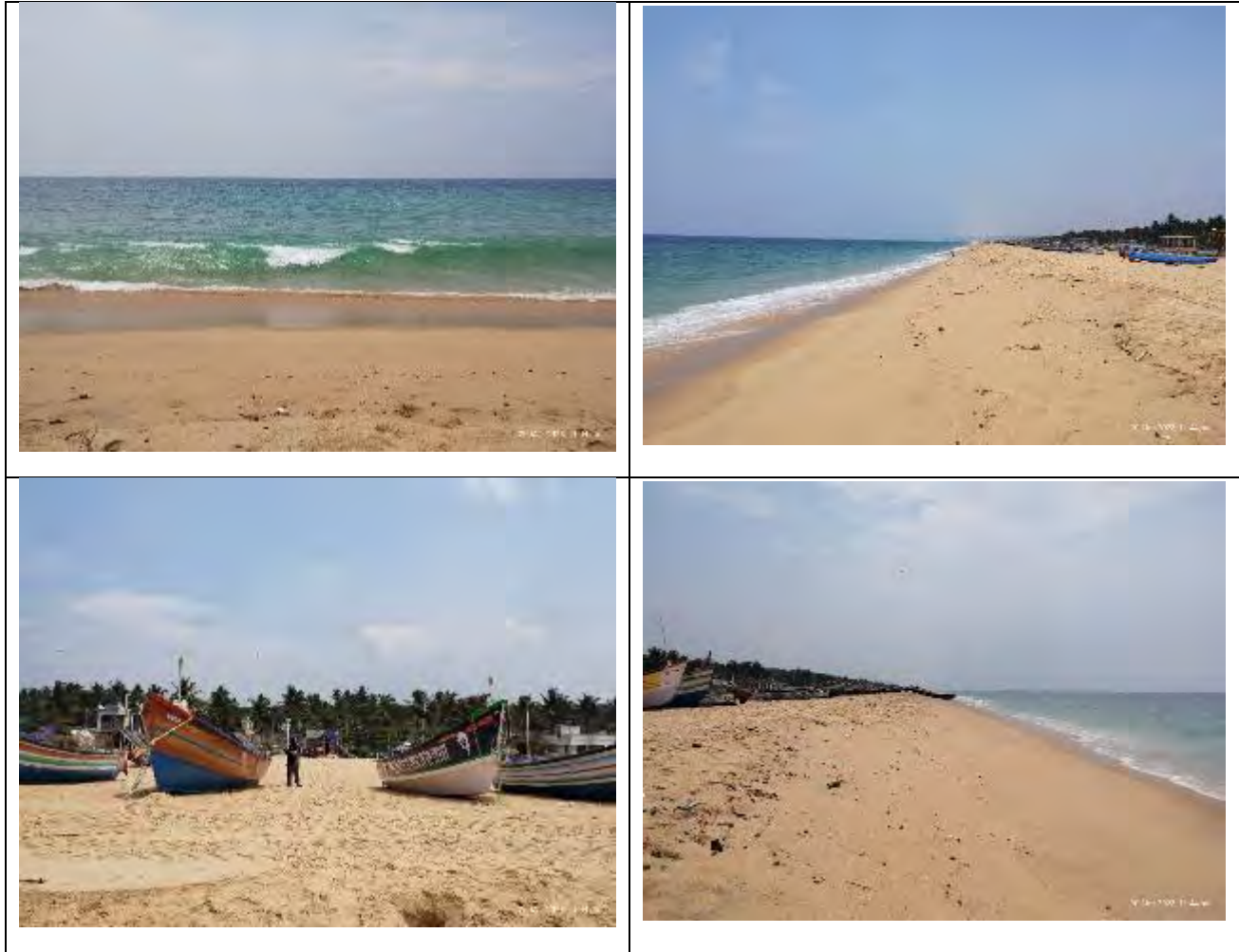


Figure 23- March CSP 23

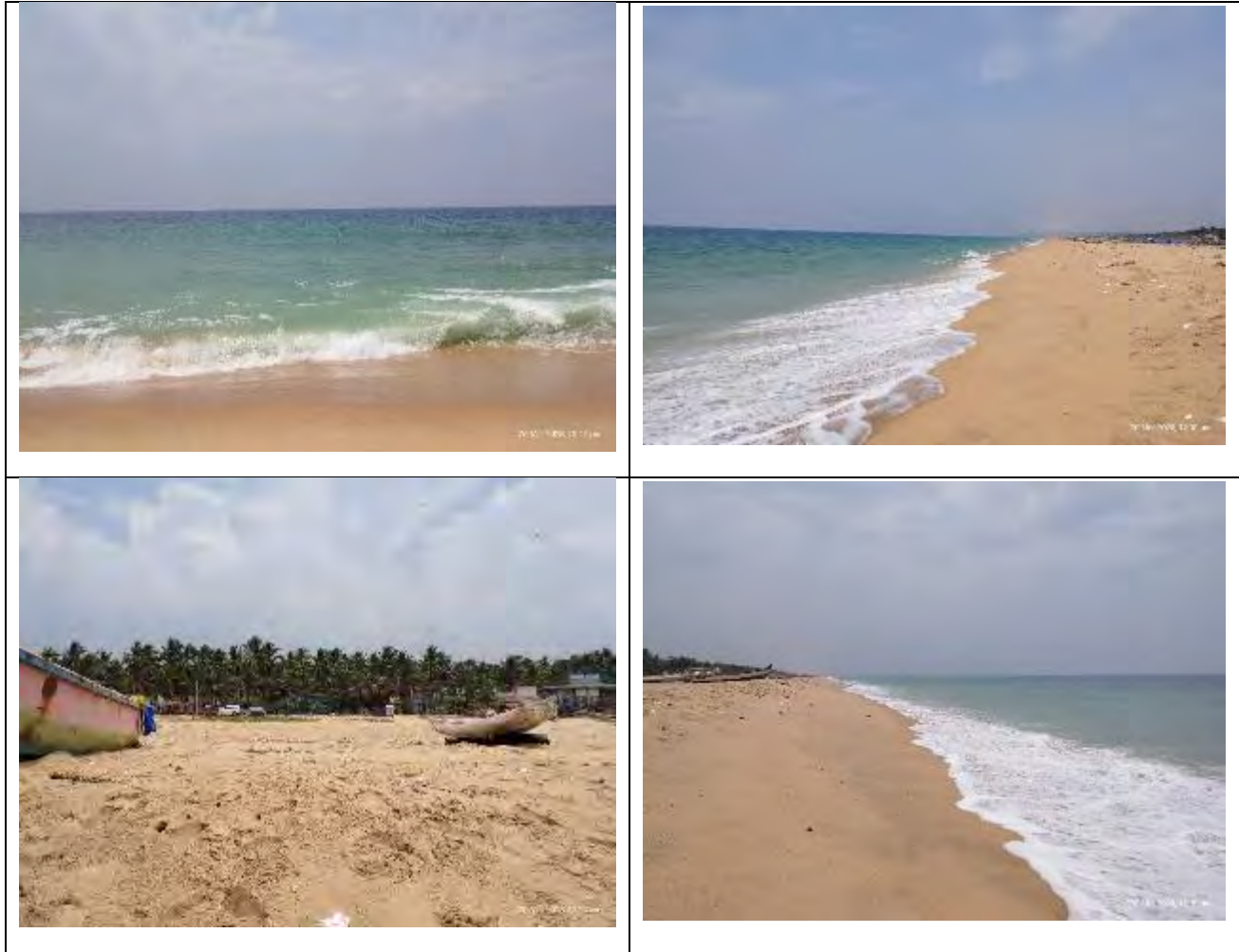


Figure 24- March CSP 24

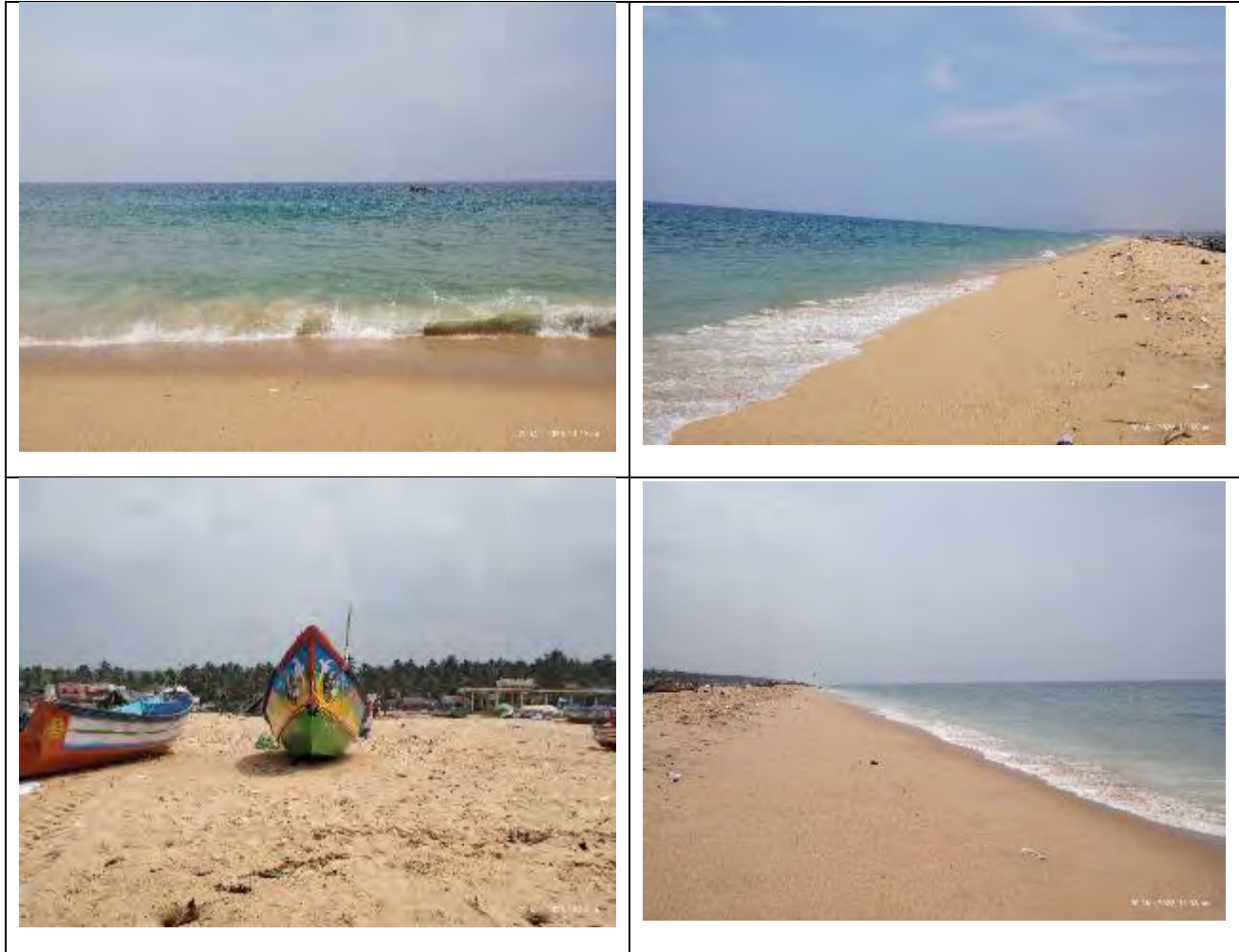


Figure 25- March CSP 26

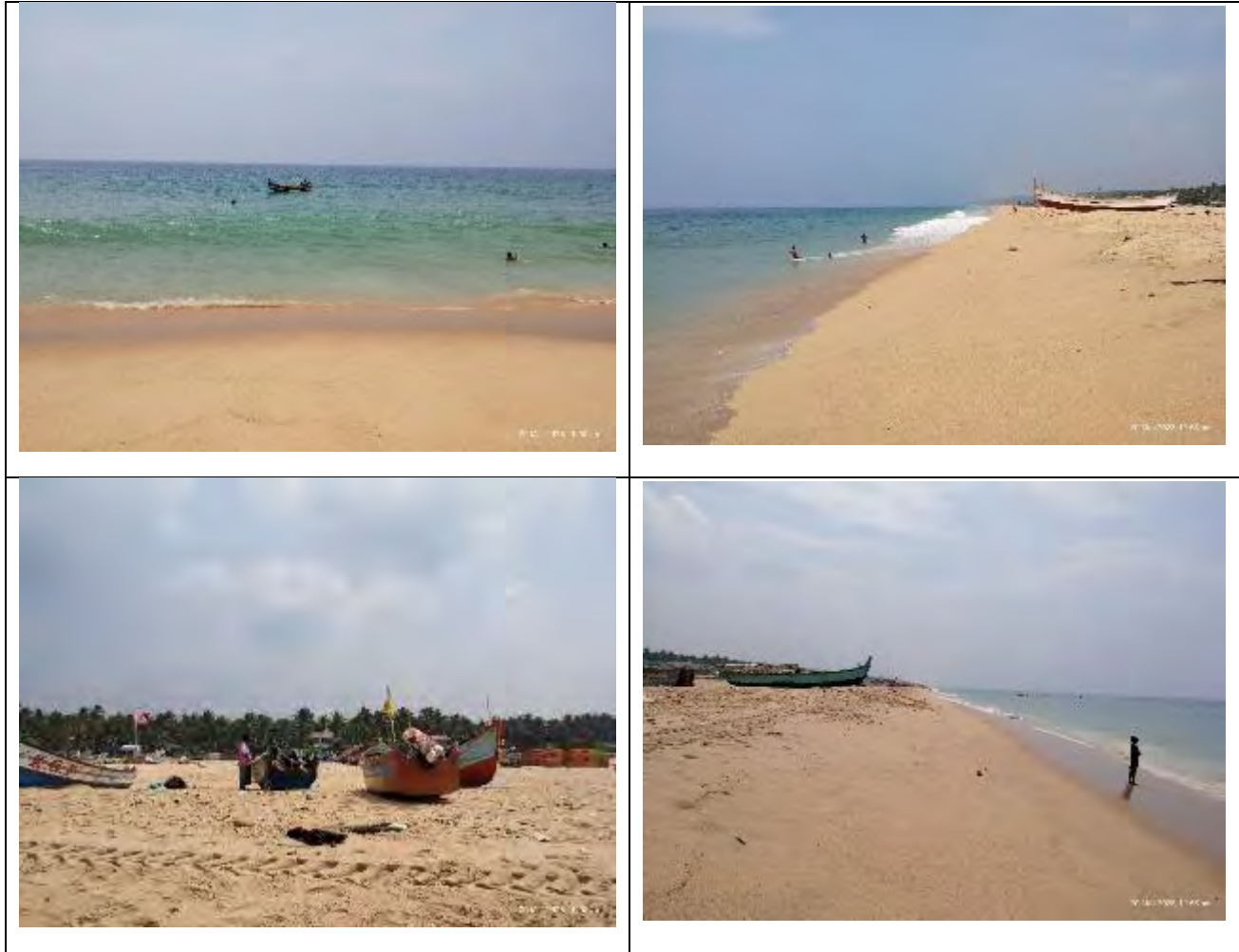


Figure 26- March CSP 27

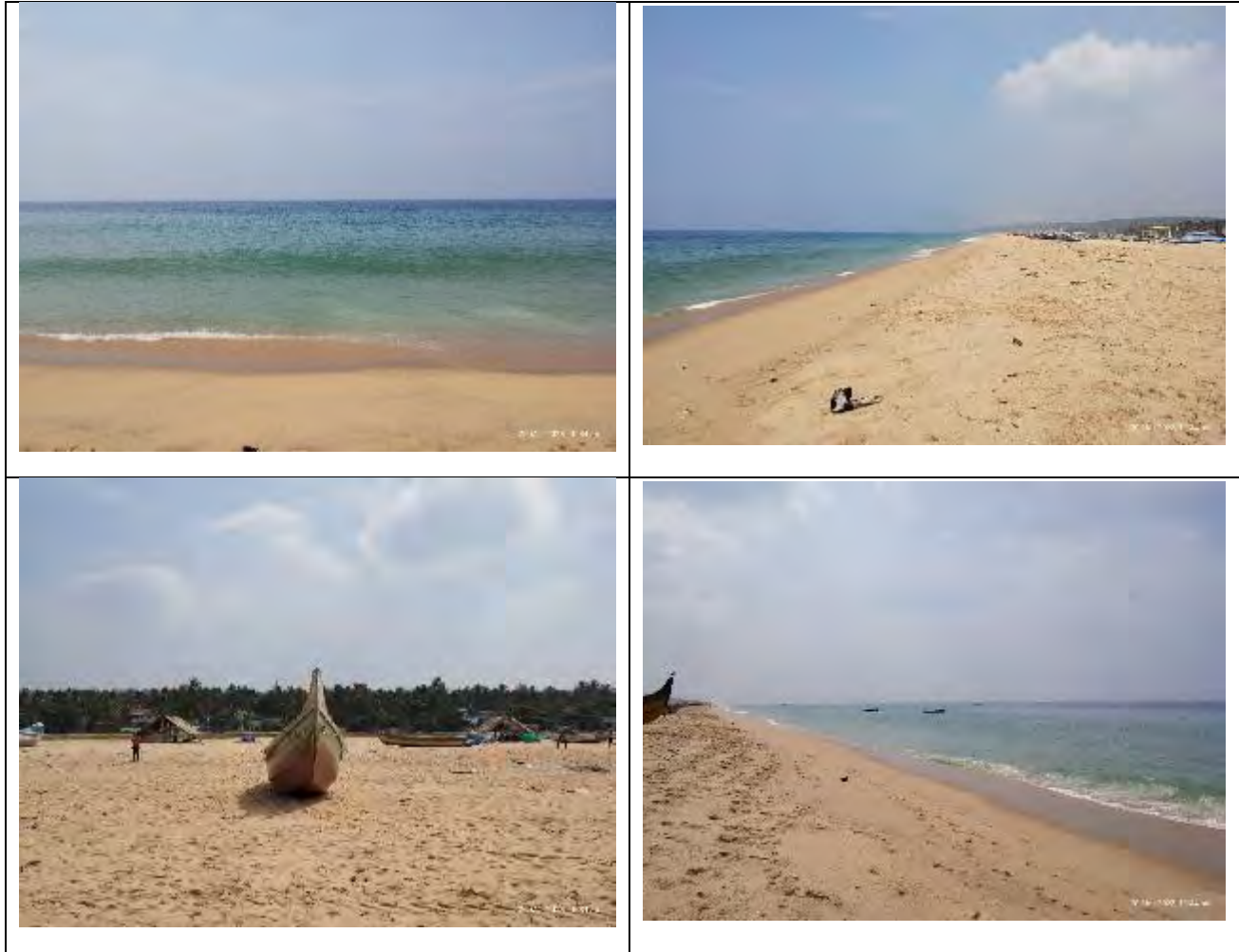


Figure 27- March CSP 28



Figure 28- March CSP 30

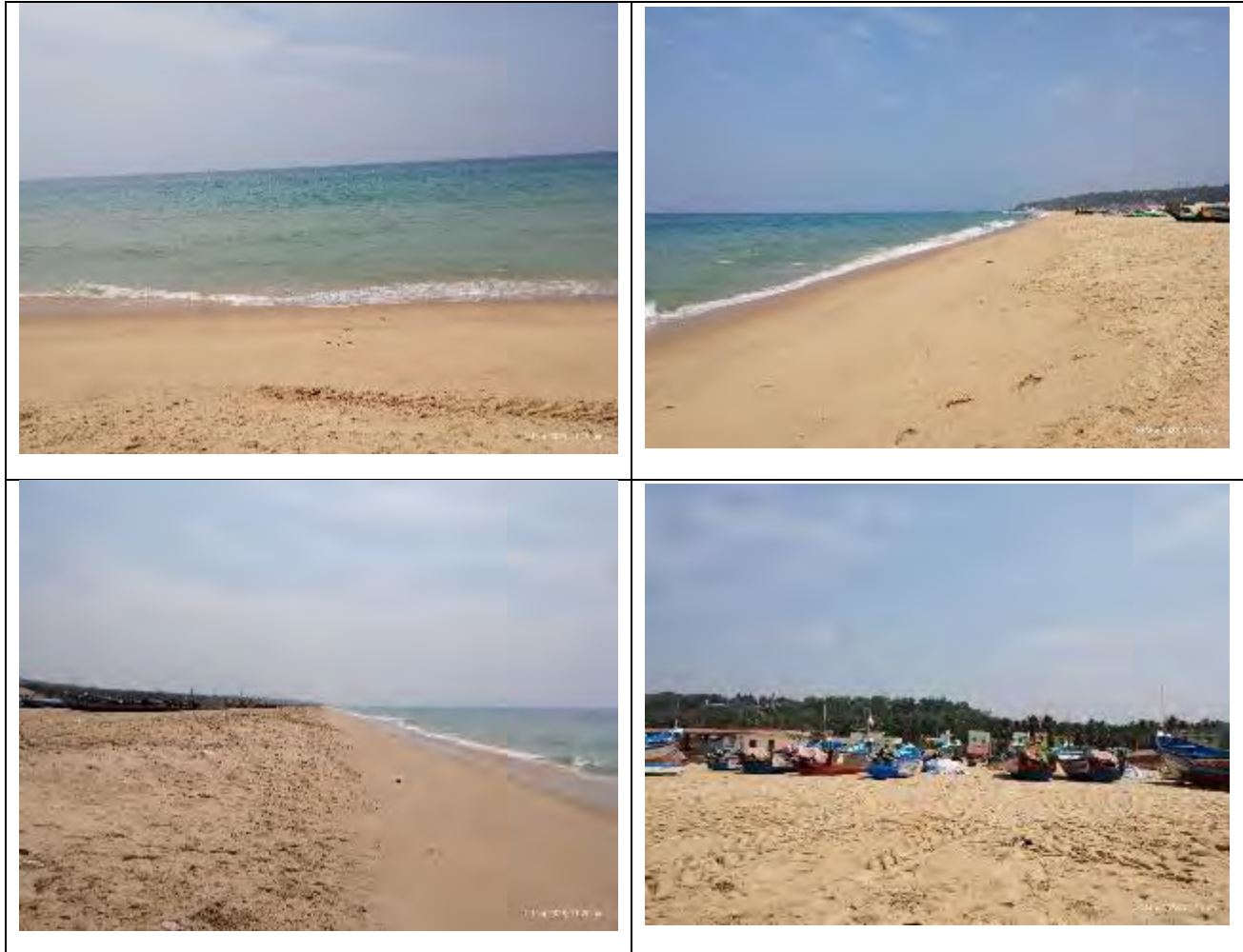


Figure 29- March CSP 31

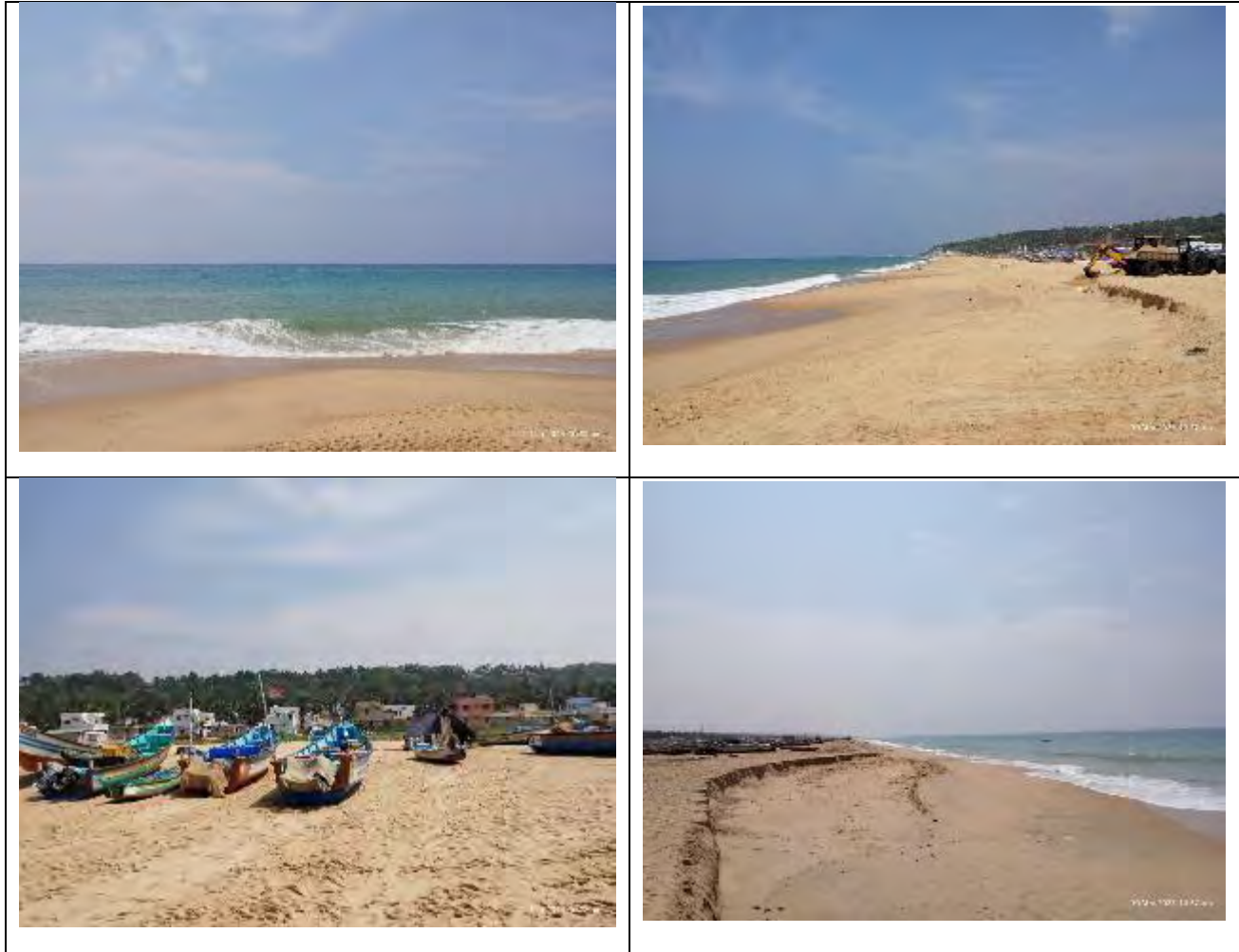


Figure 30- March CSP 32

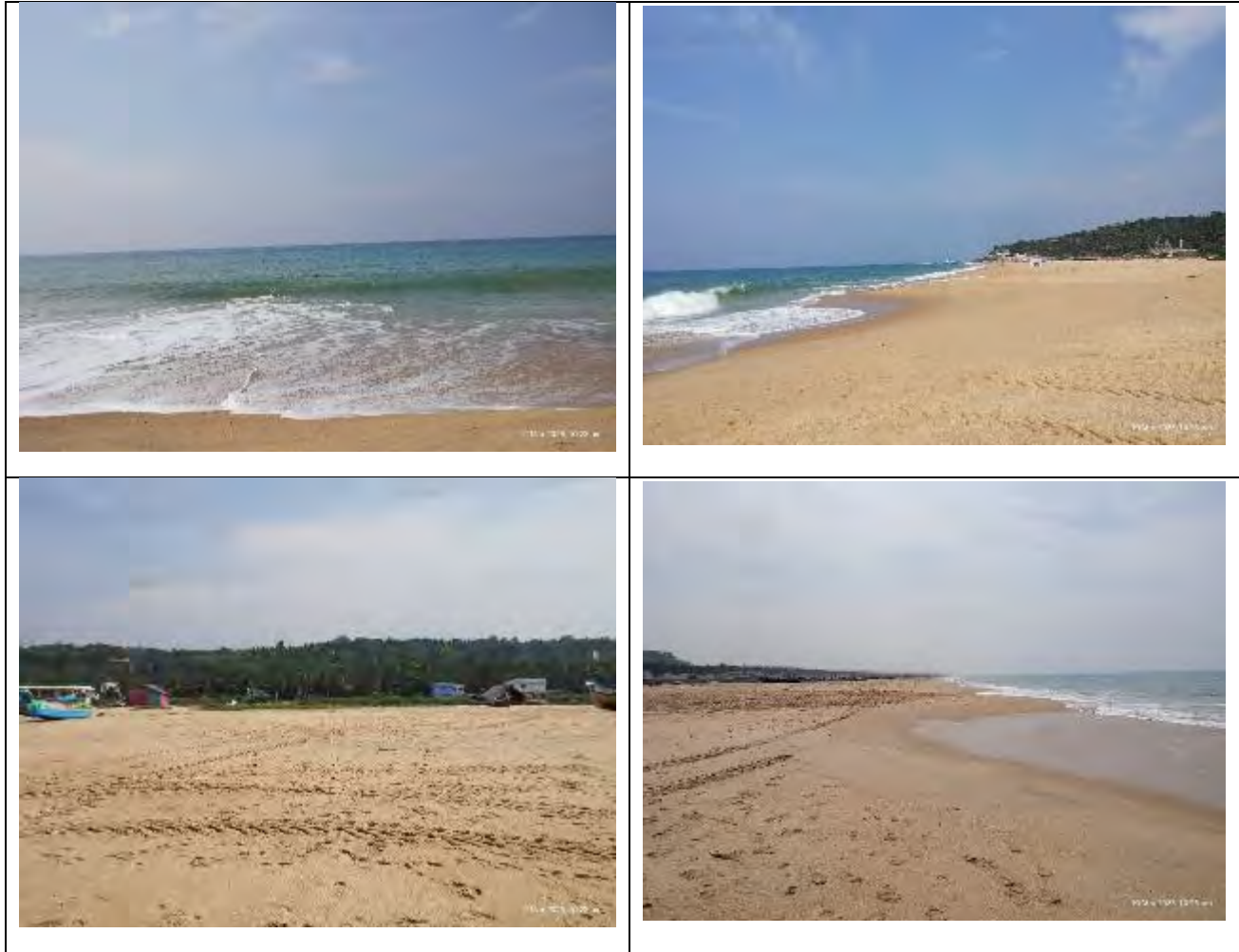


Figure 31- March CSP 33

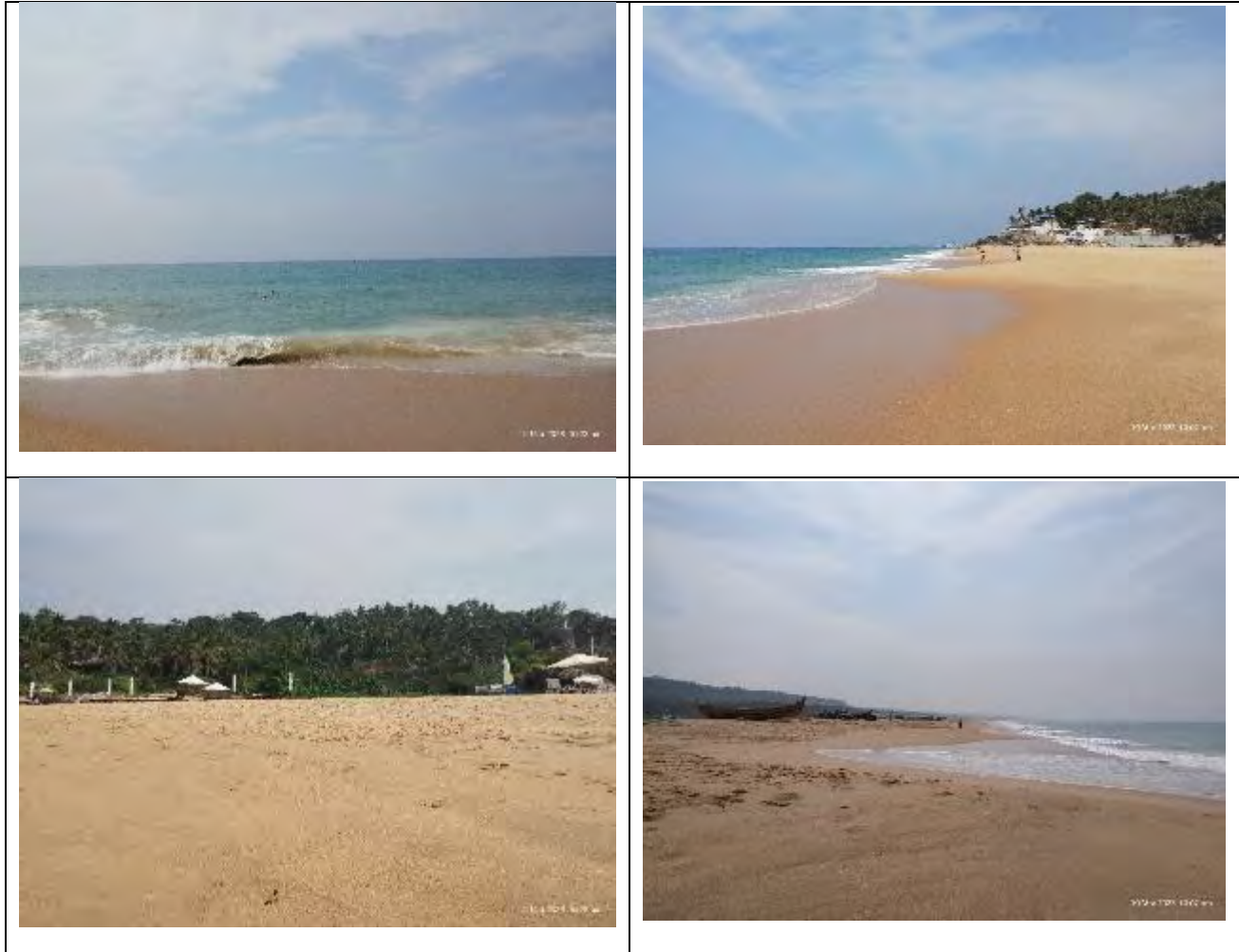


Figure 32- March CSP 34

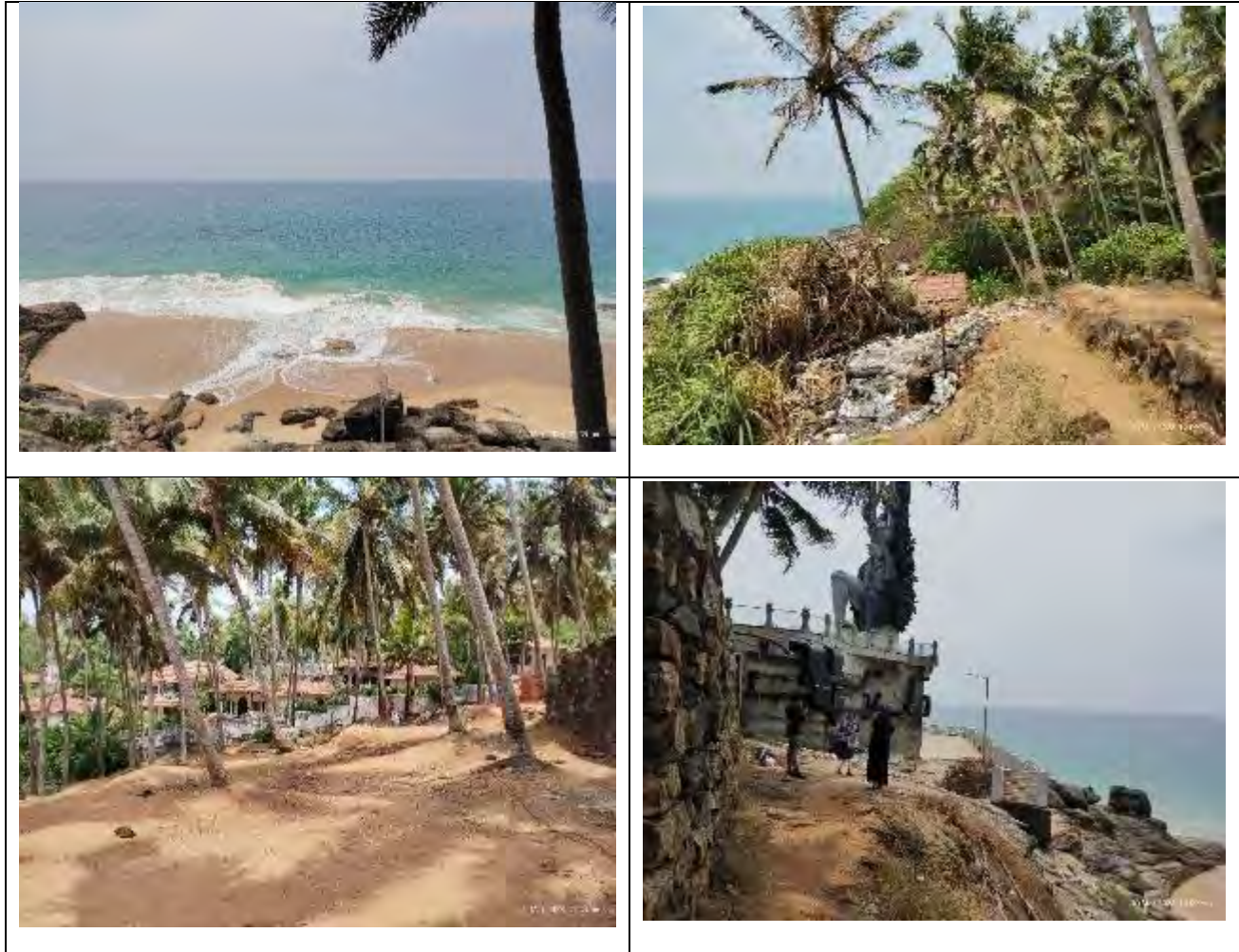


Figure 33- March CSP 35

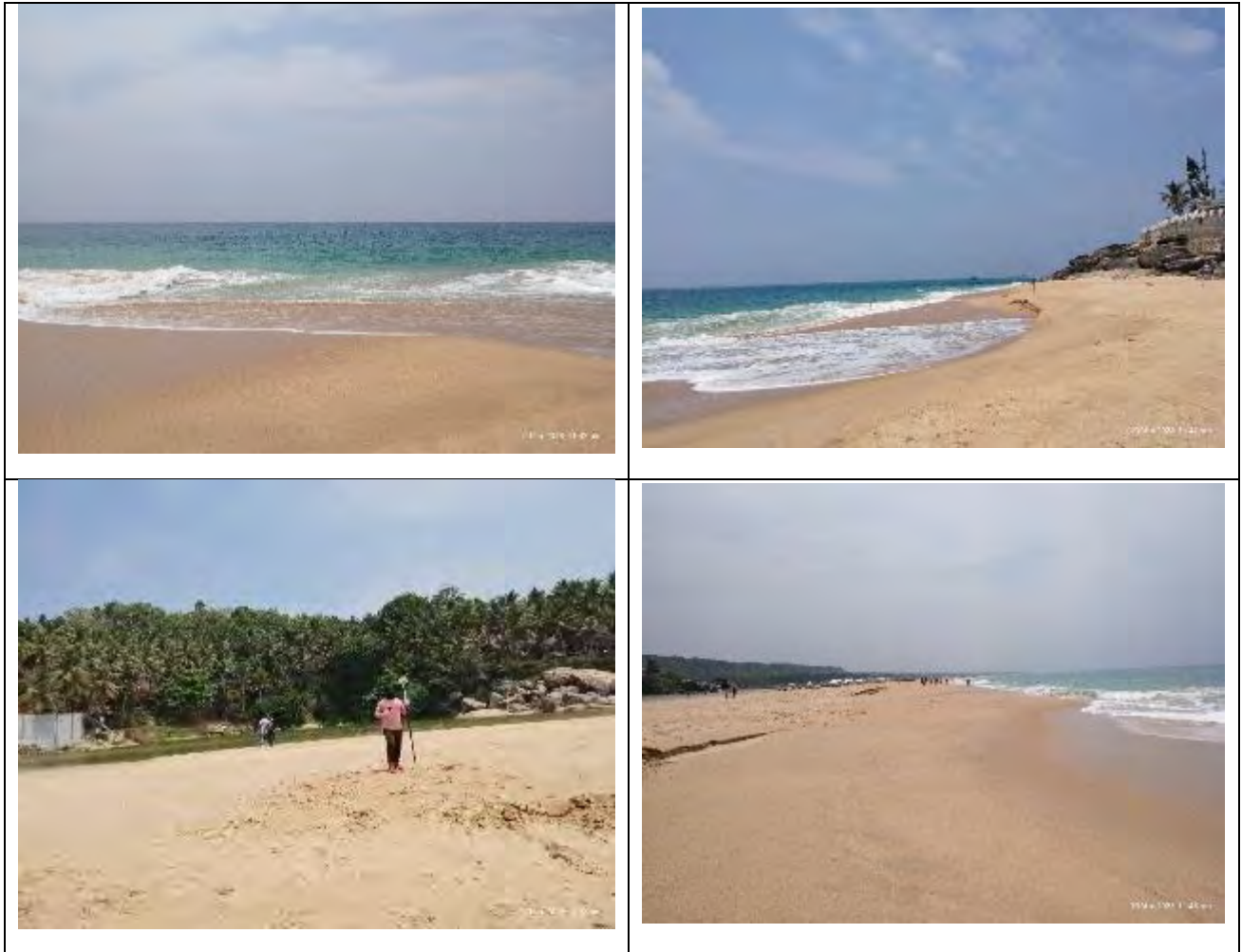


Figure 34- March CSP 35A

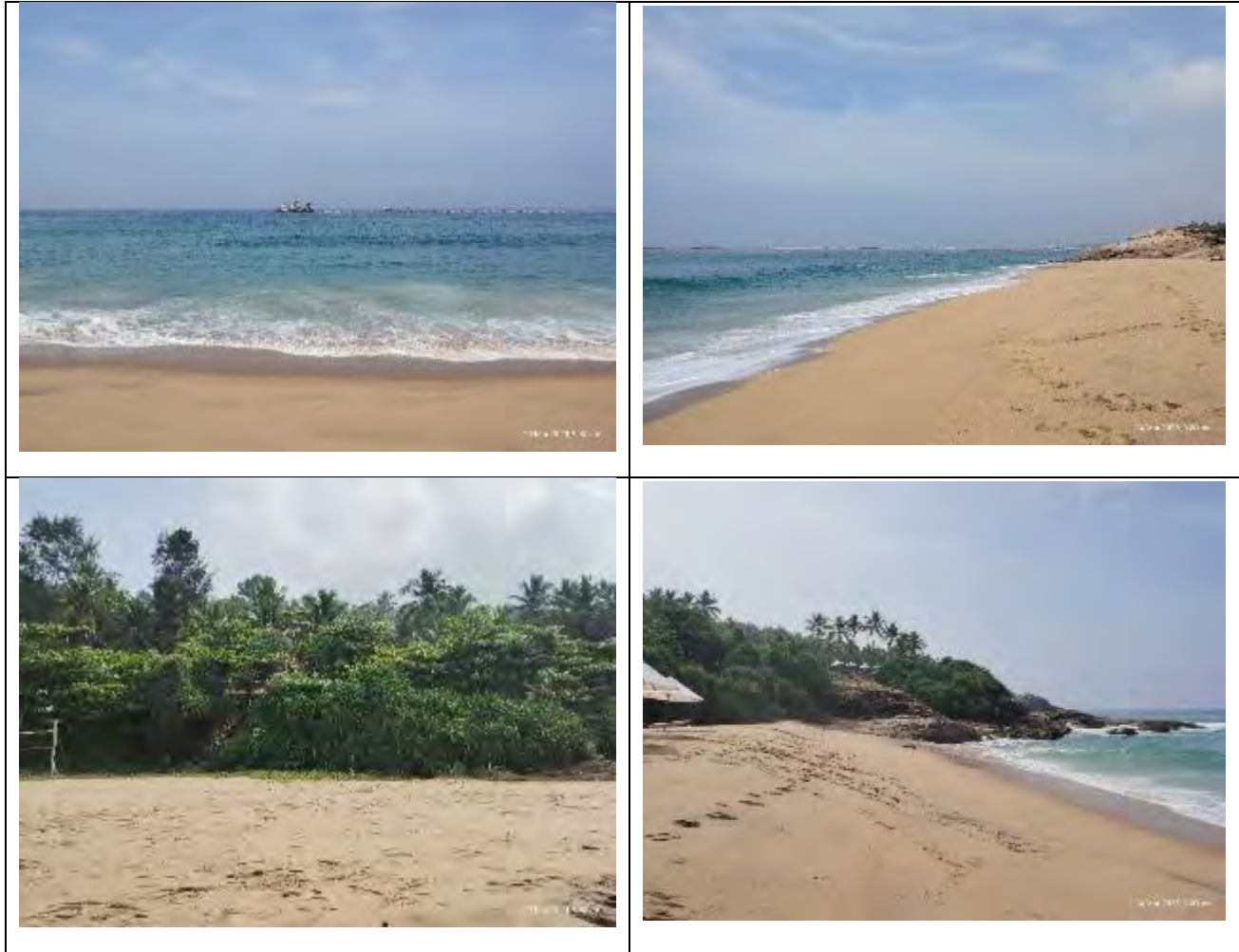


Figure 35- March CSP 36

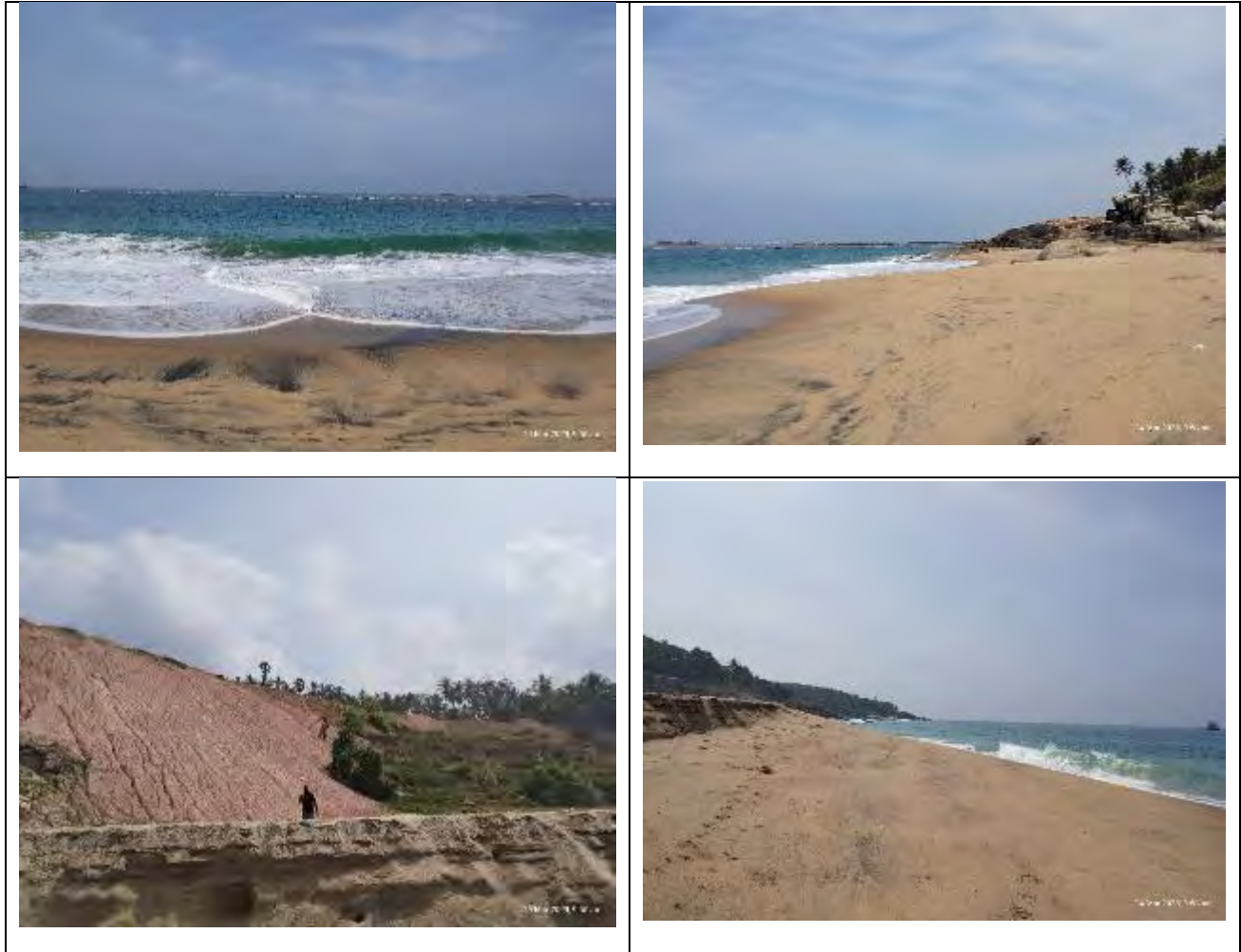


Figure 36- March CSP 37

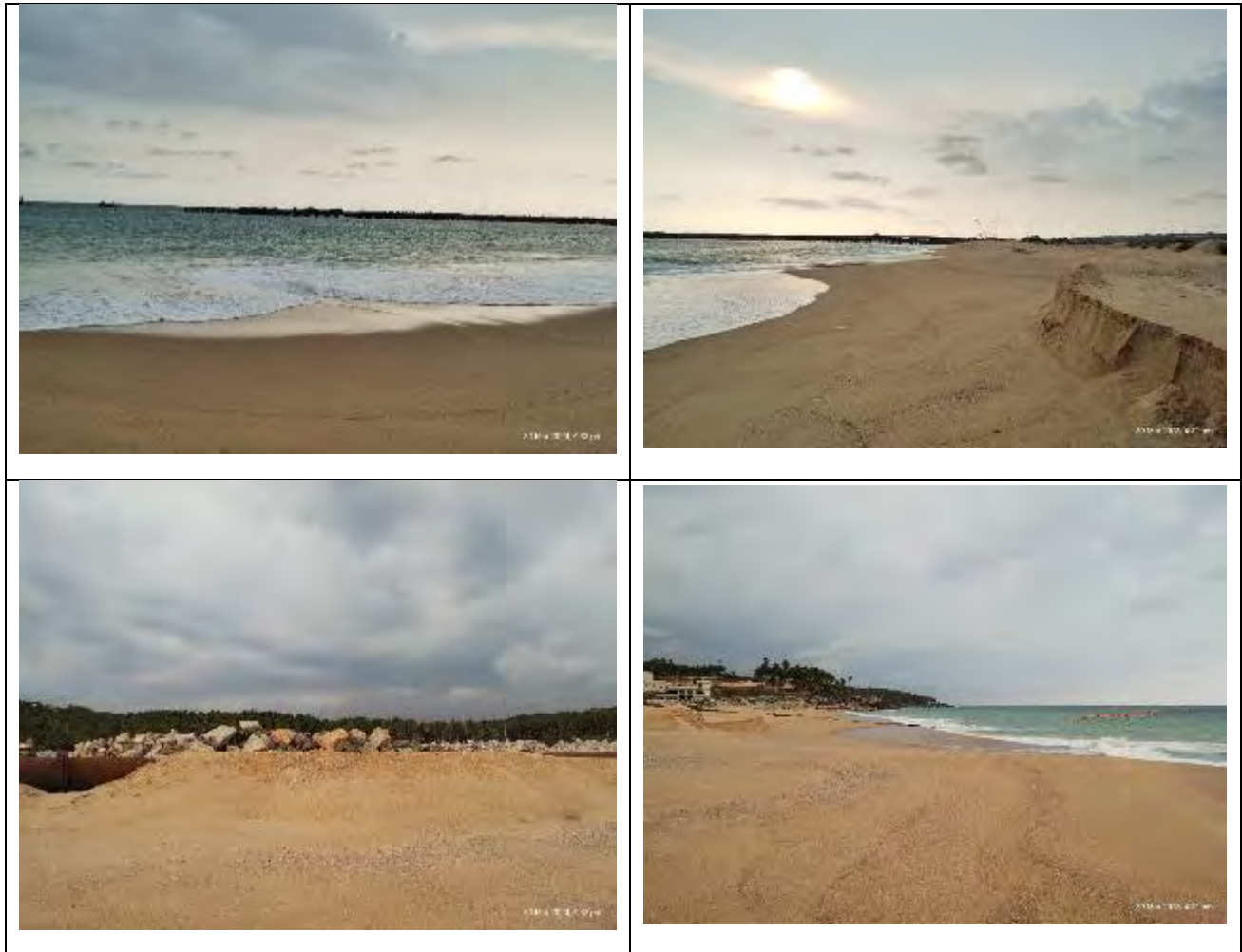


Figure 37- March CSP 38

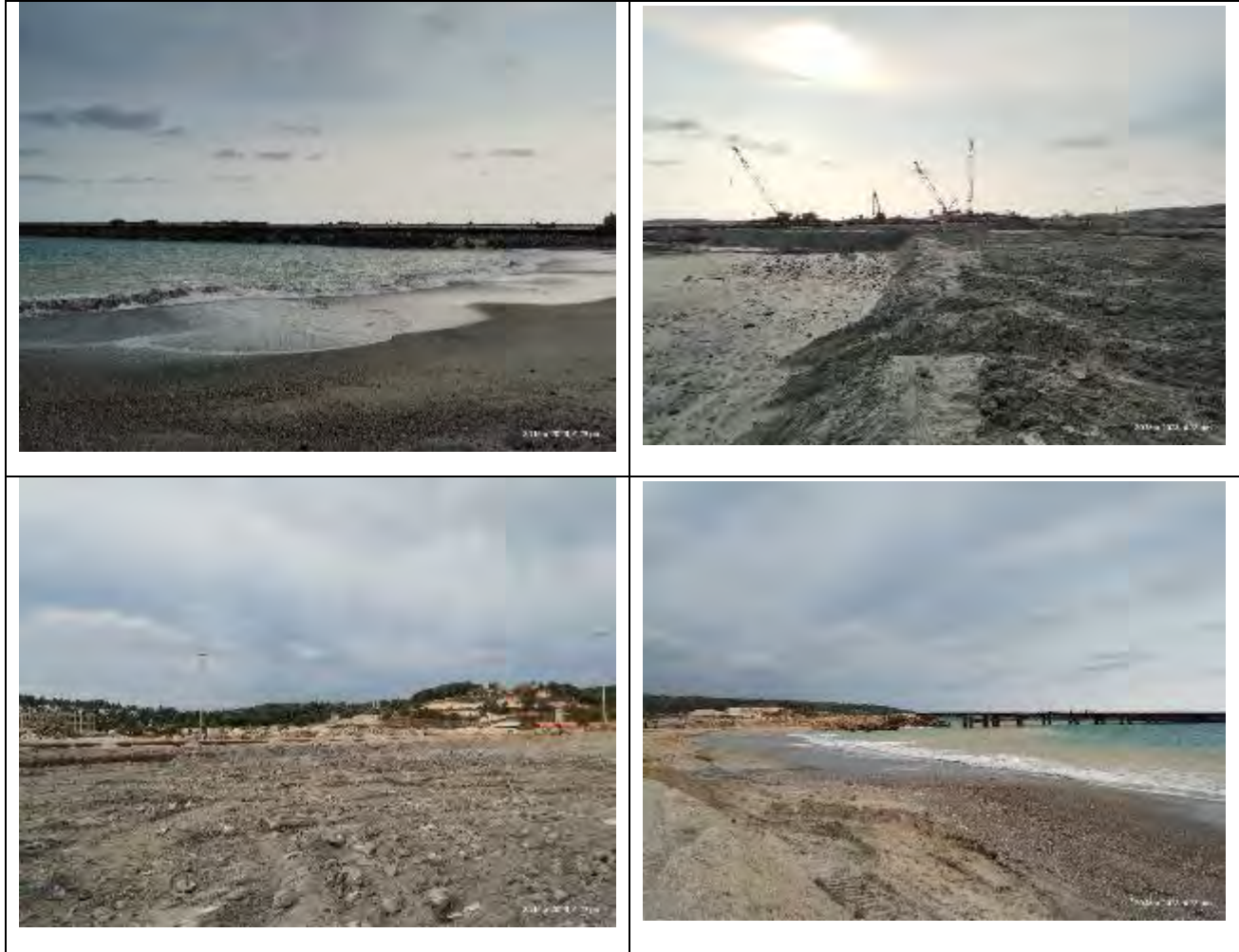


Figure 38- March CSP 39



Figure 39- March CSP 40

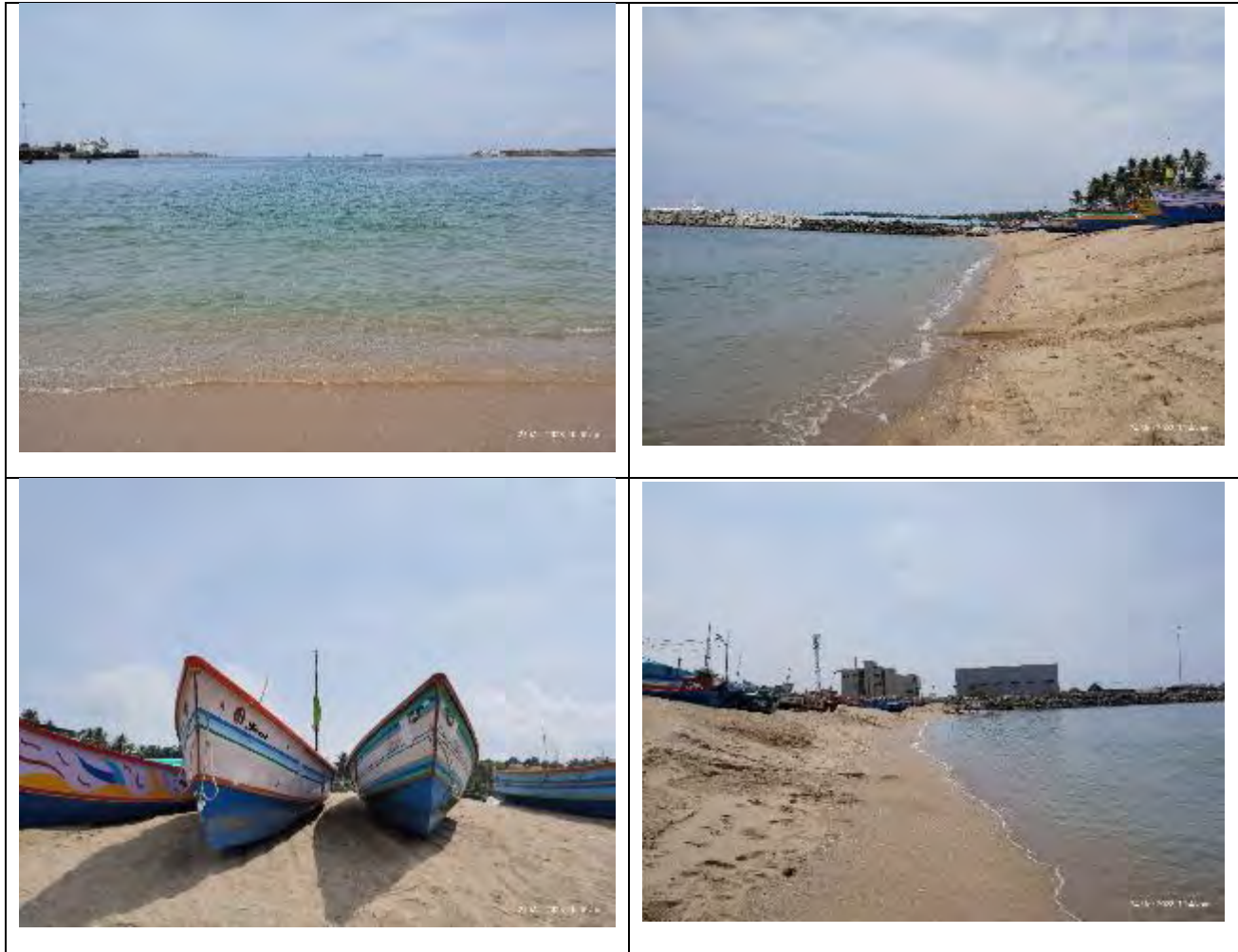


Figure 40- March CSP 40A

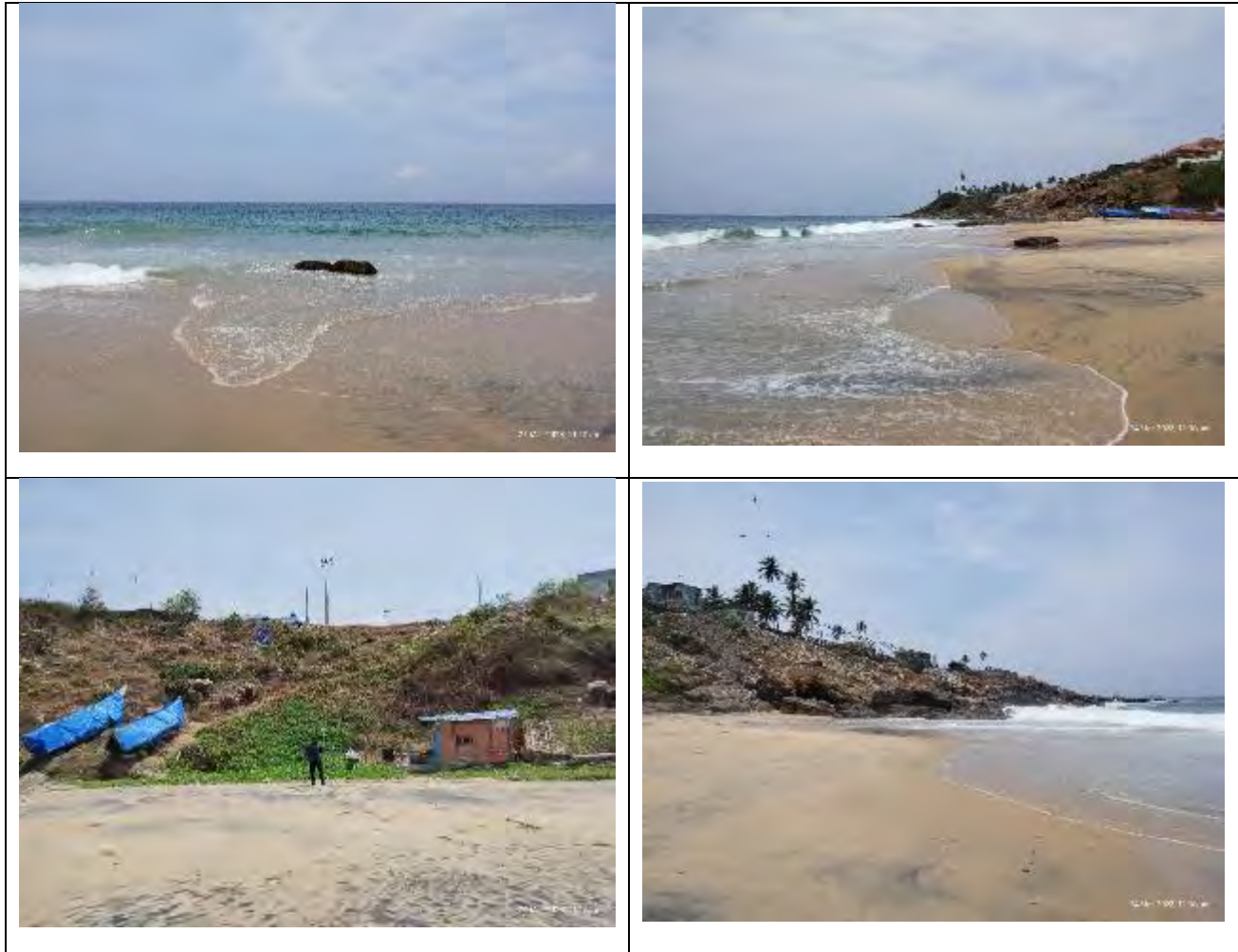


Figure 41- March CSP 41



Figure 42- March CSP 42

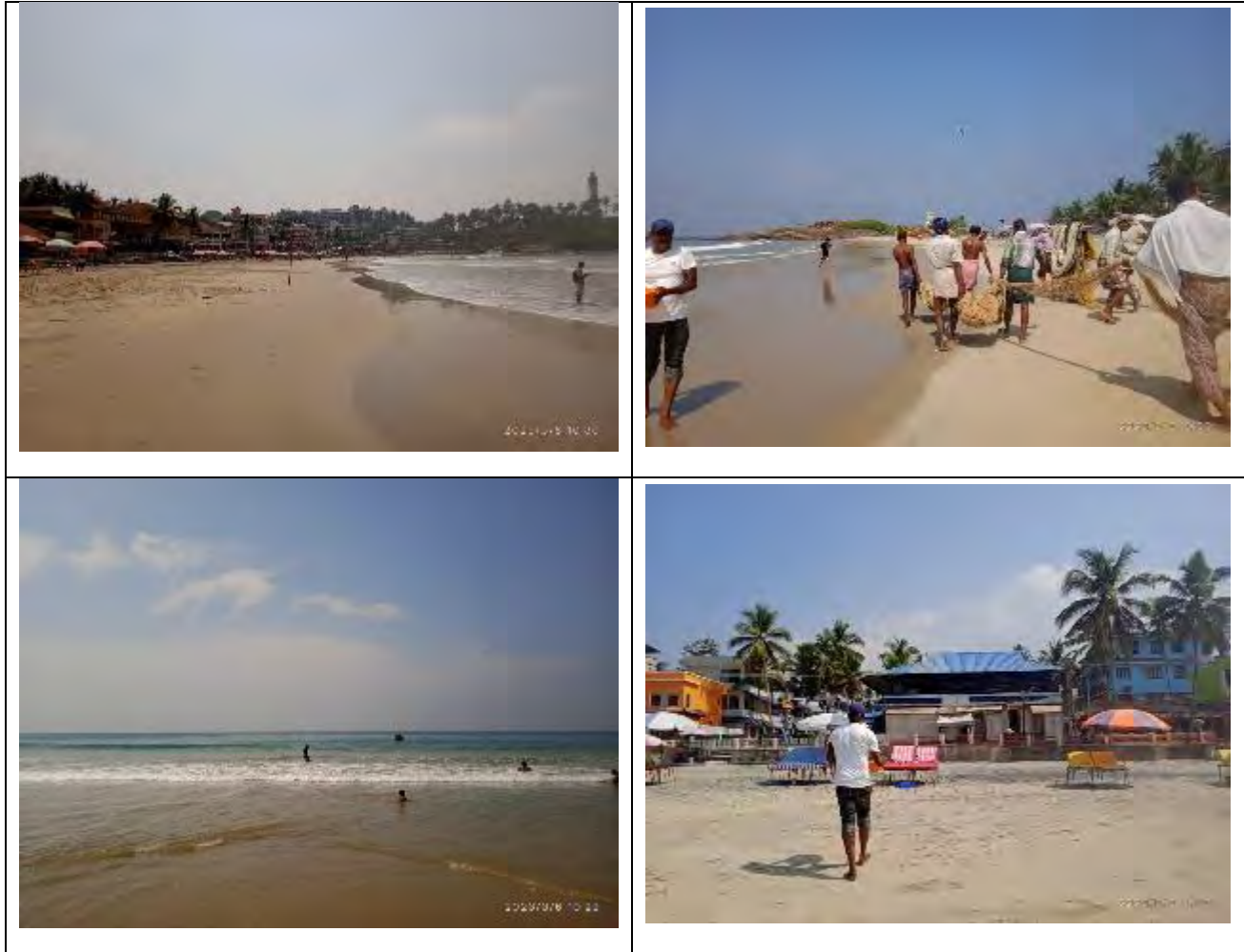


Figure 43- March CSP 43

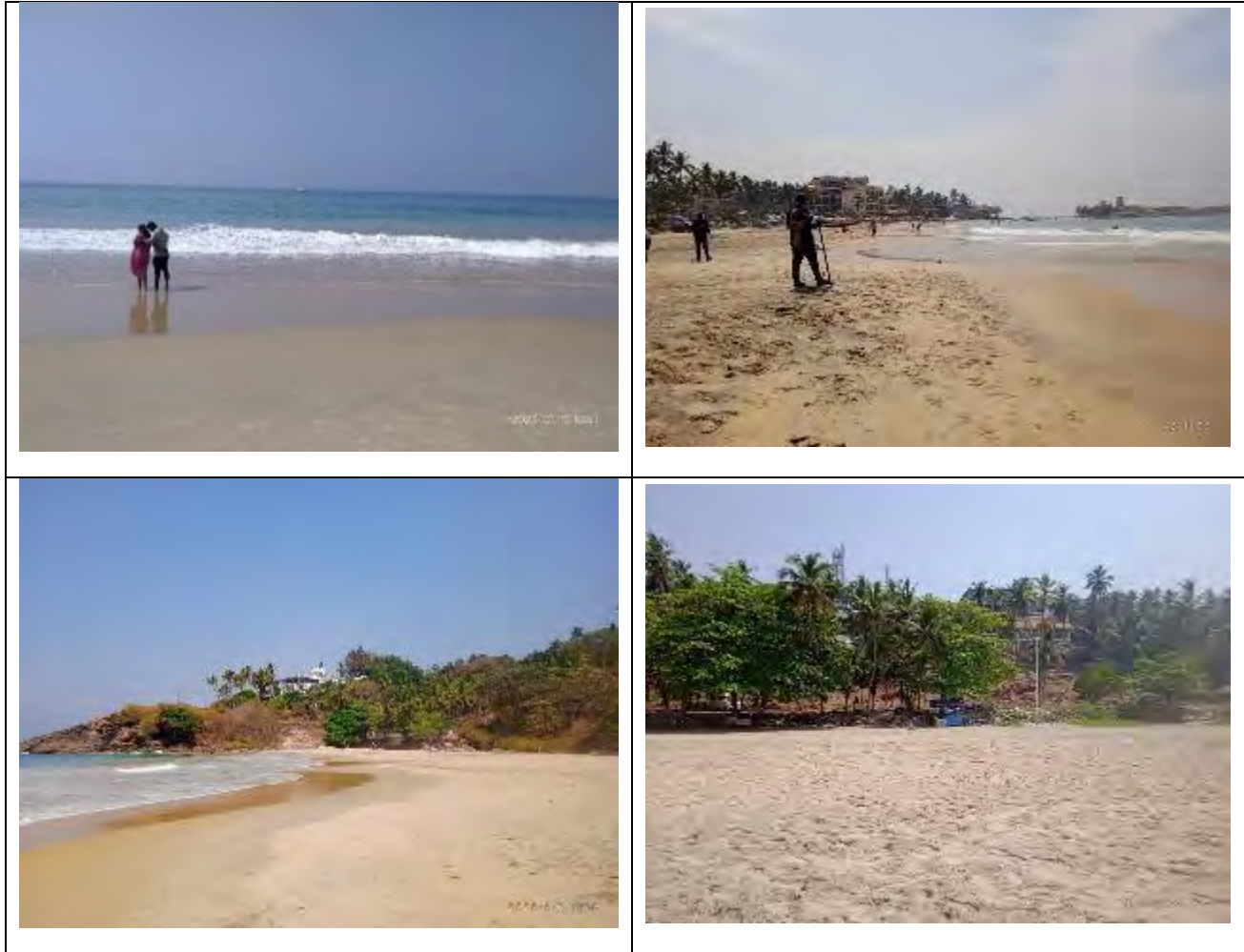


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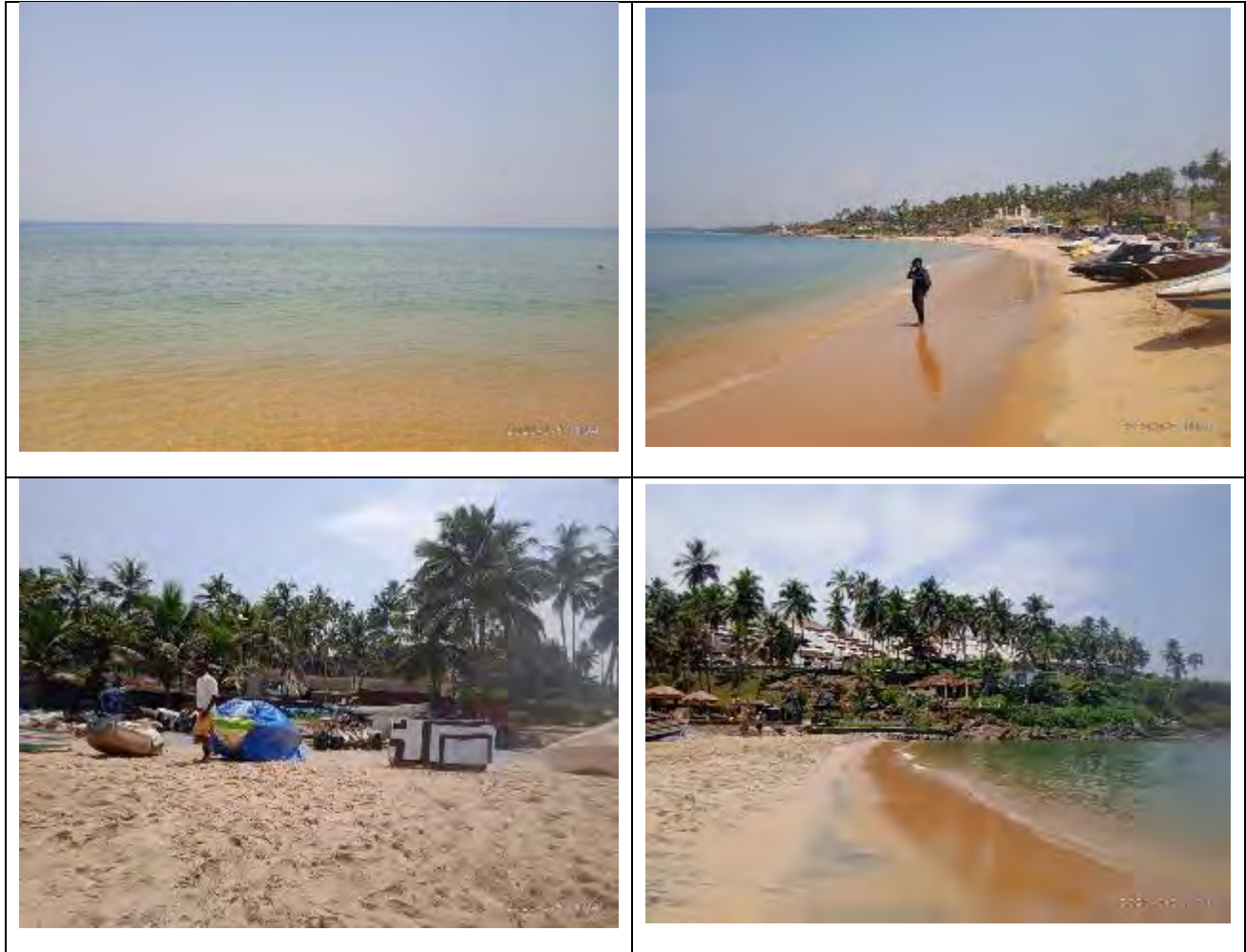


Figure 45- March CSP 45



Figure 46- March CSP 46

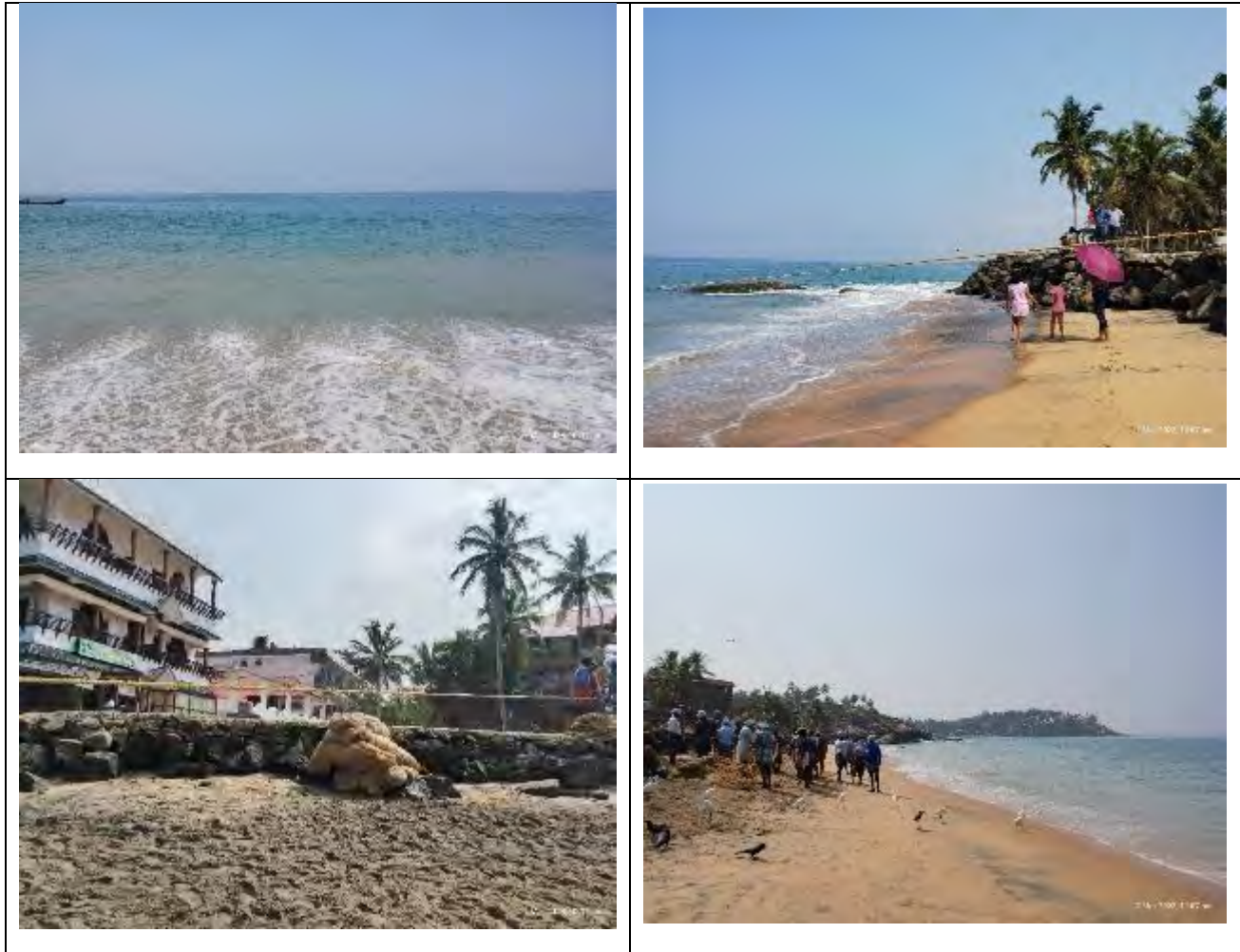


Figure 47- March CSP 47

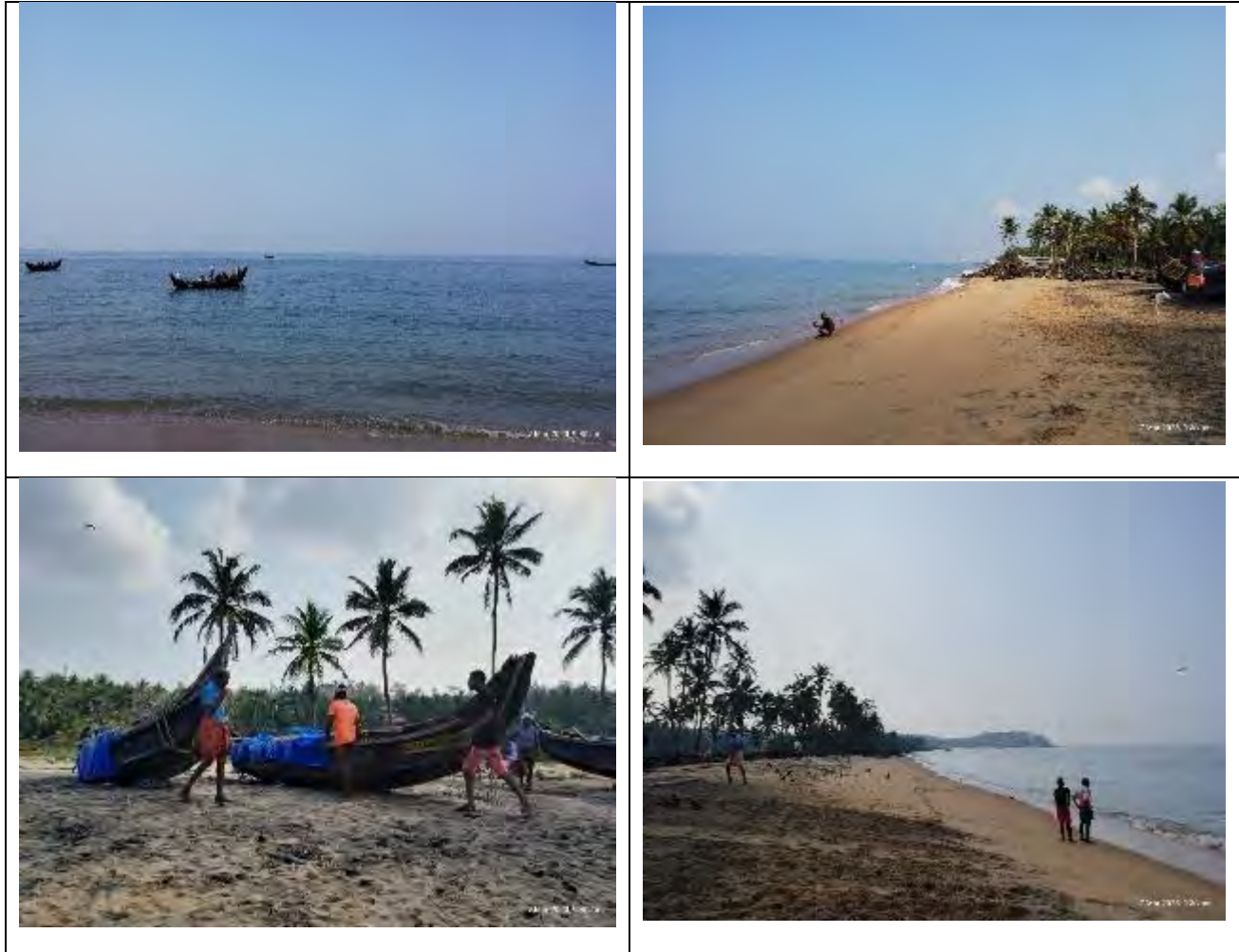


Figure 48- March CSP 48

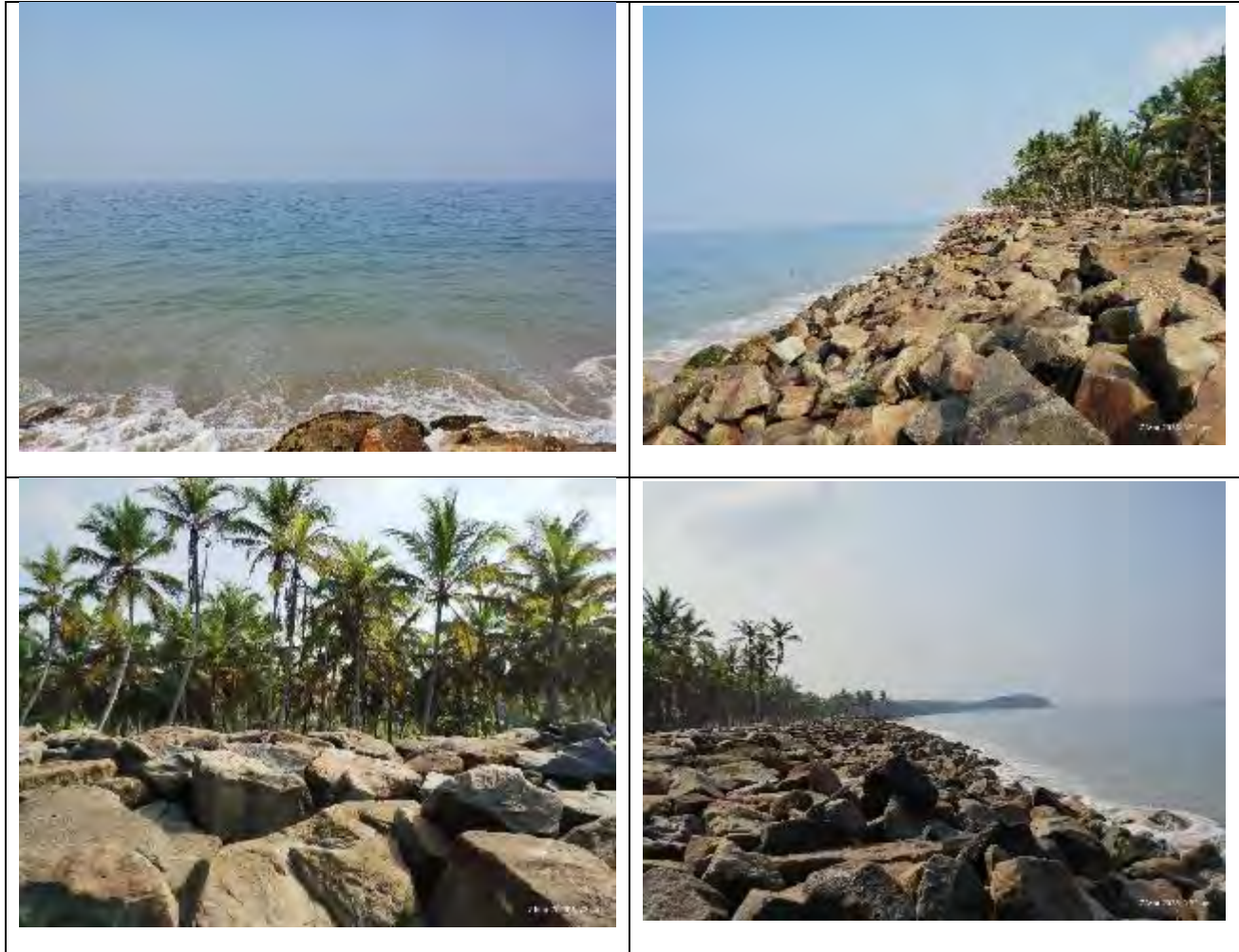


Figure 49- March CSP 49

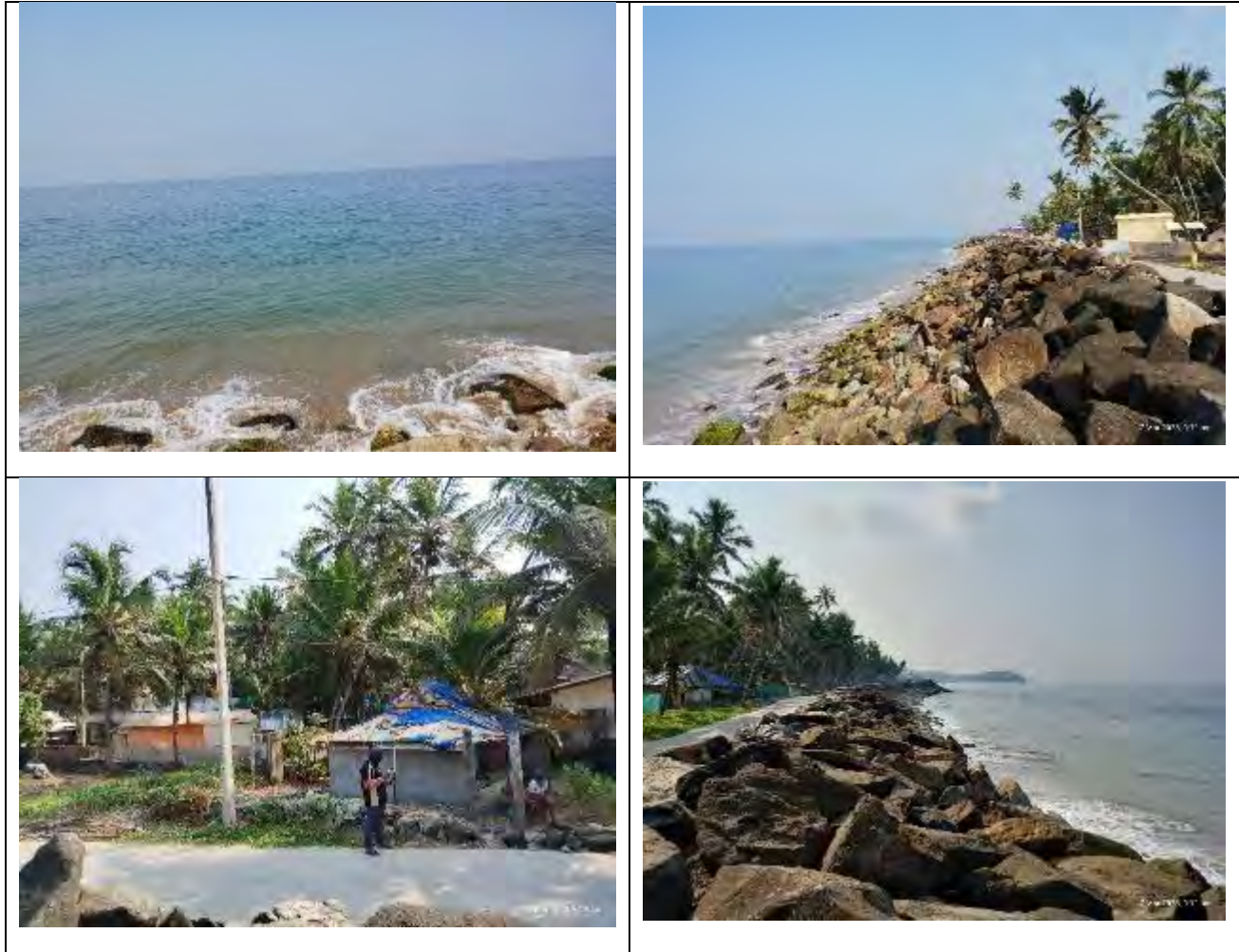


Figure 50- March CSP 50



Figure 51- March CSP 51

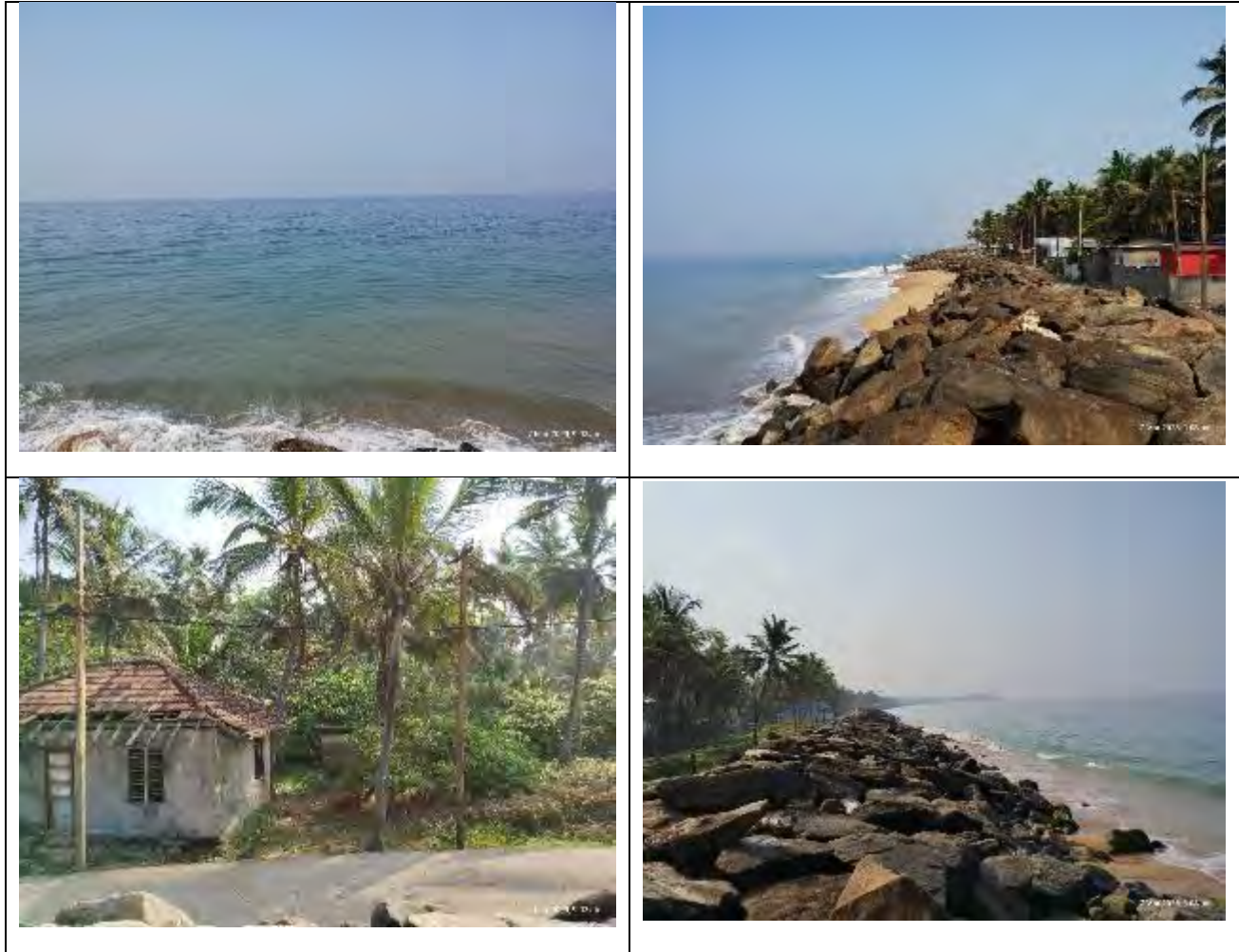


Figure 52- March CSP 52



Figure 53- March CSP 53

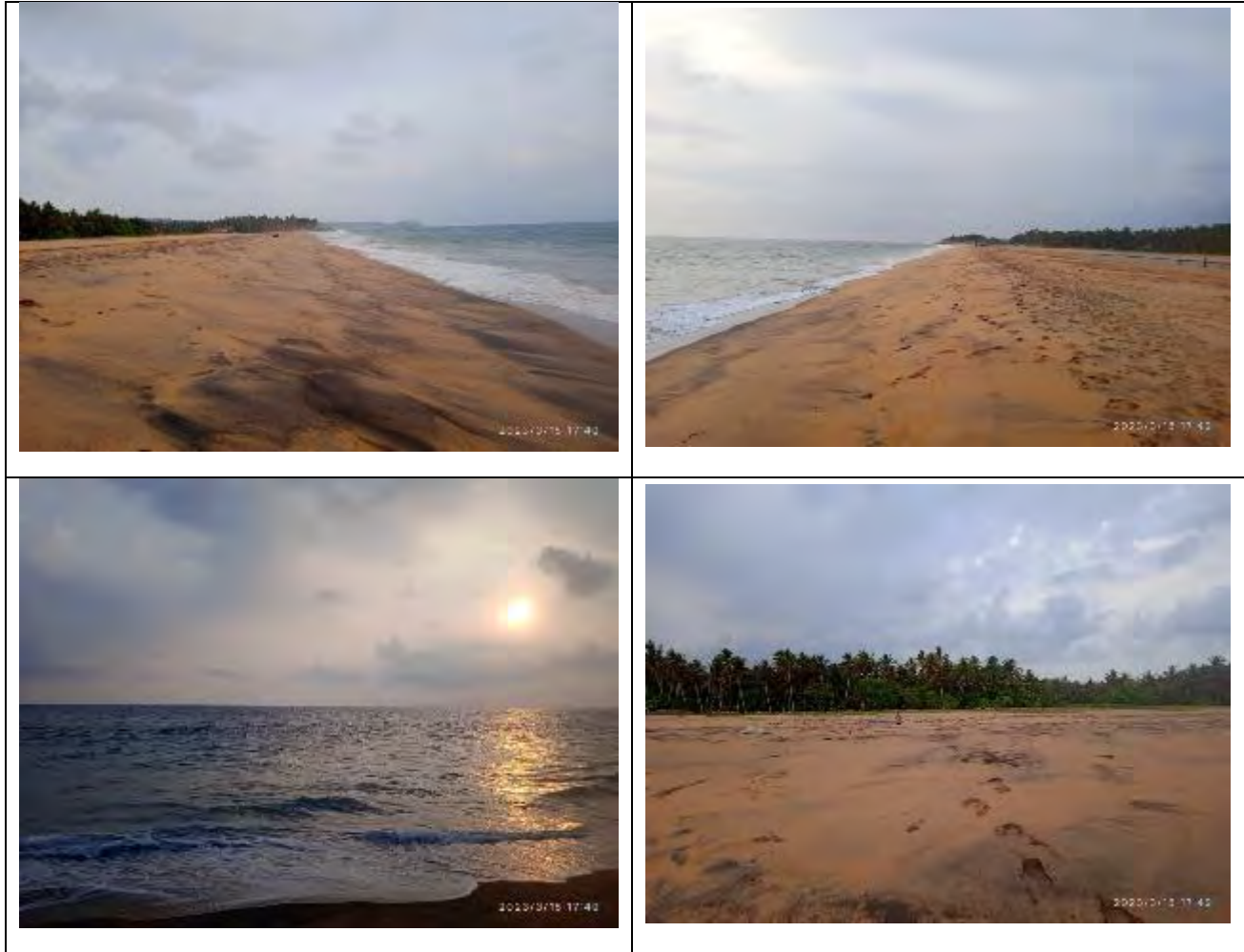


Figure 54- March CSP 54



Figure 55- March CSP 55



Figure 56- March CSP 56

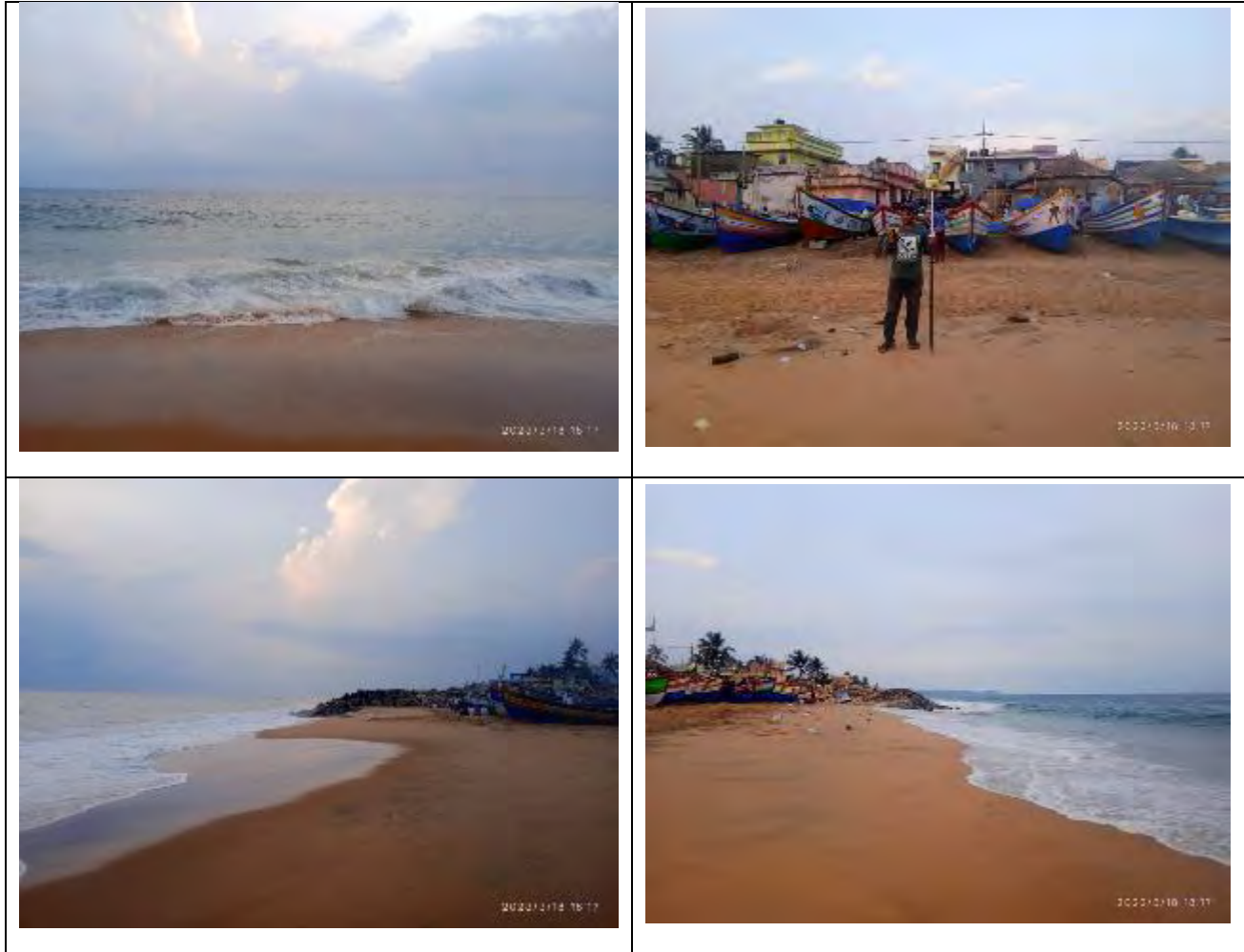


Figure 57- March CSP 57



Figure 58- March CSP 58



Figure 59- March CSP 59



Figure 60- March CSP 60

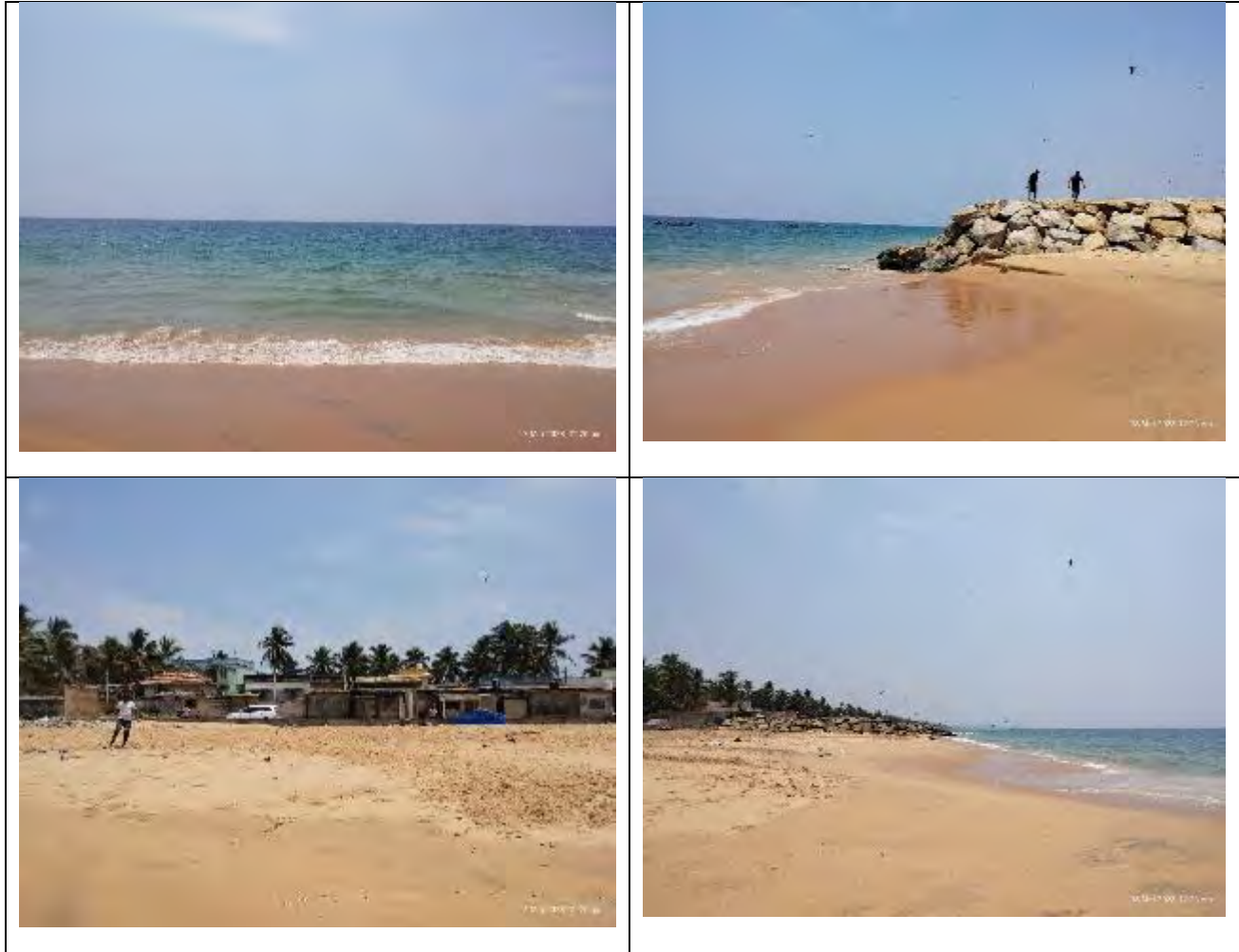


Figure 61- March CSP 61

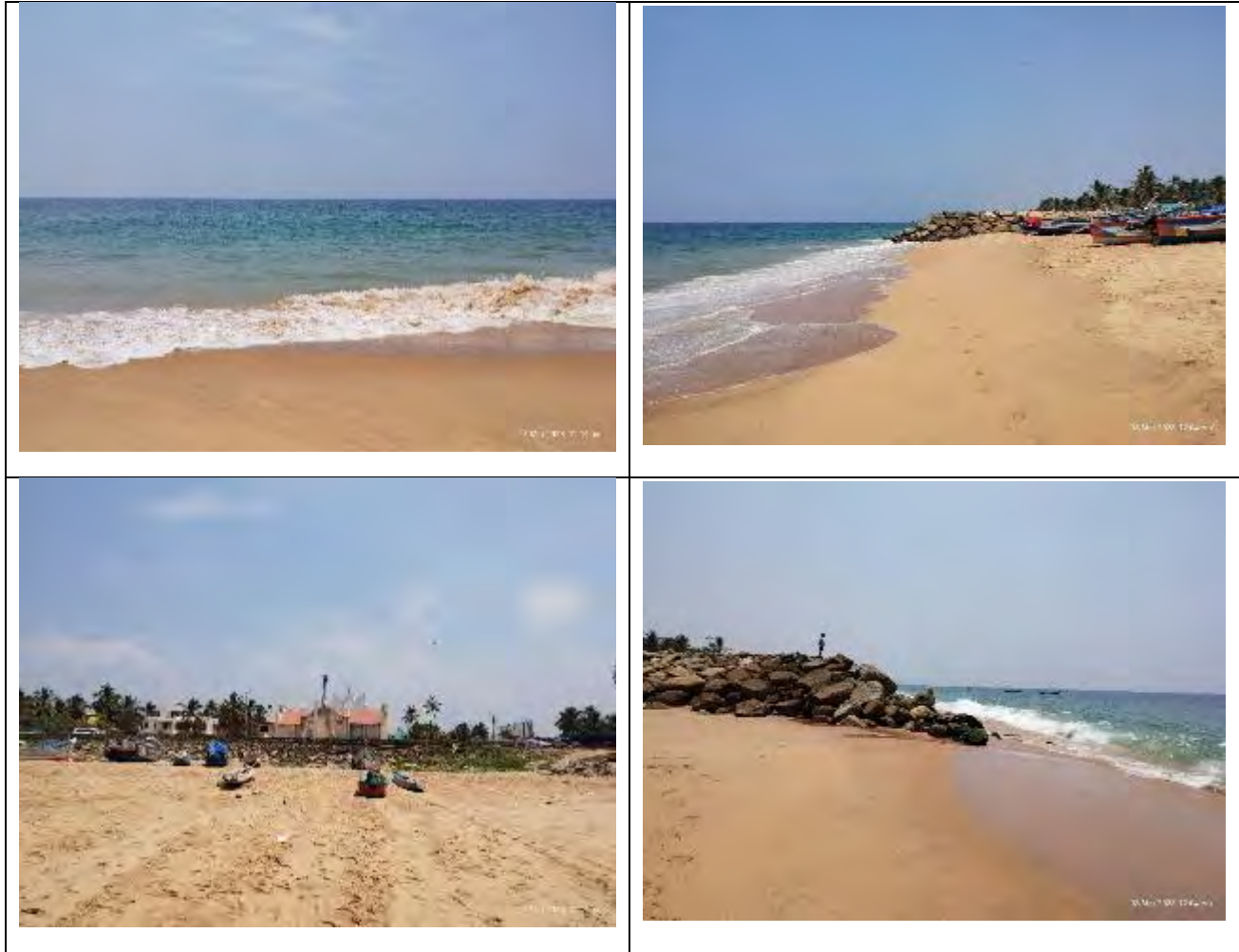


Figure 62- March CSP 62

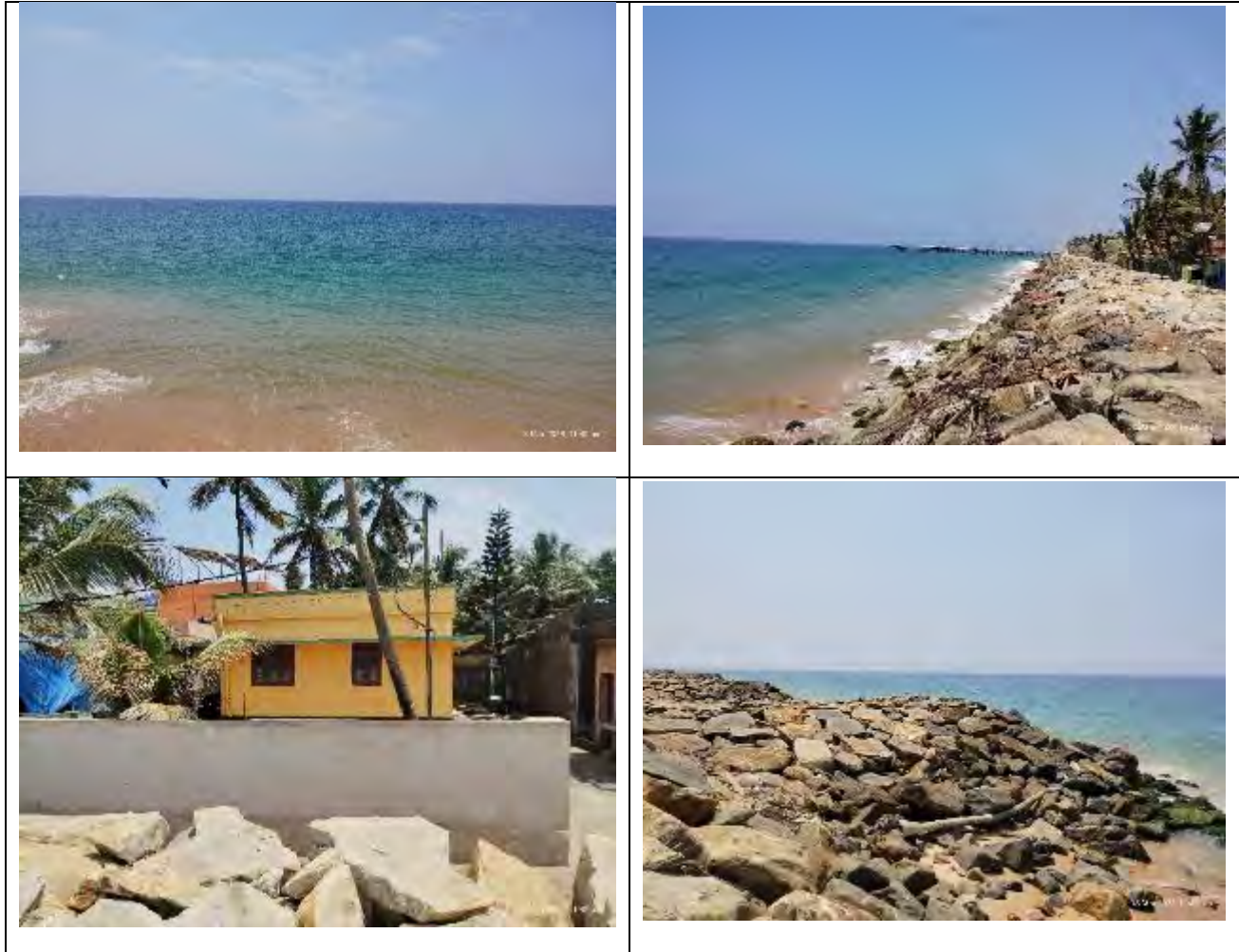


Figure 63- March CSP 63

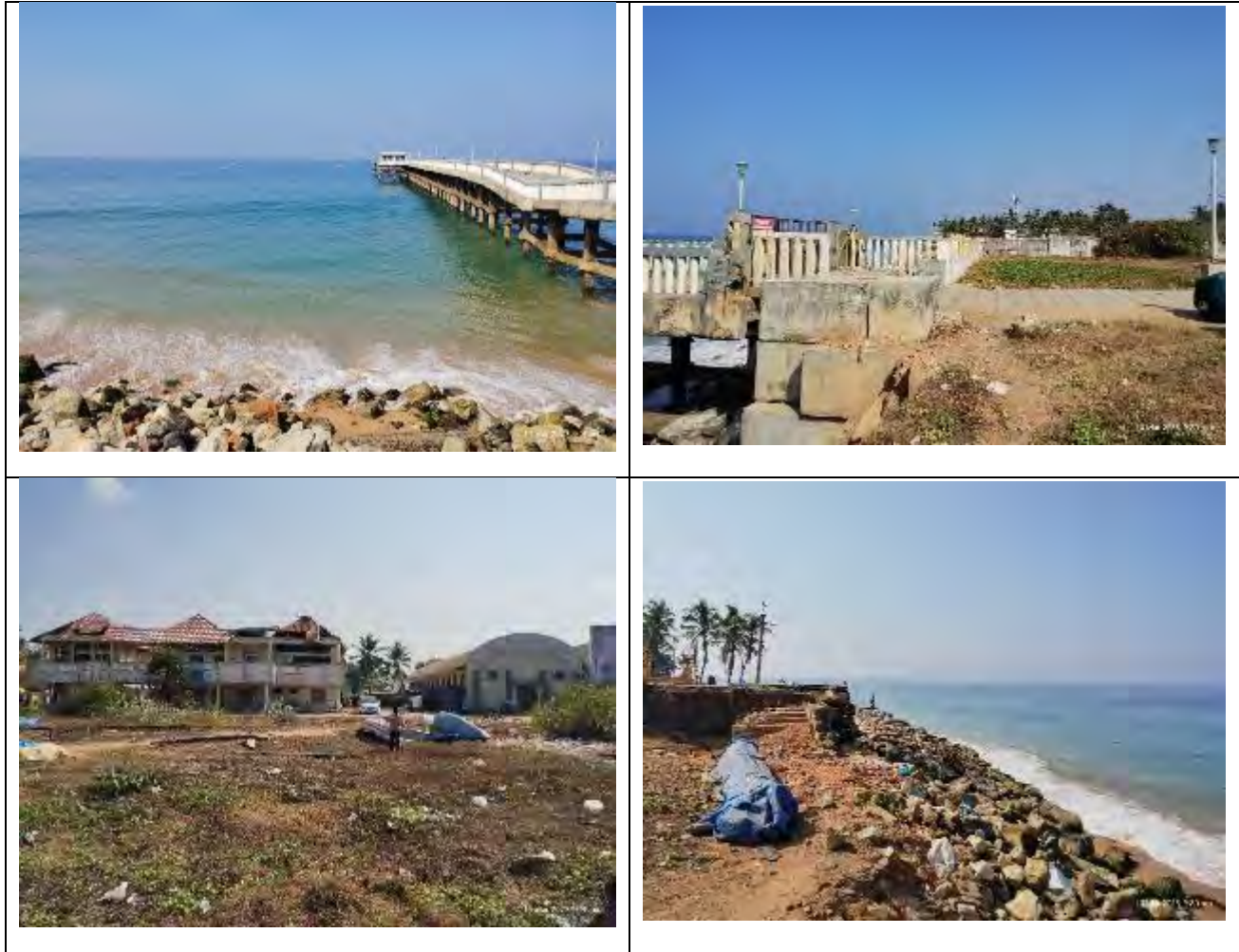


Figure 64- March CSP 64



Figure 65- March CSP 65

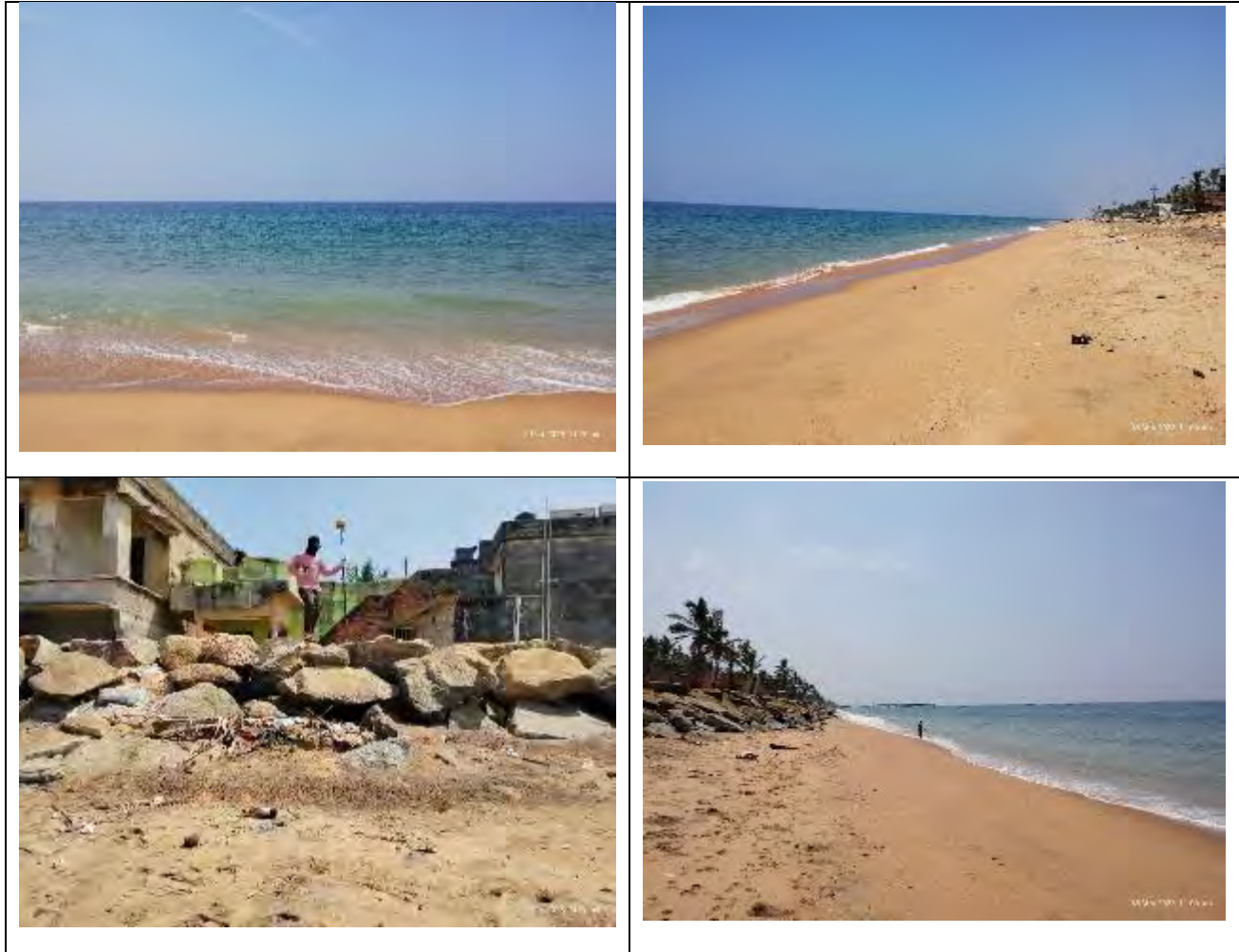


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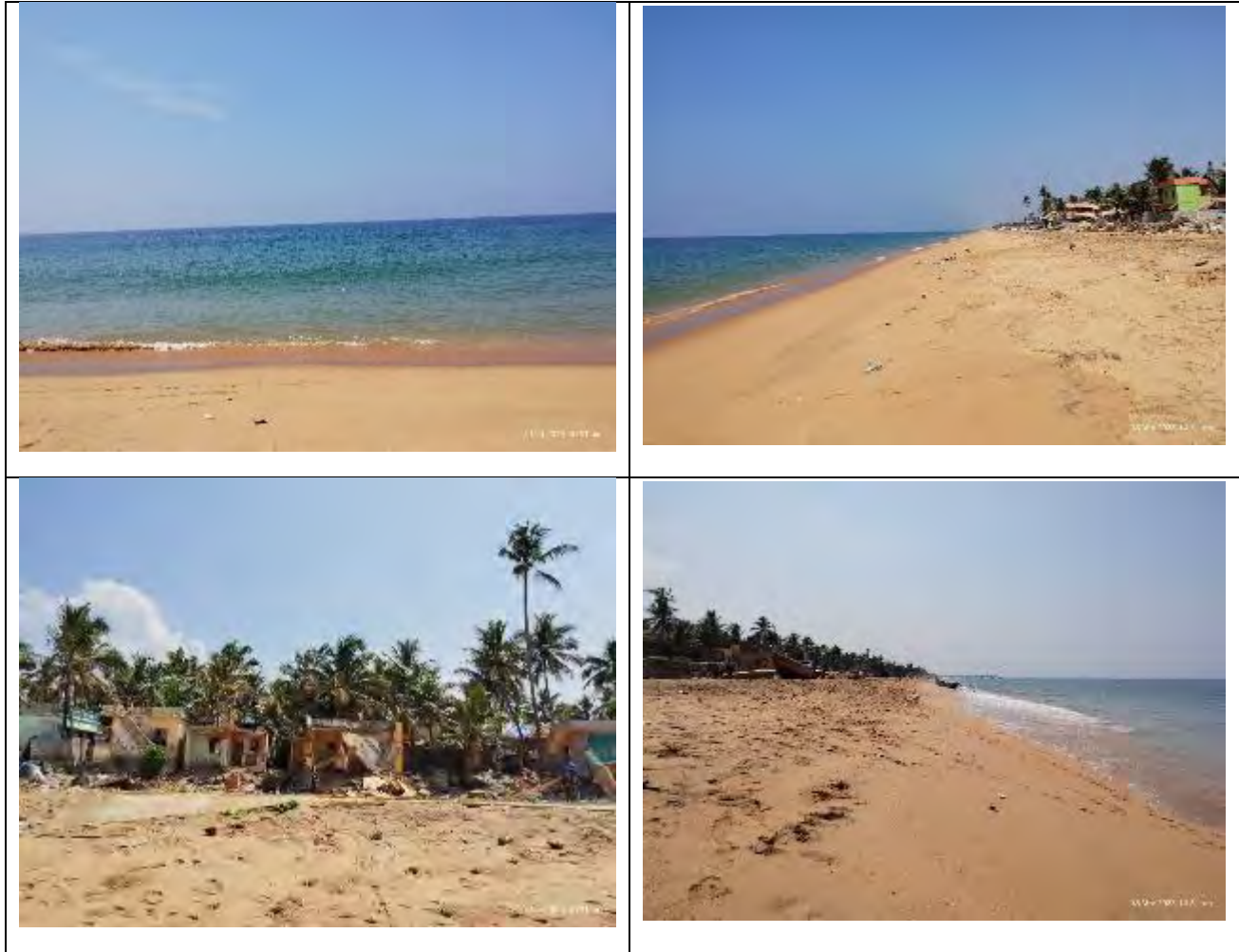


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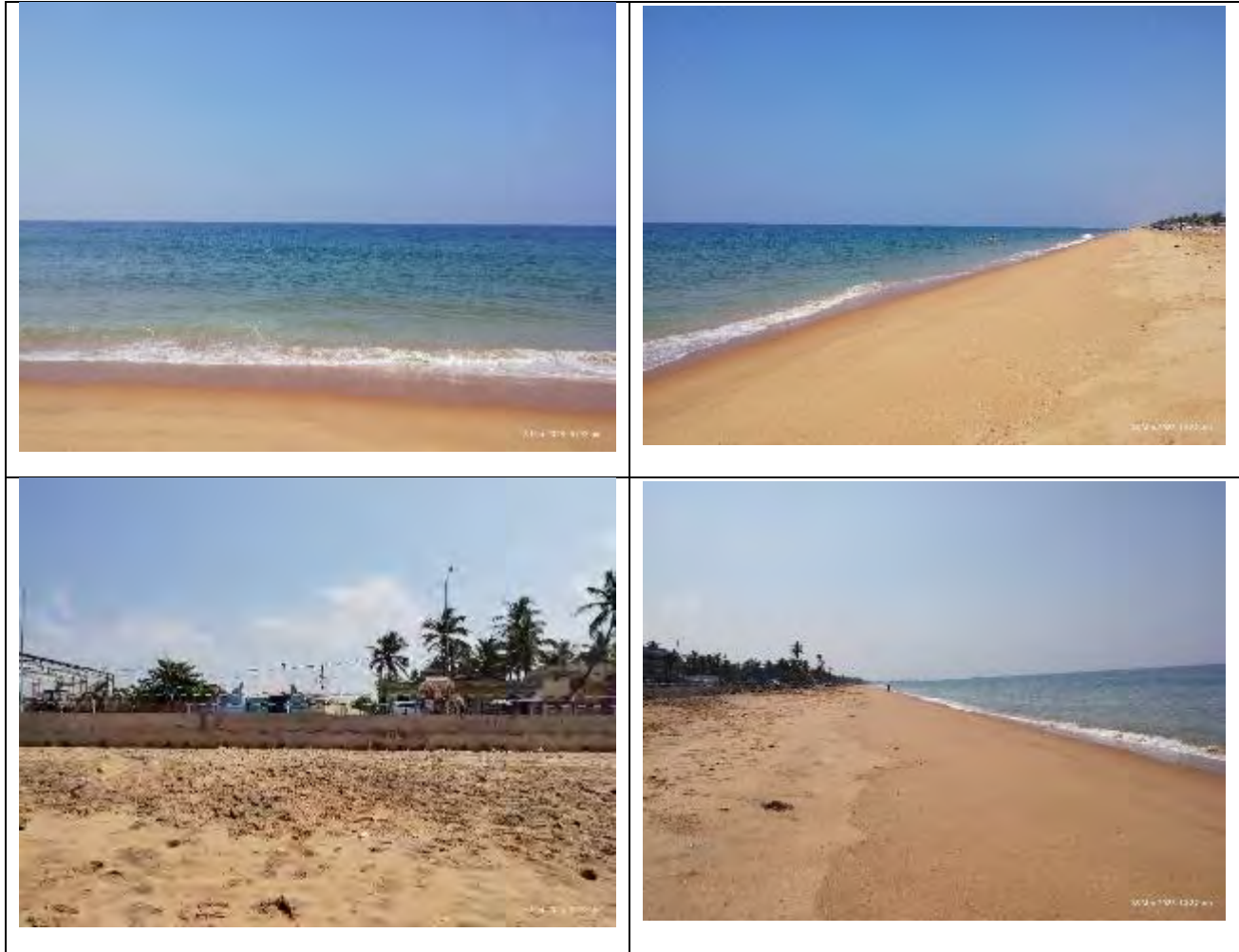


Figure 68- March CSP 68

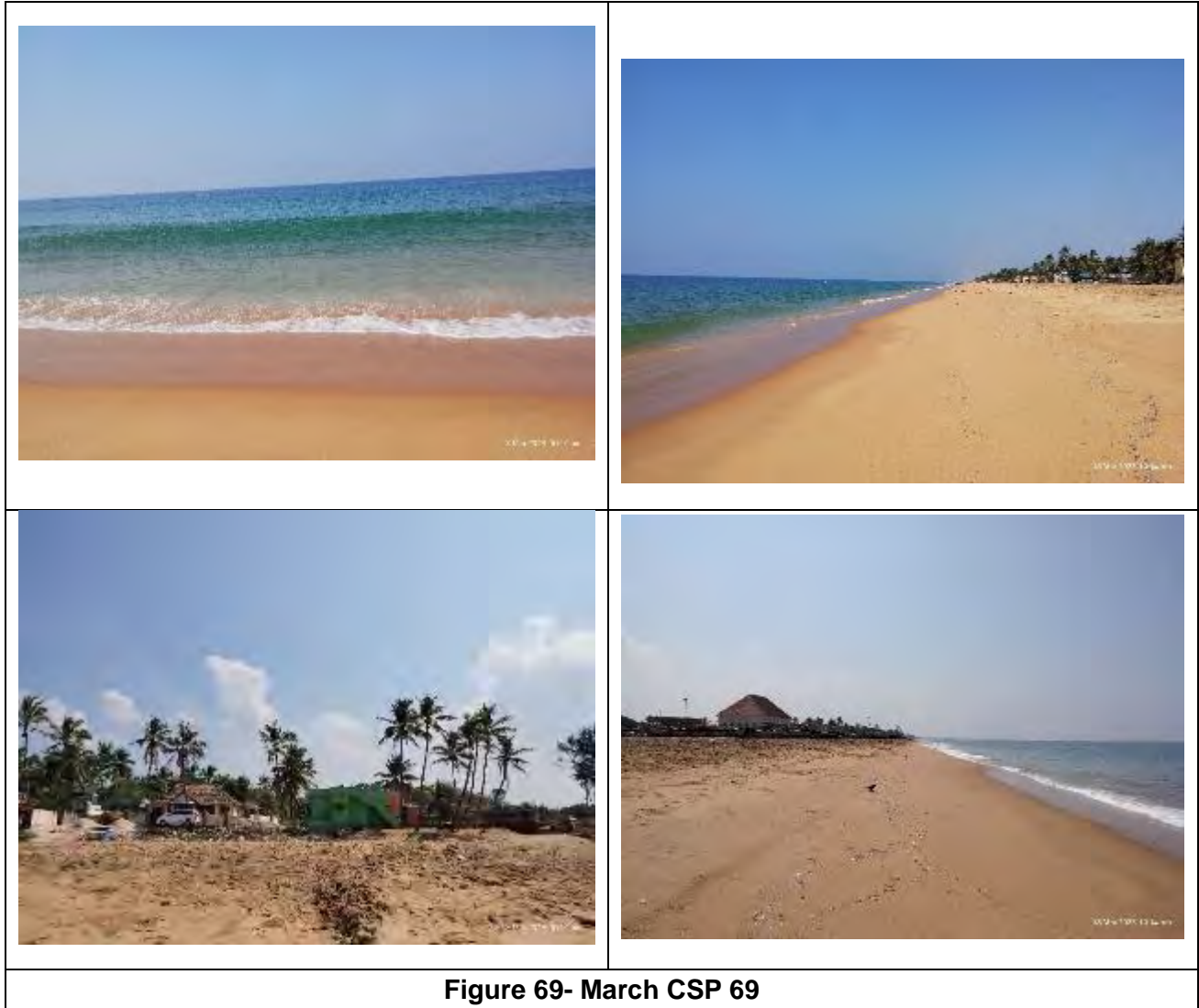


Figure 69- March CSP 69

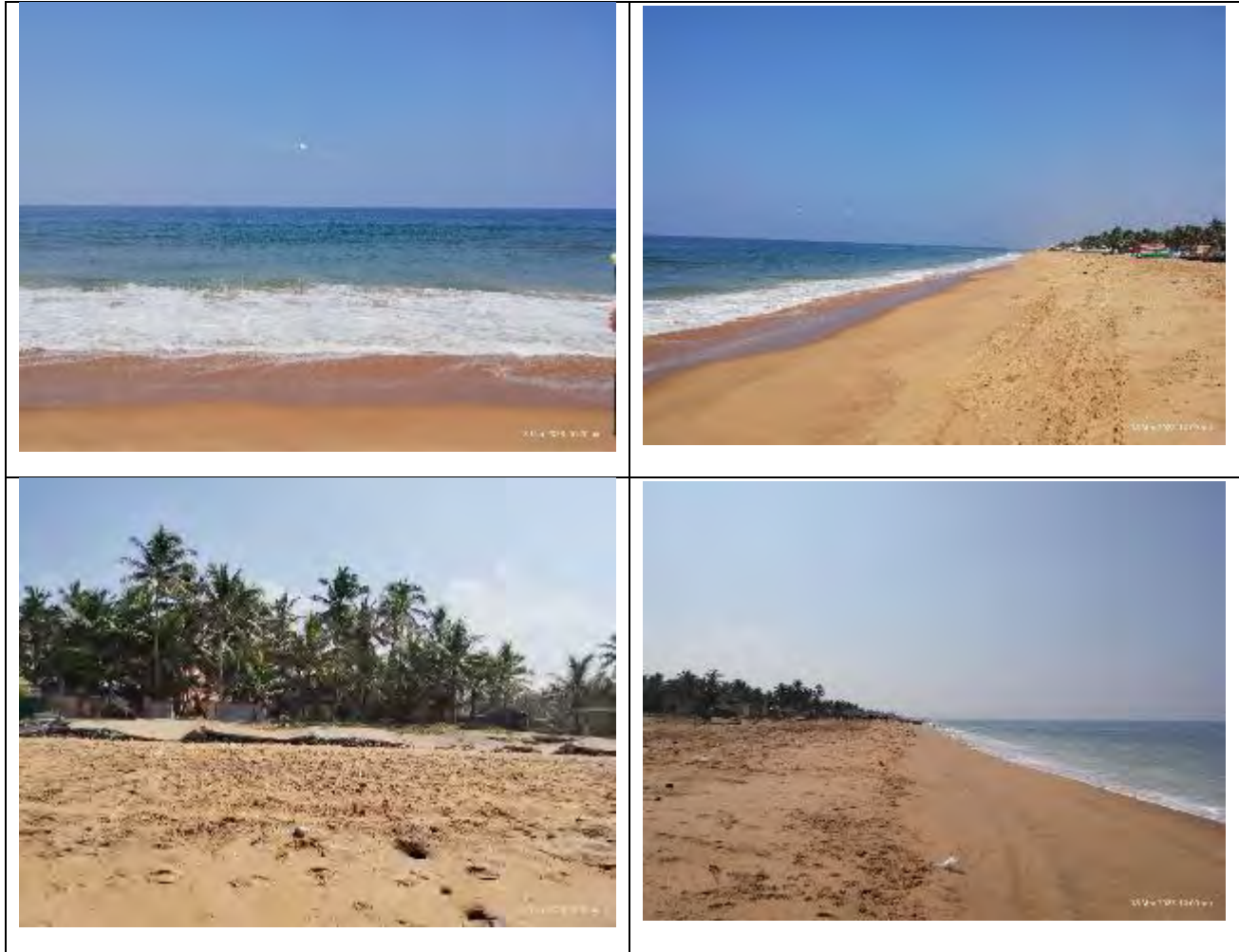


Figure 70- March CSP 70

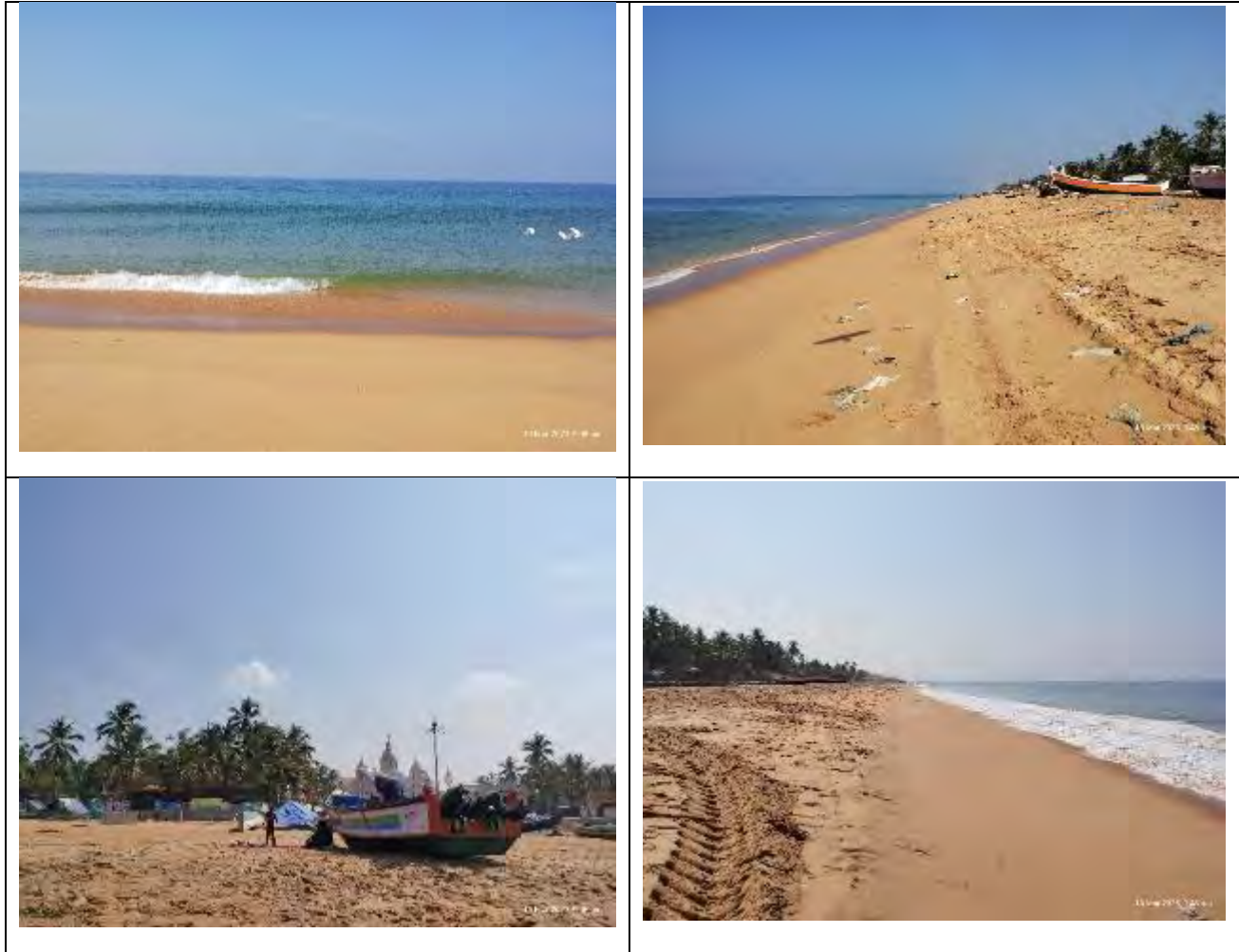


Figure 71- March CSP 71



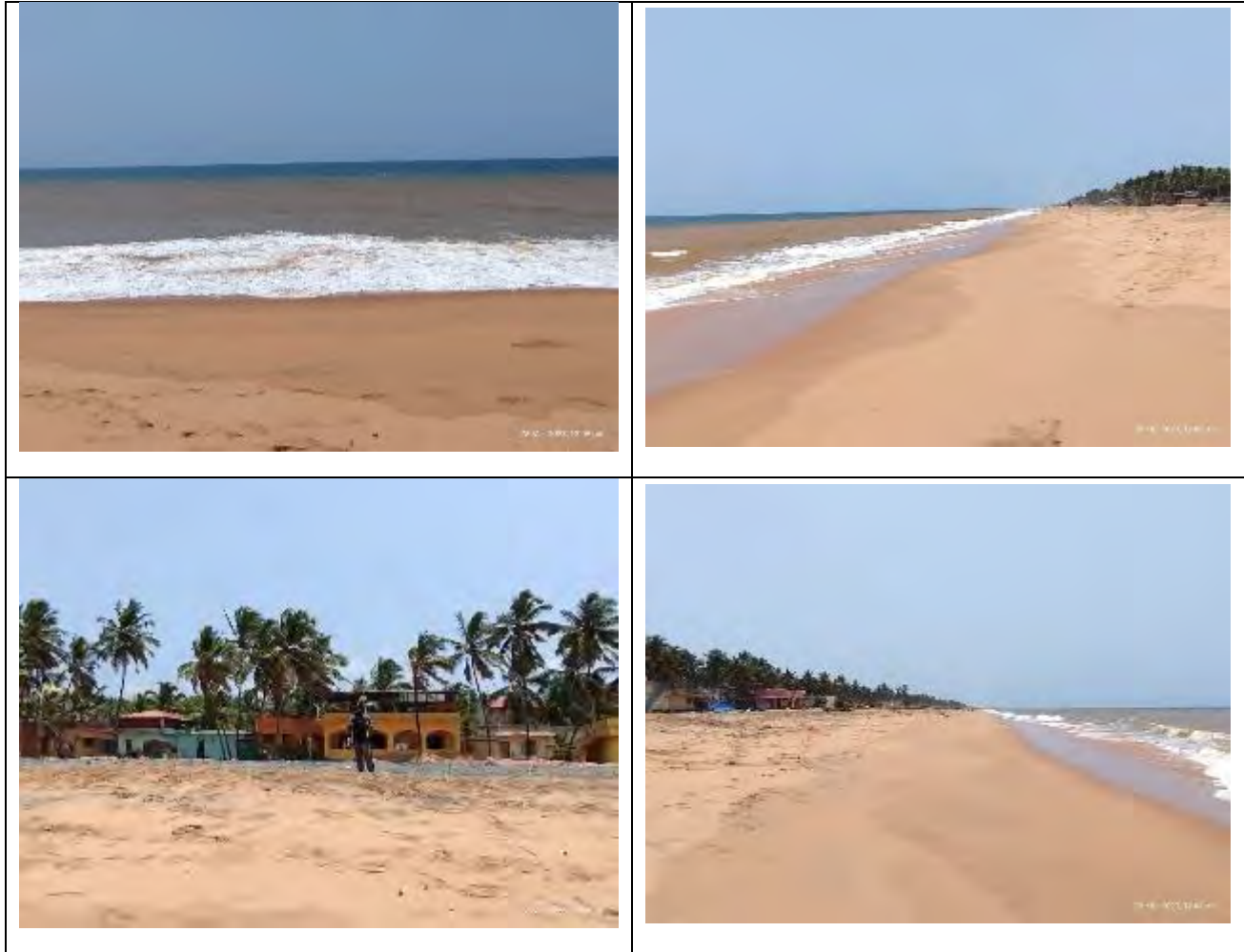


Figure 73- March CSP 73

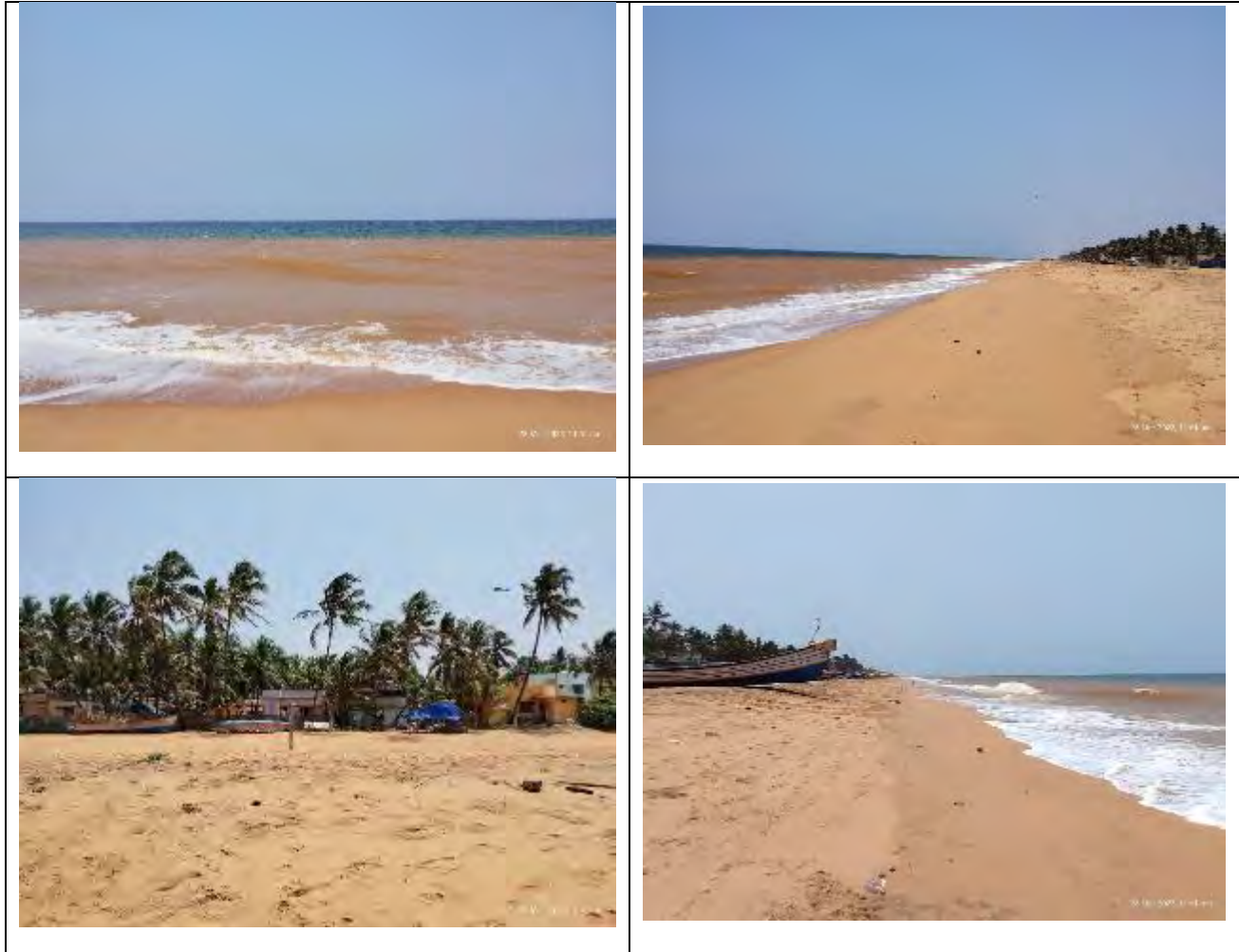


Figure 74- March CSP 74

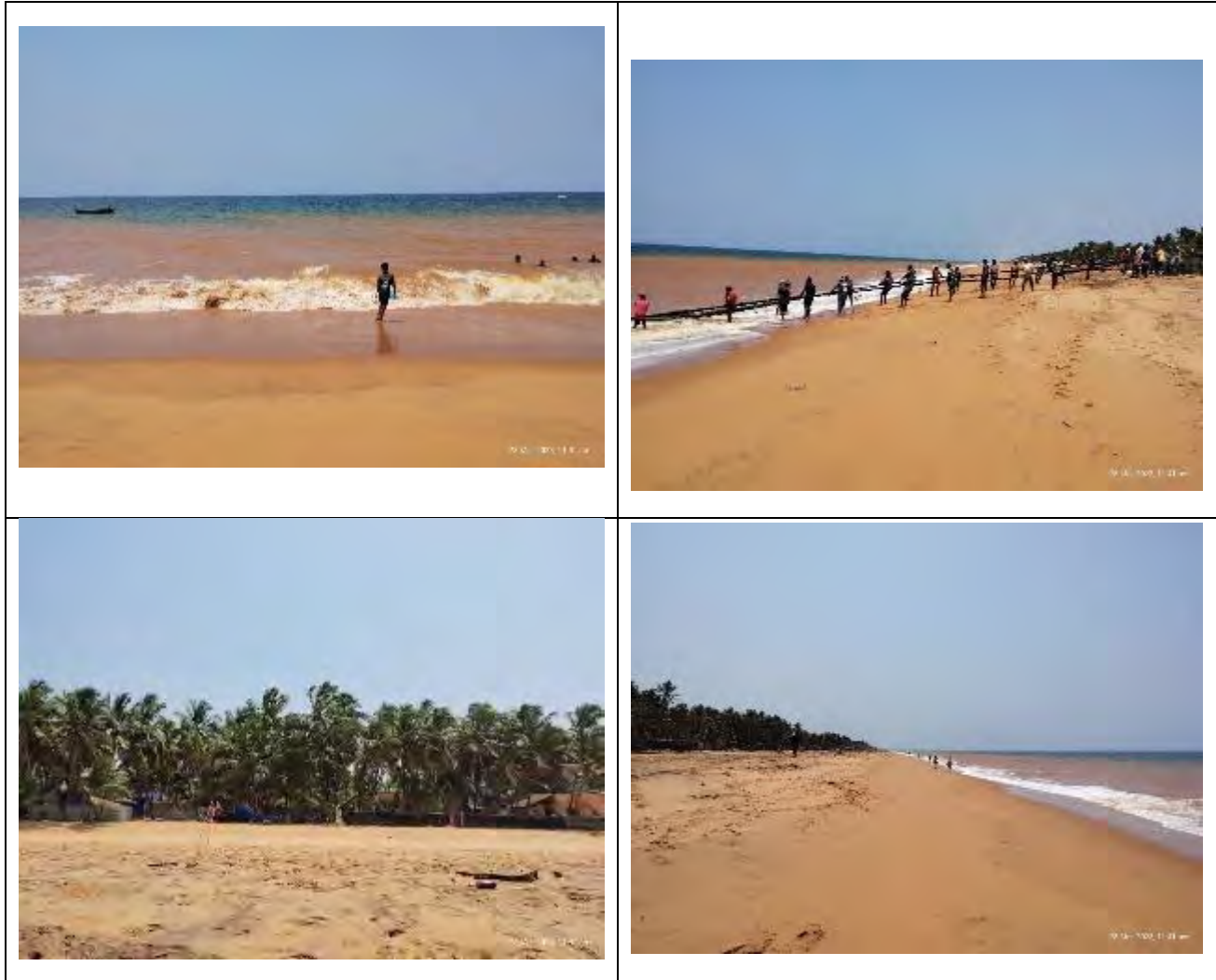


Figure 75- March CSP 75

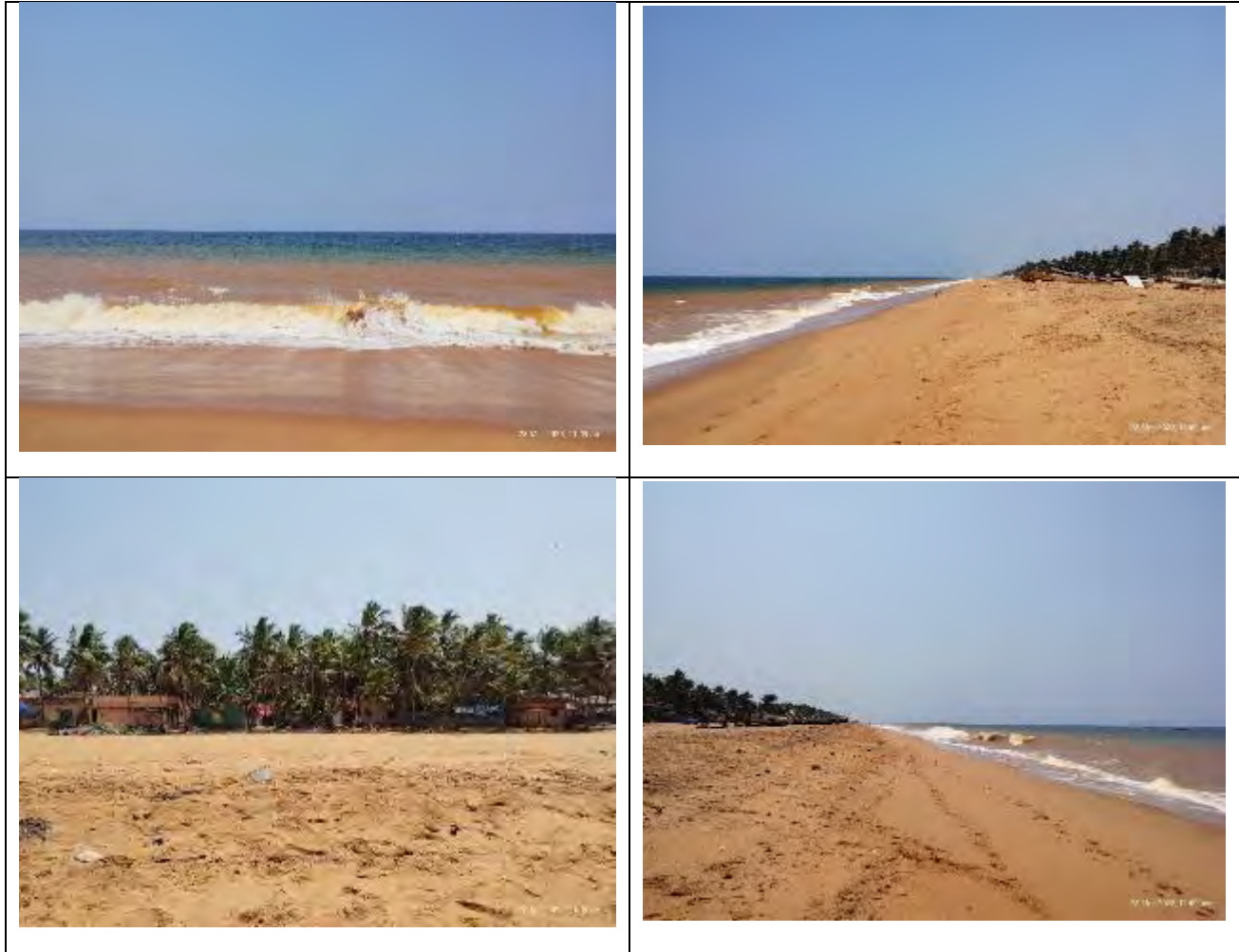


Figure 76- March CSP 76

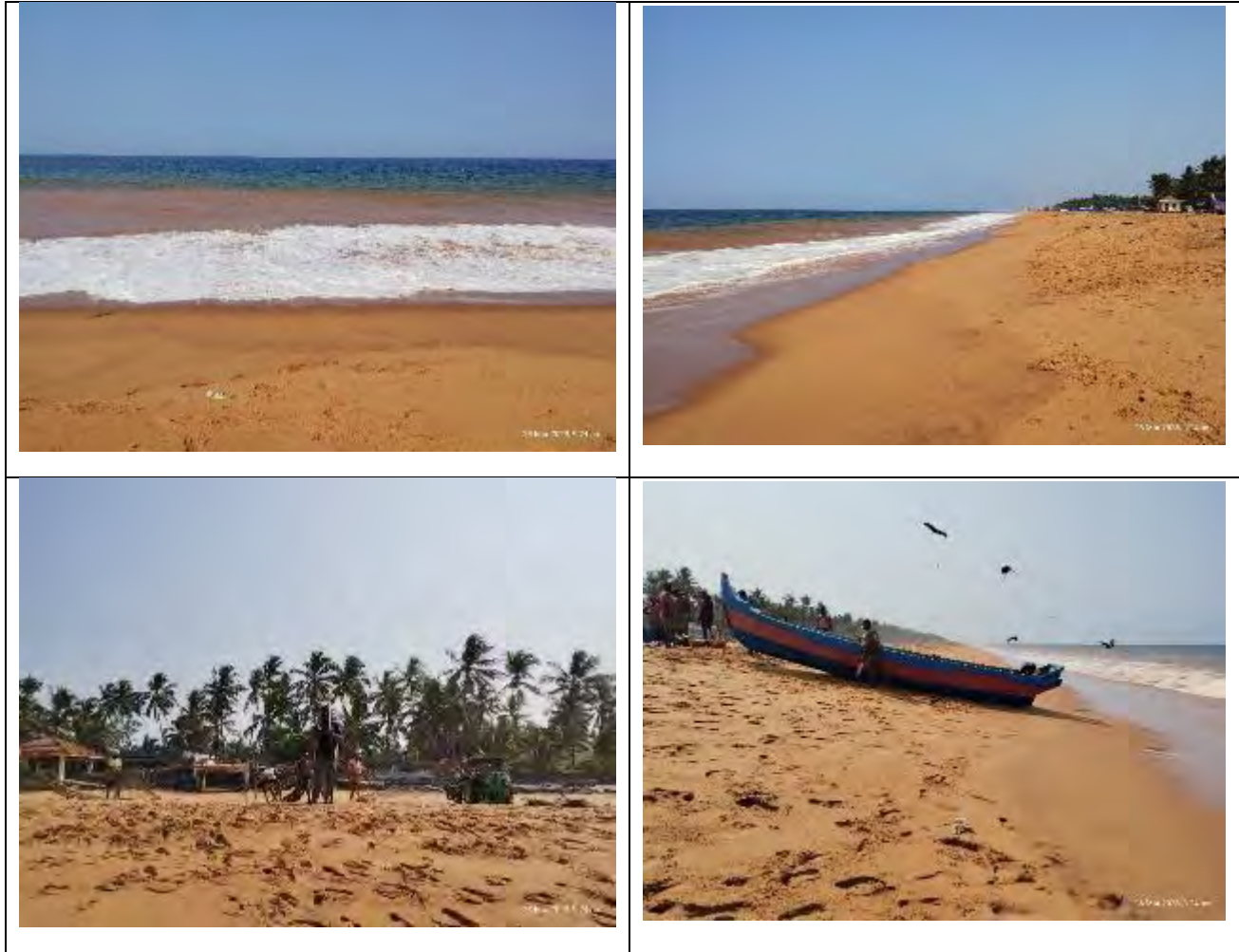


Figure 77- March CSP 77

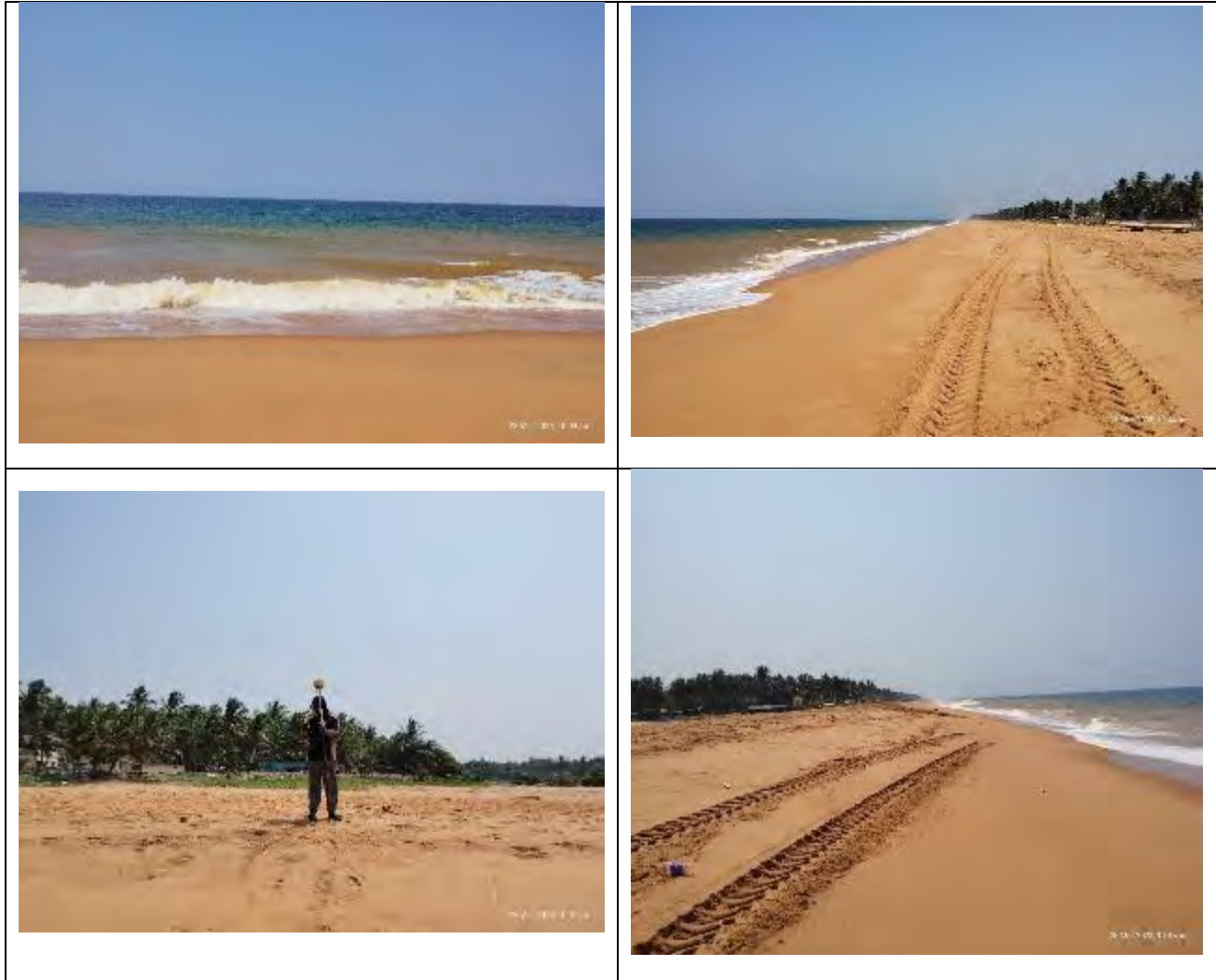


Figure 78- March CSP 78

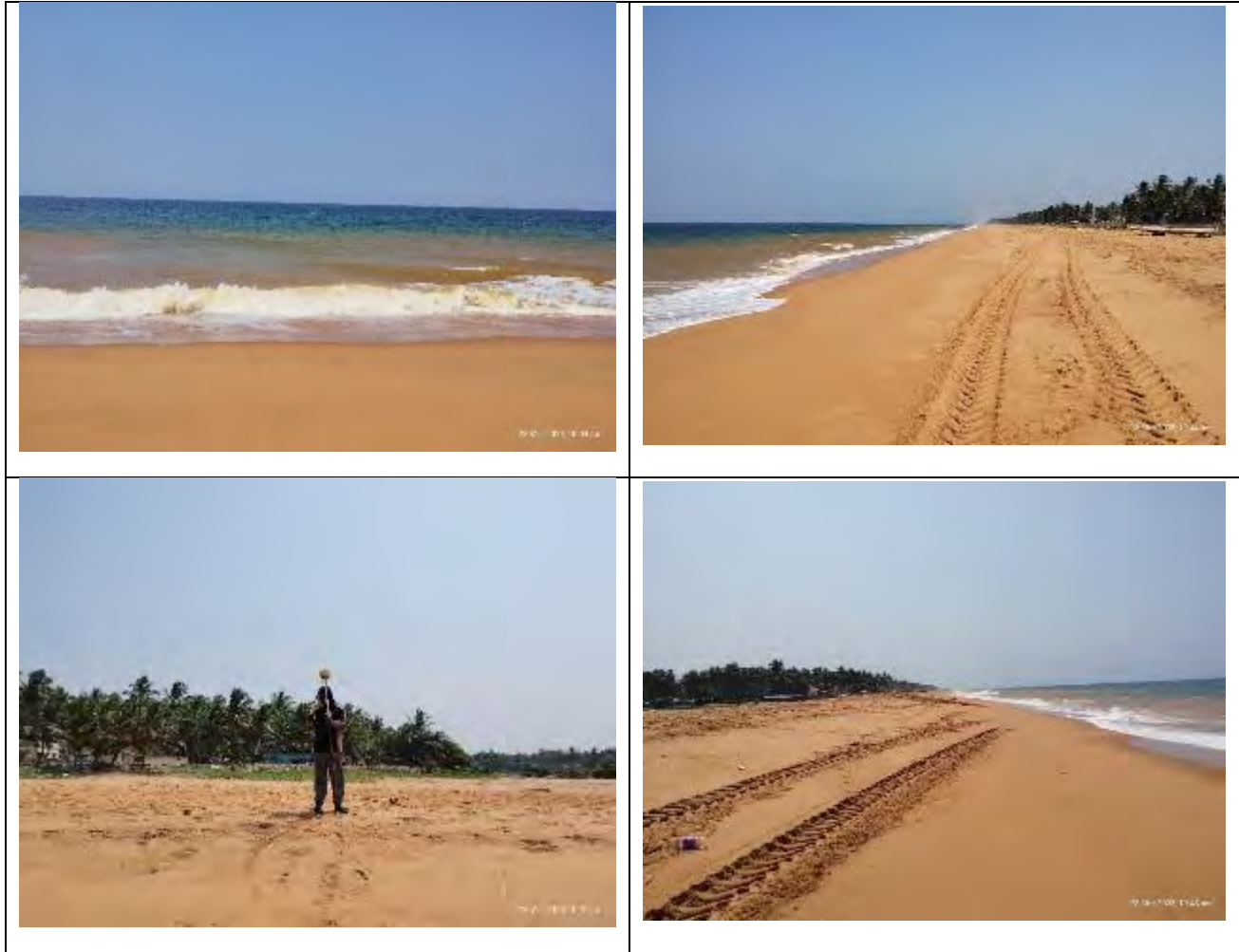


Figure 79- March CSP 79

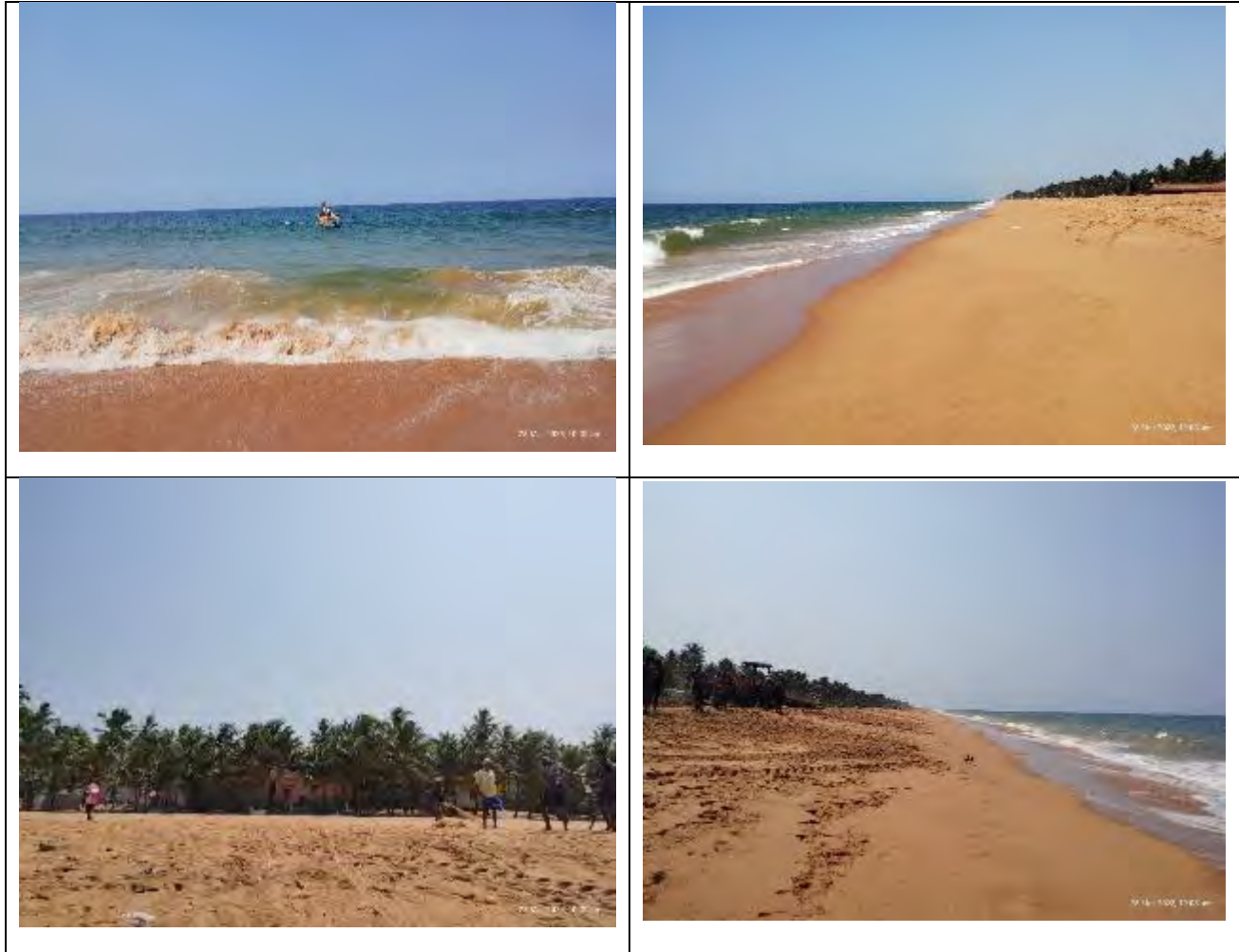


Figure 80- March CSP 80

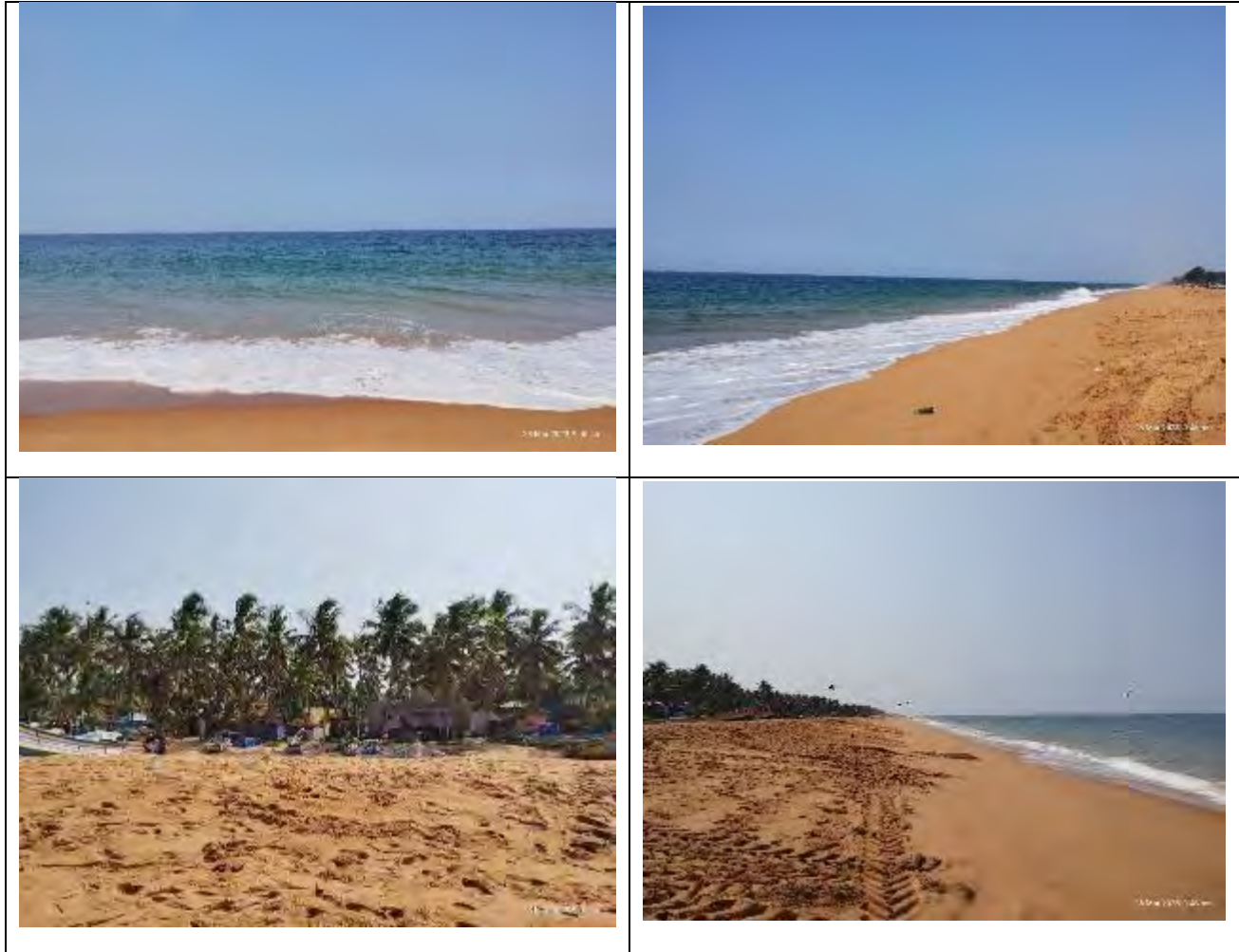
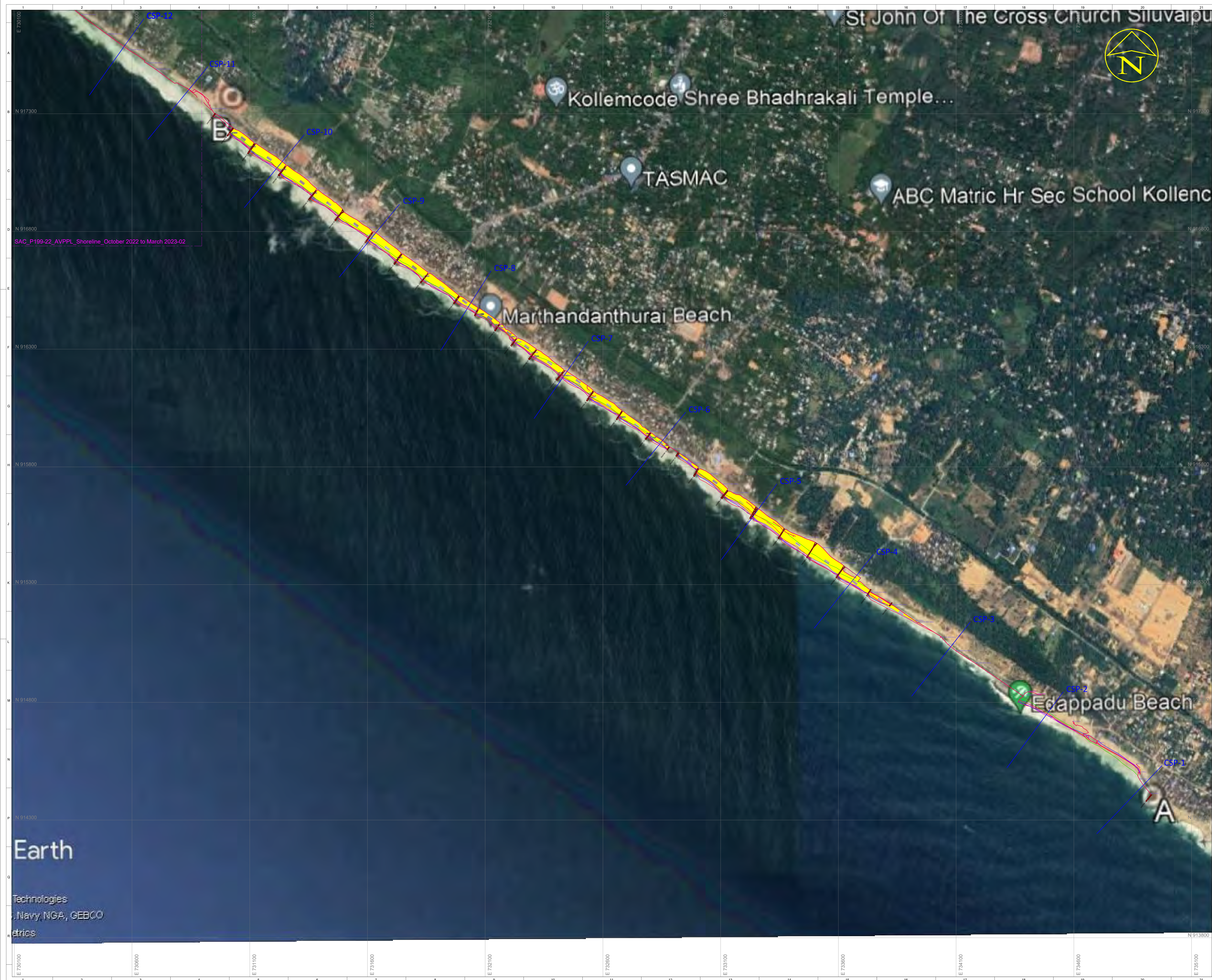


Figure 81- March CSP 81

Annexure II

Overlay of Month on Month GPS Survey Charts





Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

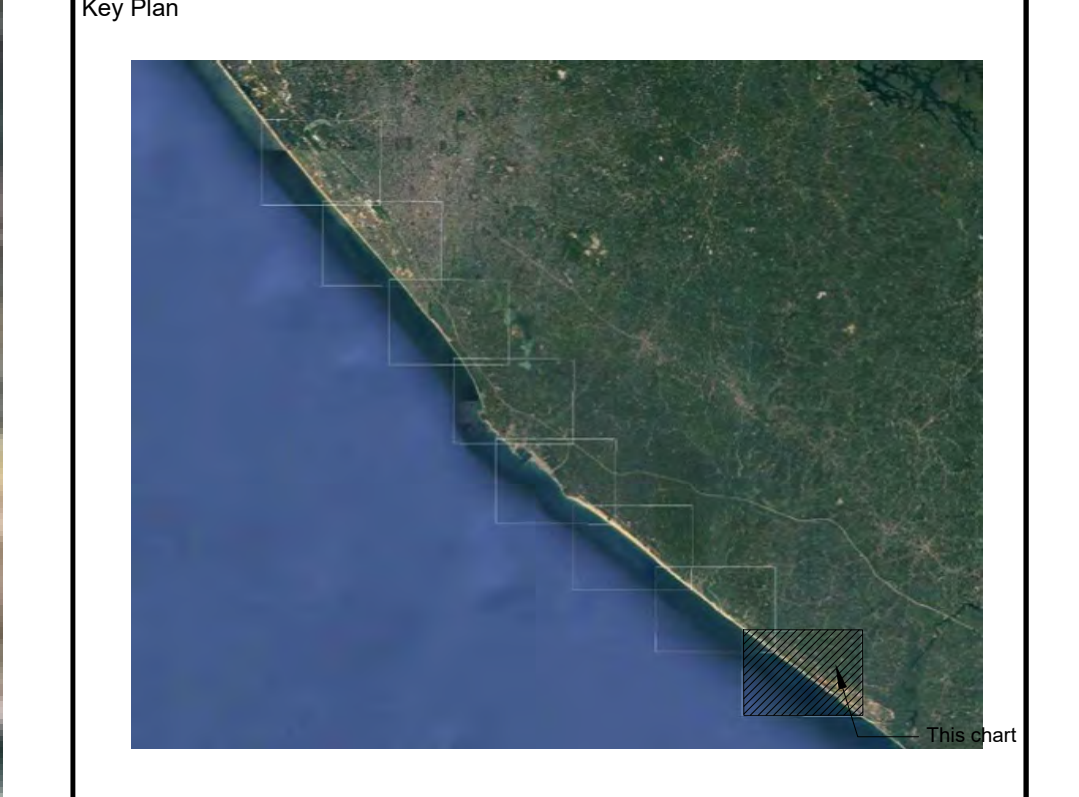
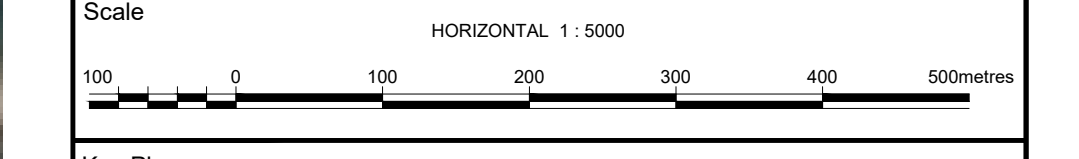
	GROYNES
	BEACH
	ROCK
	SEAWALL
	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
	SHORELINE JANUARY 2023
	SHORELINE FEBRUARY 2023
	SHORELINE MARCH 2023

Survey Notes
Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	: WGS84
Geoid Datum / Spheroid	: WGS84
Semi-Major Axis (a) (meters)	: 6378137.000m
Semi-Minor Axis	: 6356752.314245m
Inverse Flattening	: 298.2572226030
Projection	: Universal Transverse Mercator
Longitude of Origin (CM)	: 75° E (Zone 43)
Latitude of Origin	: 0° N (Equator)
Hemisphere	: North
False Easting	: 500 000 m
False Northing	: 0 m
Scale Factor at CM	: 0.9996
Units	: Metres

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Client
ADANI VIZHINJAM PORT PVT. LTD.
3-D Floor, Aspirwall House,
Kawdiar Road, Kuravankonam,
Thiruvananthapuram - 695003

Survey Contractor
SHANKAR AND CO.
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

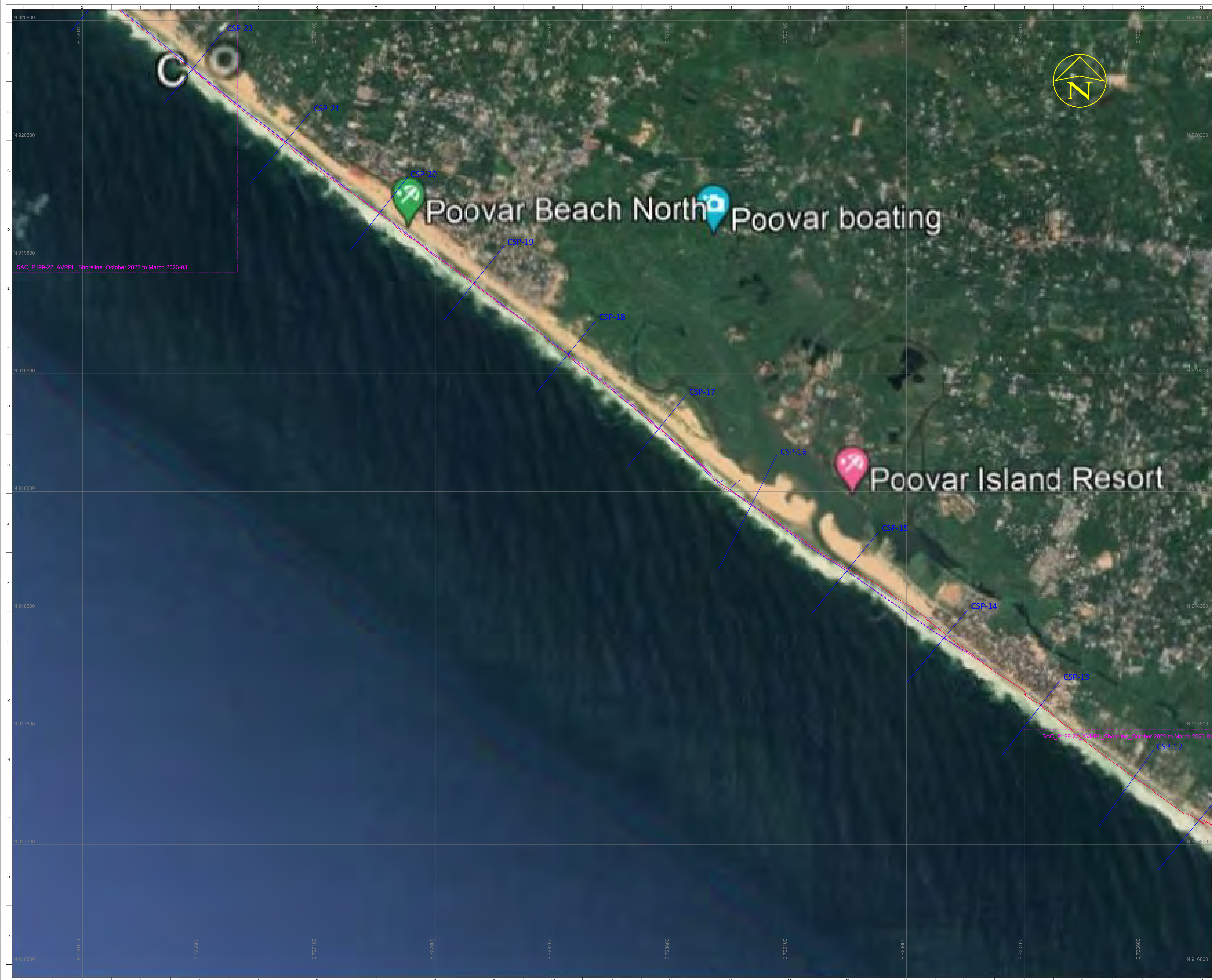
Project
Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title
Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20/04/2023

Drawn : S. Kshair Interpreted : V. Ravindran Checked : V. Menon Approved : S. Philip
Dwg No. SAC_P199-22_AVPPL_Shoreline_October 2022 to March 2023-01

Earth
Technologies
Navy, NGA, GEBCO
ometrics



SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-03

SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-01

Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

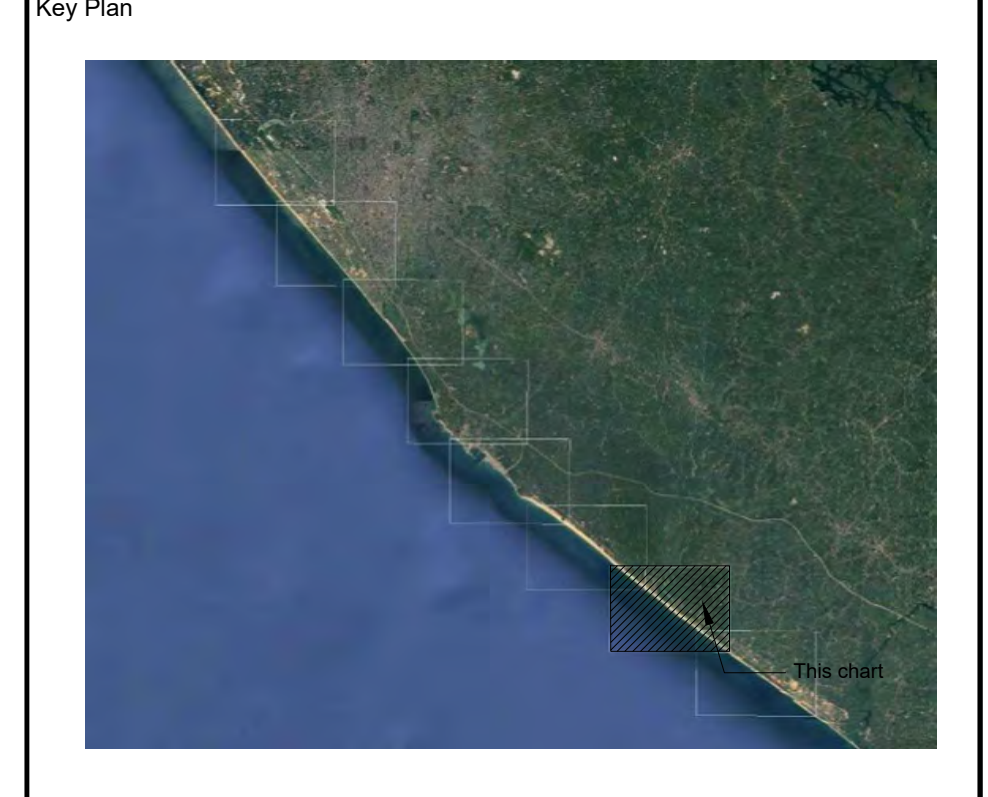
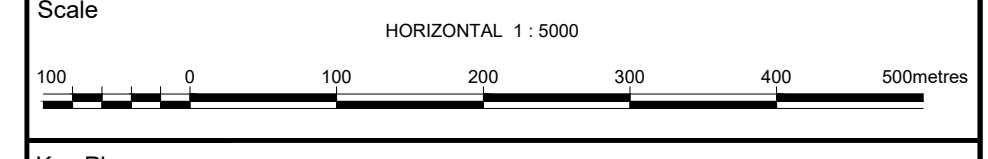
	GROYNES
	BEACH
	ROCK
	SEAWALL
	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
	SHORELINE JANUARY 2023
	SHORELINE FEBRUARY 2023
	SHORELINE MARCH 2023

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Thiruvananthapuram - 695003

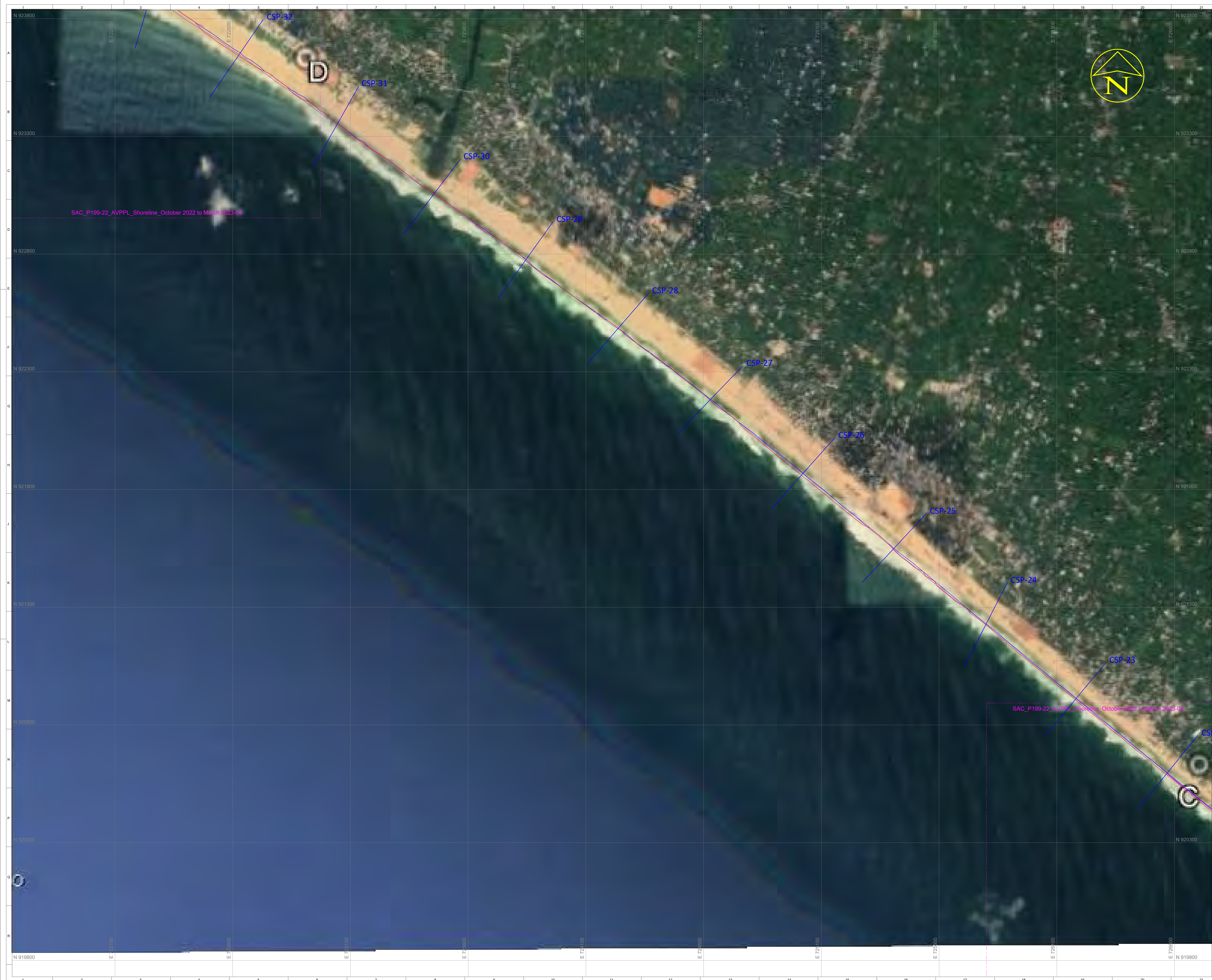
Survey Contractor
SHANKAR AND CO.
115, 1st Floor, Neco Chambers
Sector 11, CBD Belapur, Navi Mumbai
Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project
Oceanographic And Bathymetric Data Collection
For Assessment of Shoreline Changes

Drawing Title
Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20.04.2023

Drawn : S. Kshair / Interpreted : V. Ravindran / Checked : V. Manoj / Approved : S. Philip
Dwg No. SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-02



Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

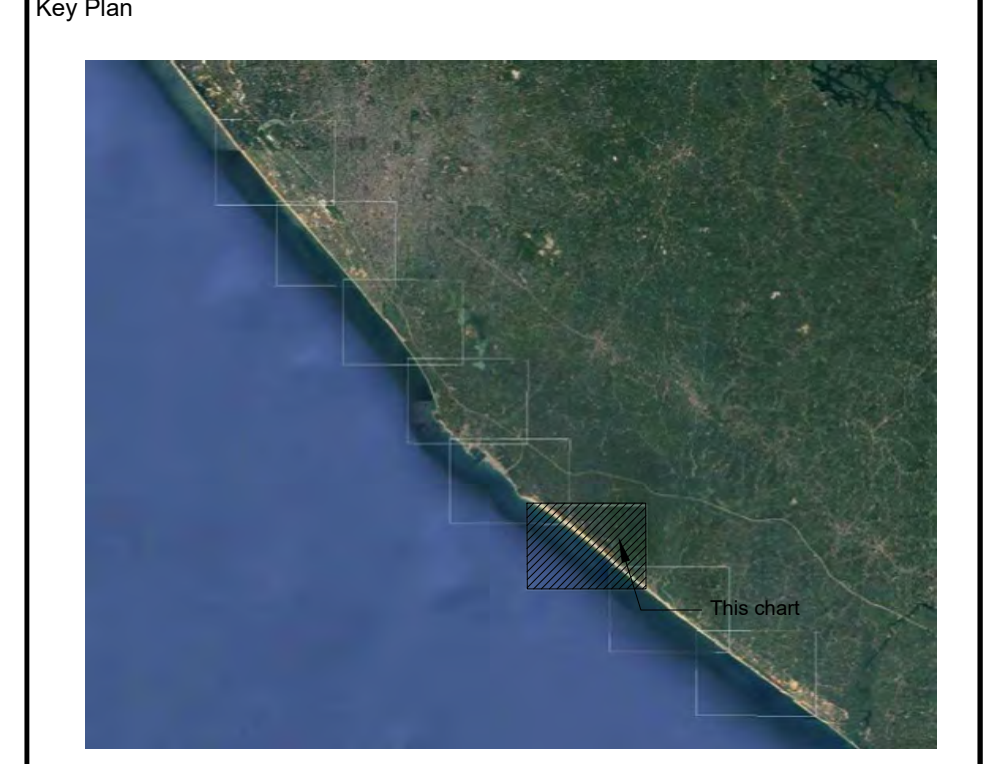
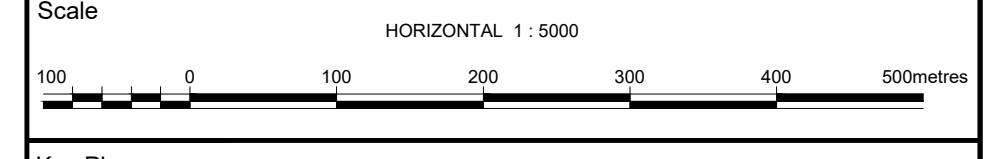
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	ROCK
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	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
	SHORELINE JANUARY 2023
	SHORELINE FEBRUARY 2023
	SHORELINE MARCH 2023

Survey Notes
Surface Positioning : Geomax Zenith (GPS Mode)

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Horizontal Coordinate System	: WGS84
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Semi-Major Axis (a) (meters)	: 6378137.000m
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Tele/Fax:- 022 27562900
E-mail : info@shankarsurveys.com

Project
Oceanographic And Bathymetric Data Collection
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Drawing Title
Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20.04.2023

Drawn : S. Kishor | Interpreted : V. Ravindran | Checked : V. Menka | Approved : S. Philip
Dwg No. SAC_P199-22_AVPPPL_Shoreline_October 2022 to March 2023-03



SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-05

SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-03

Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

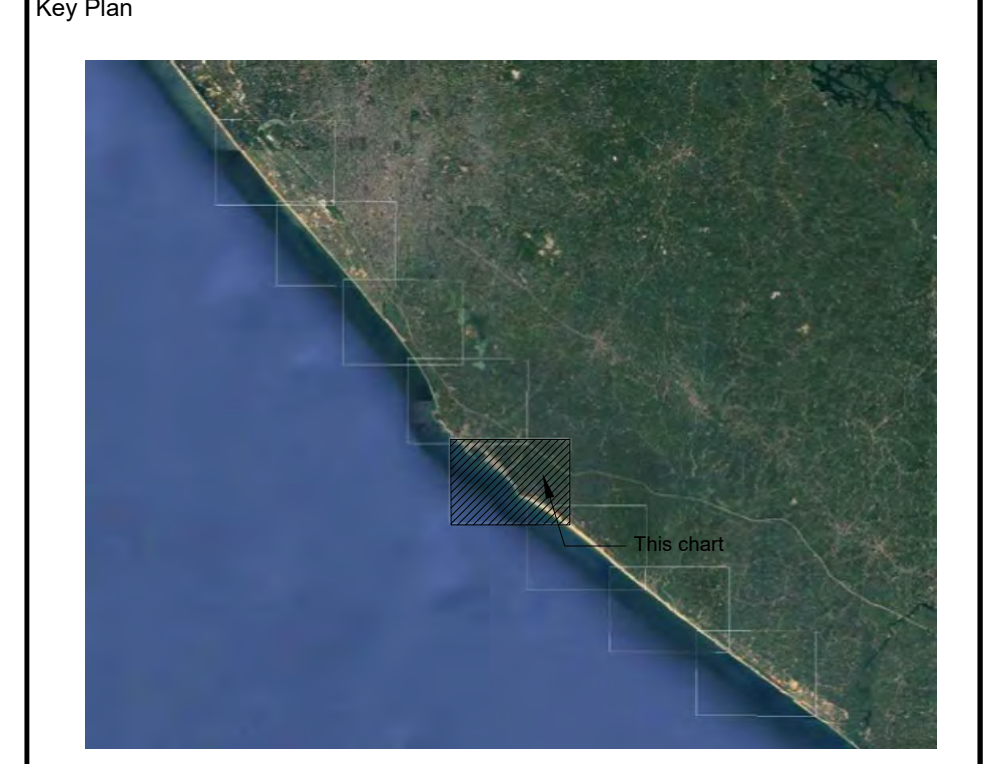
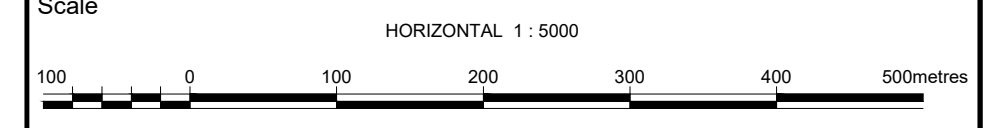
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	BEACH
	ROCK
	SEAWALL
	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
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Thiruvananthapuram - 695003

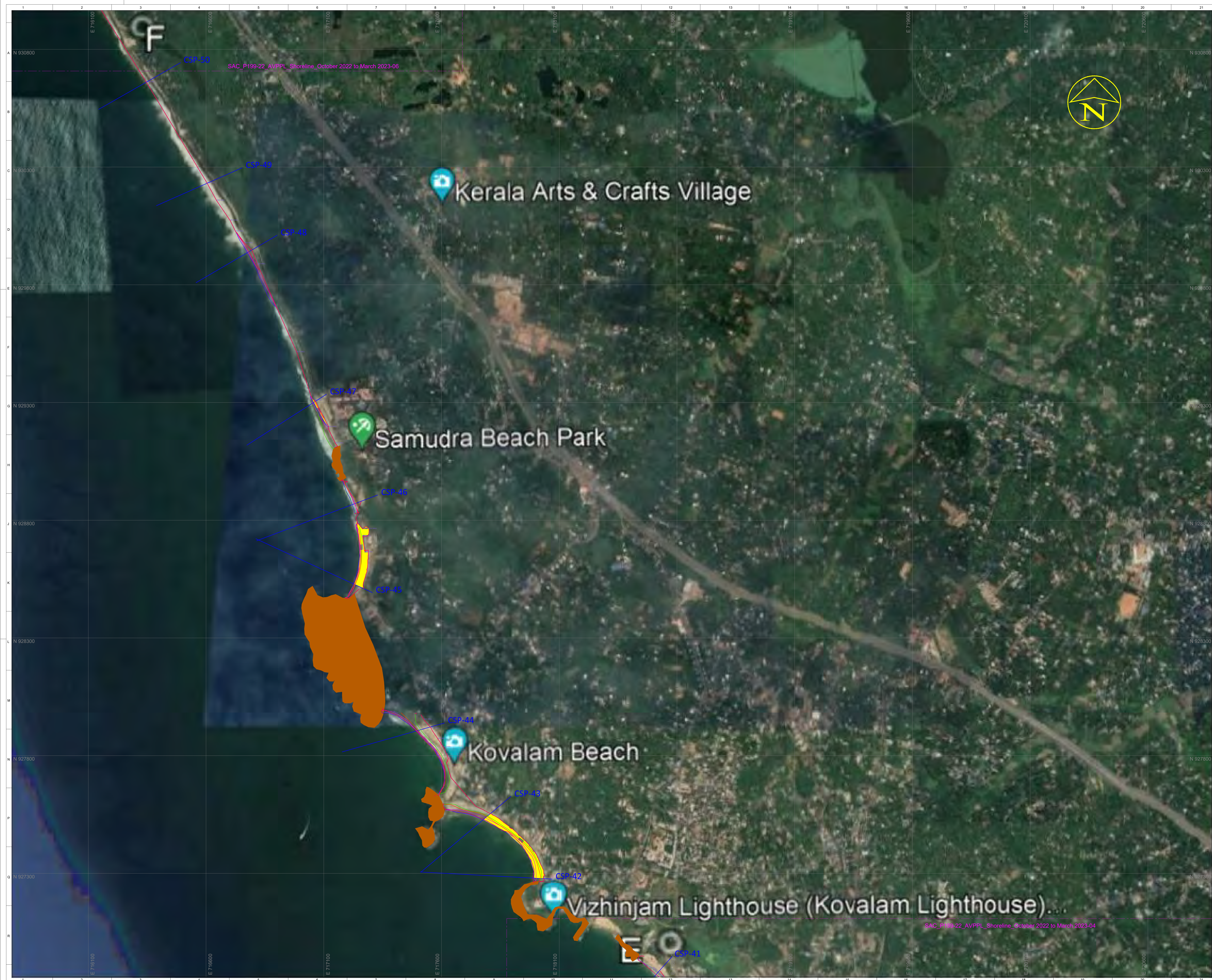
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For Assessment of Shoreline Changes

Drawing Title
Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20/04/2023

Drawn : S. Kshair / Interpreted : V. Ravindran / Checked : V. Menka / Approved : S. Philip
Dwg No. SAC_P199-22_AVPLI_Shoreline_October 2022 to March 2023-04



Notes :
 1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2022
- SHORELINE NOVEMBER 2022
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Scale Factor at CM	: 0.9996
Units	: Metres

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Scale
 HORIZONTAL 1 : 5000
 100 0 100 200 300 400 500metres

Key Plan

Client
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 3rd Floor, Aspirwall House,
 Kawdiar Road, Kuravankonam,
 Thiruvananthapuram - 695003

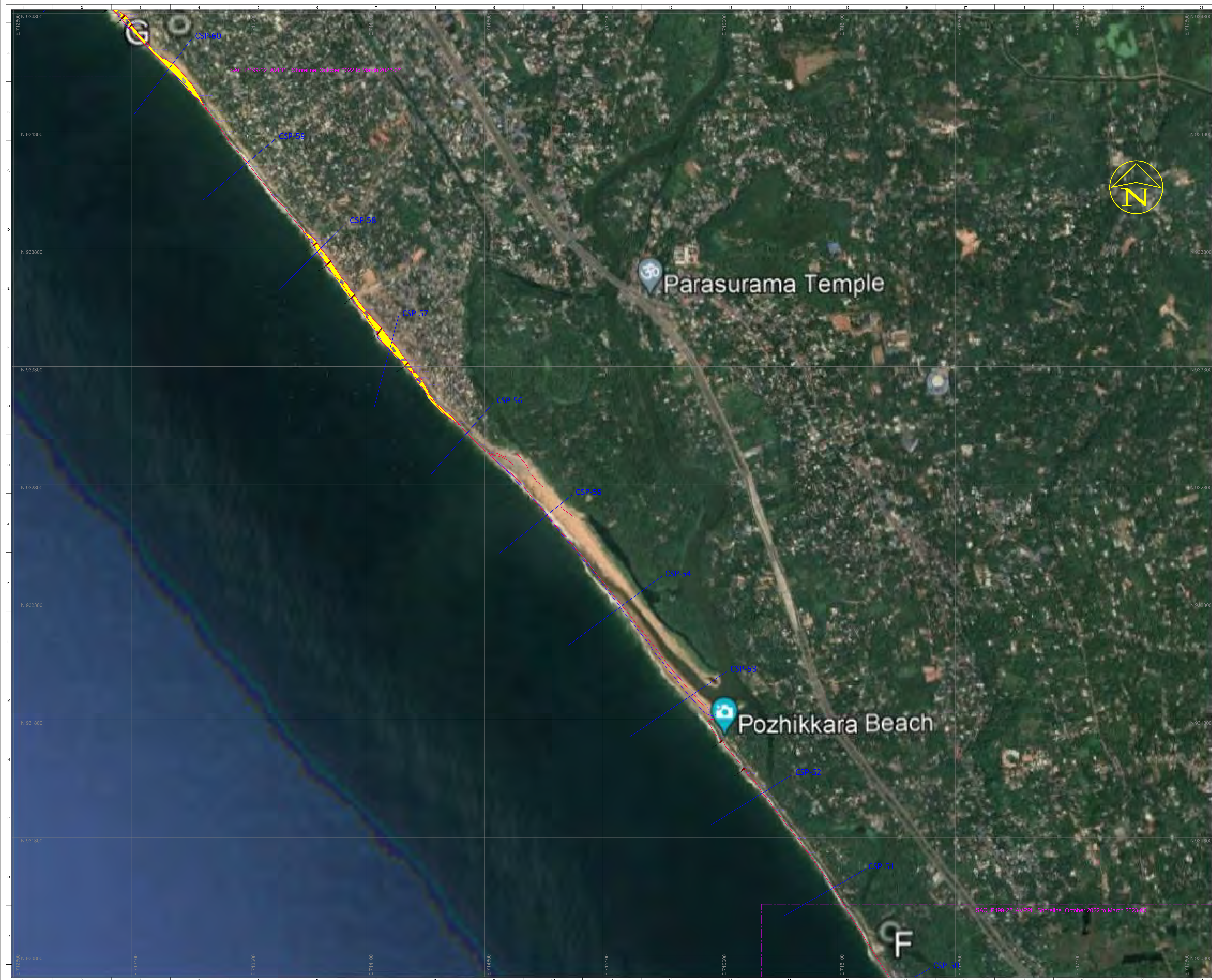
Survey Contractor
SHANKAR AND CO.
 115, 1st Floor, Neco Chambers
 Sector 11, CBD Belapur, Navi Mumbai
 Tele/Fax:- 022 27562900
 E-mail : info@shankarsurveys.com

Project
 Oceanographic And Bathymetric Data Collection
 For Assessment of Shoreline Changes

Drawing Title
 Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20.04.2023

Drawn : S. Kshair Interpreted : V. Ravindran Checked : V. Manja Approved : S. Philip
 Dwg No. SAC_P199-22_AVPPL_Shoreline_October 2022 to March 2023-05



Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

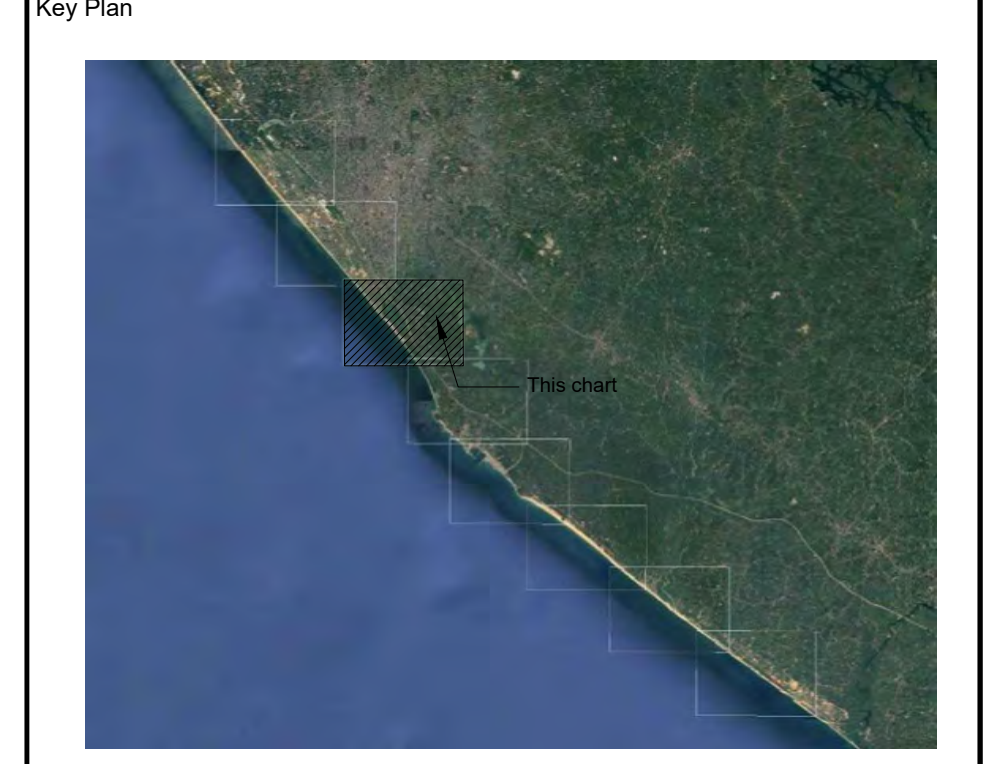
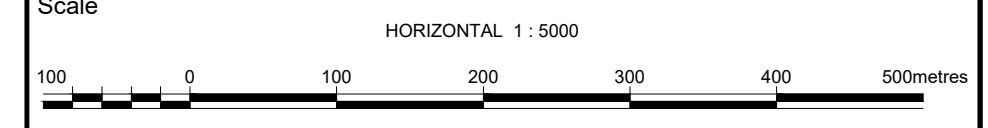
	GROYNES
	BEACH
	ROCK
	SEAWALL
	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
	SHORELINE JANUARY 2023
	SHORELINE FEBRUARY 2023
	SHORELINE MARCH 2023

Survey Notes
Surface Positioning : Geomax Zenith (GPS Mode)

Geodetic Parameters :

Horizontal Coordinate System	: WGS84
Geoid Datum / Spheroid	: WGS84
Semi-Major Axis (a) (meters)	: 6378137.000m
Semi-Minor Axis	: 6356752.314245m
Inverse Flattening	: 298.257223563
Projection	: Universal Transverse Mercator
Longitude of Origin (CM)	: 75° E (Zone 43)
Latitude of Origin	: 0° N (Equator)
Hemisphere	: North
False Easting	: 500 000 m
False Northing	: 0 m
Scale Factor at CM	: 0.9996
Units	: Metres

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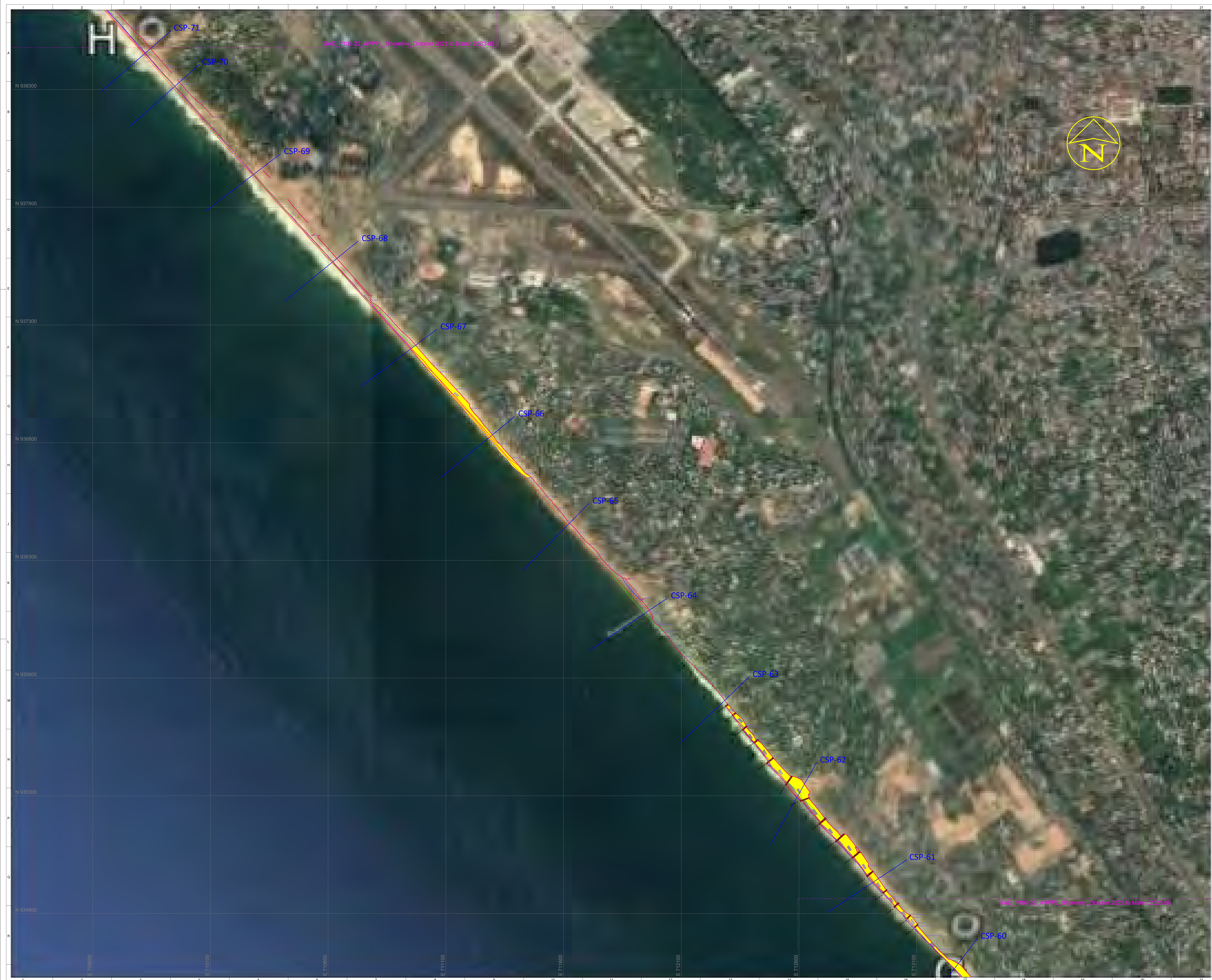
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Drawn : S. Kshair / Interpreted : V. Ravindran / Checked : V. Menka / Approved : S. Philip
Dwg. No. SAC_P199-22_AVPPL_Shoreline_October 2022 to March 2023-06



Notes :
 1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

- GROYNES
- BEACH
- ROCK
- SEAWALL
- SHORELINE OCTOBER 2022
- SHORELINE NOVEMBER 2022
- SHORELINE DECEMBER 2022
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Scale
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 100 0 100 200 300 400 500metres

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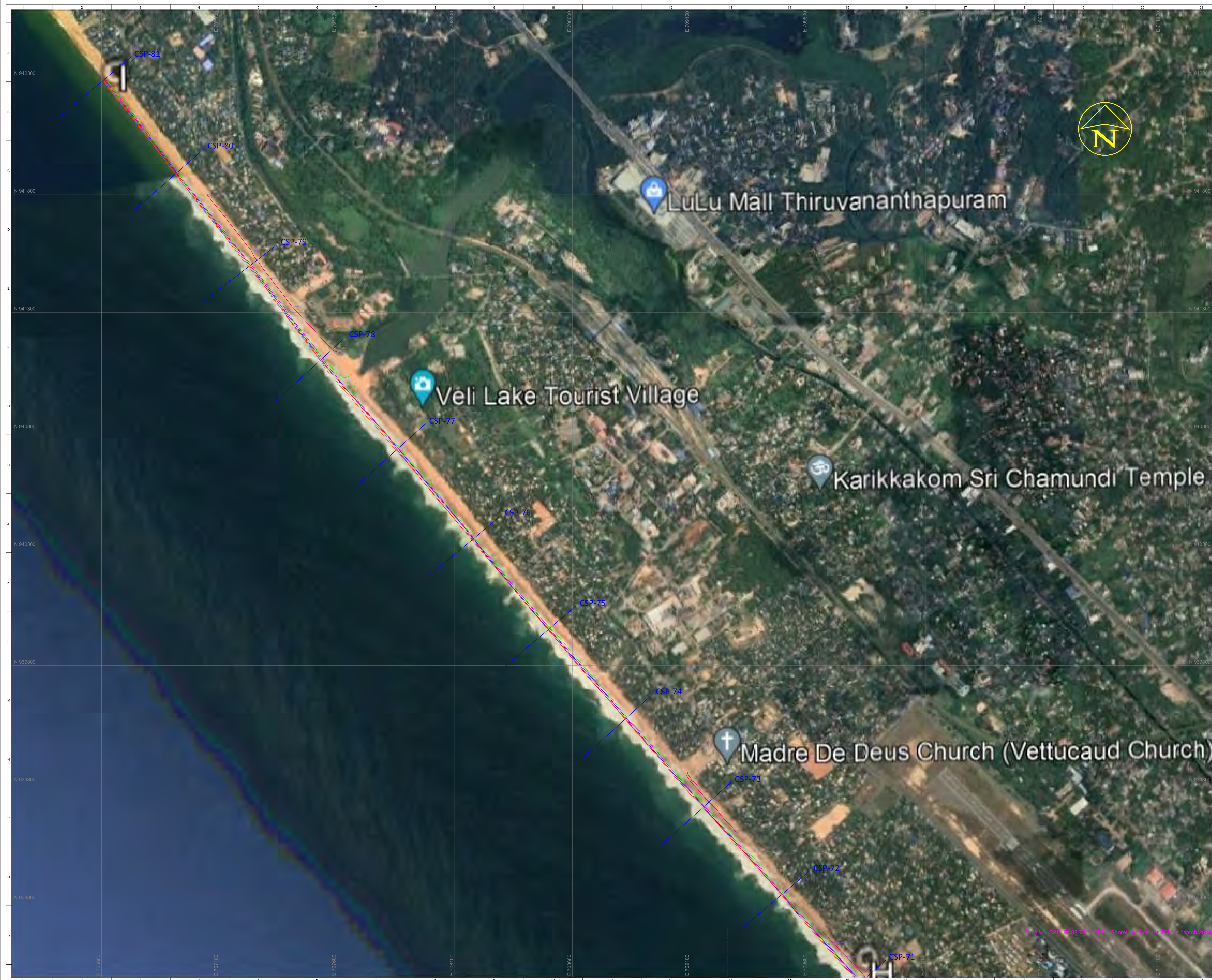
Project
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 For Assessment of Shoreline Changes

Drawing Title
 Shoreline Monitoring Chart

Rev No.	Description	Date
0	First Issue	20.04.2023

Drawn : S. Khair / Interpreted : V. Ravindran / Checked : V. Manoj / Approved : S. Philip

Dwg No. SAC_P199-22_AVPPPL_Shoreline_October 2022 to March 2023-07



Notes :
1. All coordinates are in WGS 84 datum, UTM grid system, Zone 43 North

LEGEND

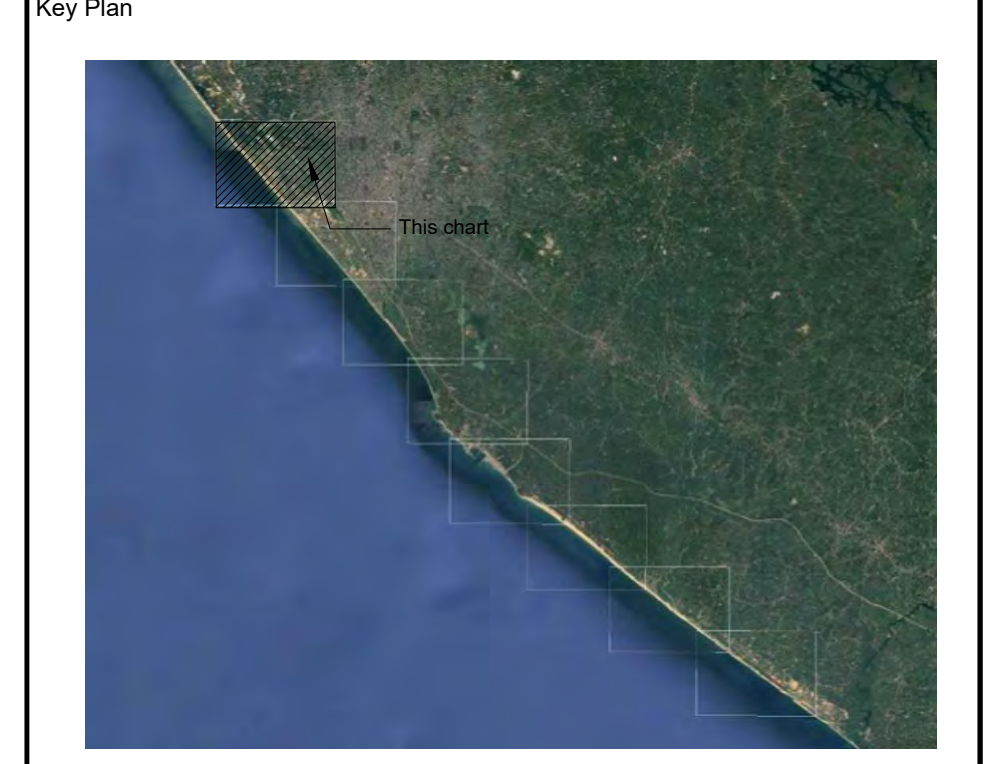
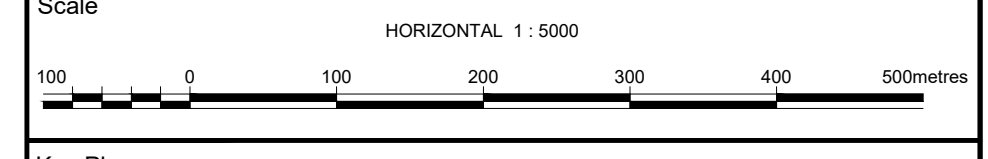
	GROYNES
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	ROCK
	SEAWALL
	SHORELINE OCTOBER 2022
	SHORELINE NOVEMBER 2022
	SHORELINE DECEMBER 2022
	SHORELINE JANUARY 2023
	SHORELINE FEBRUARY 2023
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0	First Issue	20.04.2023

Drawn : S. Kshair / Interpreted : V. Ravindran / Checked : V. Manoj / Approved : S. Philip
Dwg No. SAC_P199-22_AVPLP_Shoreline_October 2022 to March 2023-08

Dwg No. SAC_P199-22_AVPLP_Shoreline_October 2022 to March 2023-07

Annexure II
Environment Monitoring Report
(October 2022 to March 2023)

**HALF-YEARLY ENVIRONMENT
MONITORING REPORT**
FOR THE PERIOD OCTOBER 2022 TO MARCH 2023



ADANI VIZHINJAM PORT PVT. LTD.
Vizhinjam, Kerala

Report No.: SEAAL/EMR-AVPPL-2223HY-II

Report Date: 25th April, 2023

This Report presents the discussion and the results of Environmental Monitoring at Adani Vizhinjam Port. The monitoring has been conducted and the report has been prepared & issued by Standards Environmental & Analytical Laboratories, Ernakulum-683 501 to M/s Adani Vizhinjam Port Pvt Limited, Thiruvananthapuram-695 014

HYR-A	Table of Contents
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Standard^S Environmental & Analytical Laboratories is an organization providing Testing Services, Technical Consultancy for Environmental Pollution Control, Designing, Commissioning & Operation of Effluent & Sewage Treatment Plants to clients of various industries, Hotels, Hospitals & Building Apartments. It provides various training for the industries and for the budding scientists.

Standard^S has been established in 2013 in 2500 sq.ft area in a complex located at K.J Tower, (above SBI Eloor branch), Pathalam, Udyogamandal P.O, Ernakulam District – 683 501. It has been equipped with sophisticated instruments such GC-MS, AAS, UV Spectrophotometer, Flame Photometer and other Supporting Instruments with required accuracy & precision.

Standard^S is guided and lead by highly qualified scientists with rich experiences. Its technical personnel are well trained and competent and dedicated.

Testing Laboratory of Standard^S is accredited as per ISO/IEC 17025:2017 by NABL for testing of Food & Agricultural Products, Water and Environmental Samples, Medical Accessories under Chemical & Biological Disciplines. It is an “A” Grade laboratory certified by Kerala State Pollution Control Board (KSPCB). It delivers reliable testing services on time to the customers after ensuring the compliance of each stage of the testing activities to the stringent Quality Control and Quality Assurance Criteria established by international forums.

Standard^S gives Technical Consultancy in the field of Water & Waste Water Treatment and has completed a number of Turn-Key projects to solve the water pollution issues for different clients and making them compliant to the statutory requirements.

Standard^S had been engaged by Adani Vizhinjam Port Pvt. Ltd. (AVPPL) for performing Environmental Monitoring as per the Plan mentioned in EIA and EC. AVPPL issued Service Order vide email dated 11-07-2022 which mentions the matrix, parameters and frequency of environmental monitoring. Standard^S carried out said environmental monitoring strictly as per above mentioned service order,

Standard^S Environmental & Analytical Laboratories

K.J Tower, (above SBI Eloor branch), Pathalam, Udyogamandal P.O, Ernakulam District – 683 501
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viz. Ambient Air Monitoring (twice in a week), Ambient Noise Monitoring (fortnightly), Marine Ecological Survey including marine water, sediment, phytoplankton and zooplankton analysis (monthly), Ground Water and Surface Water Analysis (monthly), Soil Analysis (yearly).

Standard^S submits monthly reports 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 conditions mentioned in service order.

This present report is the consolidated half yearly report over the period from October 2022 to March 2023.

HYR-2	Quality Assurance & Quality Control
--------------	--

The quality assurance and quality control plan include following elements:

- Monitoring and Collection, Preservation & Transportation of samples;
- Sample Registration, Chain of Custody & Report Preparation;
- Laboratory Analysis & Review of Results; and
- Validation of Technical Activities.

HYR-2.1. Monitoring and Collection, Preservation & Transportation of samples:

The authorized Laboratory Sampling Team prepares the checklist for the required Sampling Kits, other auxiliary equipment and Sampling Procedures including Datasheets. The team collects the required item as per the list and visits the sampling site.

The team identifies the appropriate monitoring location as per the agreement and keep the sampling kits at the identified location. The team notes down the environmental conditions of the site in the sampling data sheets and all other required information. Then the team starts the monitoring activity.

Periodically the team inspects the status of the conditions of the sampling kits and records the necessary data on the sampling data sheet as per the requirements.

After the completion of monitoring as per PCB standards, the team collects the samples and preserves them safely and securely in an appropriate labelled container as per the procedure to prevent from contamination and deterioration.

Then the team returns to the laboratory and takes due care to maintain the integrity of the samples during transport. The team submits the samples and sampling data sheets to the Executives - Sample Registration.

HYR-2.2. Sample Registration, Chain of Custody & Report Preparation:

After receiving the samples, the Executive - Sample Registration examines the sample conditions and the sampling data sheets along with the agreement as per the Checklist and records the findings.

The executive registers the samples for testing in the Sample Entry Register and assigns the unique Sample Code for each sample only if all the criteria are fulfilled. The Executive prepares the Job Card for each sample as per the agreement and enters the allotted Sample Code in the Job Card and on the Test Item. The Test Item is identified throughout its life in the laboratory only by the unique Sample Code.

The executive then delivers the sample to the respective section of the Laboratory and the Job Card along with necessary sampling details required for performing the analysis excluding the details of the origin of the samples. The delivery is recorded in the Sample Delivery Register and the same is acknowledged by the Laboratory Technical personnel.

The information available in the Job Card are the test parameters to be performed, test method to be adopted, units in which the analytical results to be expressed, the due date for completion of analysis and the details about sample storage and retention conditions.

The executive submits the other Customer information and Sample details to the Reporting Section for preparing the Test Reports.

After completion of analysis, the technical personnel enter all the results and dates of analysis in the Job Card and submit the same to Reporting Section.

The Reporting Executive decodes the Job Card with the Test Request details, prepares the Draft Report as per the respective report format and submits the draft report to the Authorized Signatory. This draft report is verified and returned back to the Reporting Section for making the final report. Final reports are prepared by

the Reporting Executive with necessary corrections if any and authorized by the Authorized Signatory. Then the Final Test Report is delivered to the customer.

HYR-2.3. Laboratory Analysis & Review of Test Results:

After receiving the Test Items along with the Job Card, the Technical Manager allots the Job to the authorized Technical Personnel. The assigned Technical Personnel performs the allotted tests as per the method mentioned in the Job Card as well as the required Quality Control Checks (QC) and submits the results to the Technical Manger. The Technical Personnel conforms that all the required calibration status of the equipment is valid and the Certified Reference Material are valid. Also, the Technical Personnel ensures that the results of daily verification conforming to the specified criteria.

The Technical Manager reviews the results of samples & QC checks and approves the results only if the results of QC checks are compliance to the Acceptance Criteria. Then the Job Card is submitted to the Reporting Section.

HYR-2.4. Validation of Technical Activities:

For the validation of Technical Activities, the laboratory performs Internal Quality Assurance Check, Proficiency Testing and Inter Laboratory Comparison. Quality Assurance Team prepares Annual Internal Quality Assurance Check (IQC) Plan, Inter laboratory Comparison (ILC)/ Proficiency Testing (PT) Plan.

As per the IQA plan, Quality Assurance Team prepare and send the Test Items to the respective section of the Laboratory. After getting the results, Quality Assurance team evaluates the results against the predefined criteria. The results of evaluation are submitted and discussed during Management Review meeting.

Quality Assurance Team identify and register the suitable PT Scheme authorized by NABL. Also, Quality Assurance Team identifies suitable ILC or conducts by covering at least five NABL accredited Laboratories.

If the QA team conducts ILC, then they evaluate the performance and calculate the Z-score after getting the results of the participating laboratories.

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The acceptance criteria for the ILC/PT is ± 2 . The summary of the PT/ILC is prepared and discussed during Management Review Meeting.

The Quality Assurance Team monitors the performance of the Laboratory activities by conducting Internal Quality Audits and Vertical Audit periodically. The Audit reports are prepared and discussed during Management Review Meeting.

HYR-3	Ambient Air Quality Monitoring
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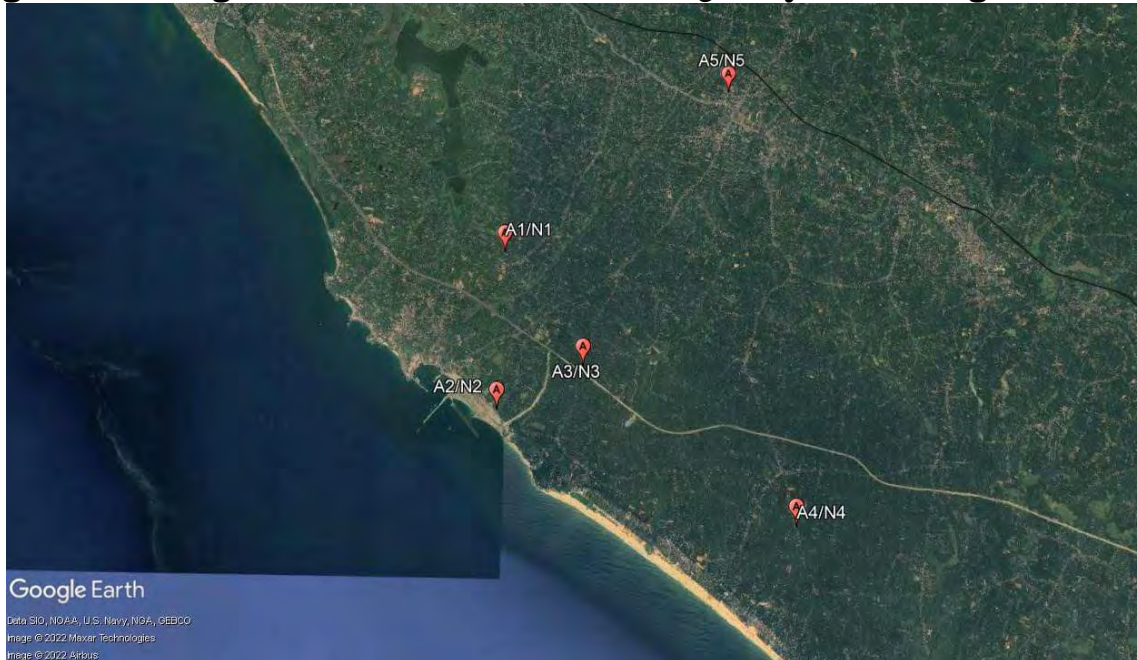
HYR-3.1. Ambient Air Quality Monitoring location details:

This section describes the sampling location, methodology adopted for monitoring and analysis of Ambient Air Quality. The prime objective of the environment monitoring with respect to Ambient Air Quality is to establish the air quality of present condition and its conformity to Applicable Standards. Ambient Air quality monitoring was carried out at five (5) locations including Venganoor, Port Site, Proposed Port Estate Area, Chani and Balarampuram from October 2022 to March 2023.

Table 3.1: Coordinates of Ambient Air Quality Monitoring Locations

Location	Legend	Latitude	Longitude
Venganoor	A1	8°23'55.10"N	77°00'12.19"E
Port Site	A2	8°22'13.73"N	77°00'08.39"E
Proposed Port Estate Area	A3	8°22'41.37"N	77°01'03.17"E
Chani	A4	8°21'02.11"N	77°03'16.59"E
Balarampuram	A5	8°25'43.73"N	77°02'39.99"E

Figure 3.1: Google Earth View of Ambient Air Quality Monitoring Locations



HYR-3.2. Methodology of Sampling and Analysis:

Table 3.2: Ambient Air Quality Monitoring Methodology

Sl. No.	Parameter	Unit	Detection Limit	Method Reference
1.	Particulate Matter (size less than 10 µm) or PM ₁₀	µg/m ³	5.0	IS 5182 (Part 23): 2006
2.	Particulate Matter (size less than 2.5 µm) or PM _{2.5}	µg/m ³	2.0	EPA 40 CFR Part 50 Appendix-L: 1997
3.	Sulphur Dioxide (SO ₂)	µg/m ³	2.0	IS 5182 (Part 2): 2001
4.	Nitrogen Dioxide (NO ₂)	µg/m ³	2.0	IS 5182 (Part 6): 2006
5.	Carbon Monoxide (CO)	mg/m ³	1.15	IS 5182 (Part 10):1999 (NDIR Method)
6.	Hydrocarbon (HC)	ppm	0.0003	IS 5182 (Part 17):1979

HYR-3.3. National Ambient Air Quality Standards (NAAQS):

Table 3.3: National Ambient Air Quality Standards dated 16th November 2009

Sl. No.	Pollutant, Unit	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), mg/m ³	8 h	02	02
		1 h	04	04
6.	Hydrocarbon (HC), ppm	-	-	-

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HYR-3.4. Ambient Air Quality Monitoring Results for the period from October 2022 to March 2023:

Table 3.4: Location – Venganoor (A1)

Venganoor (A1)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
03-10-2022	50.8	26.6	2.86	4.15	BDL	BDL
06-10-2022	56.2	24.5	3.63	4.44	BDL	BDL
10-10-2022	49.1	23.3	2.7	4.1	BDL	BDL
13-10-2022	50.2	25.7	3.01	4.9	BDL	BDL
17-10-2022	52.3	27.8	2.25	3.56	BDL	BDL
20-10-2022	49.6	25.6	2.56	3.98	BDL	BDL
24-10-2022	55.2	28.4	2.4	3.85	BDL	BDL
27-10-2022	45.6	23.6	2.11	3.9	BDL	BDL
31-10-2022	53.4	27.1	3.11	5.23	BDL	BDL
03-11-2022	58.4	30.2	3.16	4.96	BDL	BDL
07-11-2022	62.4	32.40	3.22	4.5	BDL	BDL
10-11-2022	55.3	28.5	2.96	4.23	BDL	BDL
14-11-2022	56.8	29.3	3.23	5.12	BDL	BDL
17-11-2022	56.4	29.2	2.75	4.12	BDL	BDL
21-11-2022	55.1	29.5	2.46	4.36	BDL	BDL
24-11-2022	61.2	31.5	2.55	4.63	BDL	BDL
28-11-2022	45.1	23.8	2.63	4.26	BDL	BDL
01-12-2022	49.2	27.7	3.98	4.83	BDL	BDL
05-12-2022	56.3	31.2	3.61	5.12	BDL	BDL
08-12-2022	58.7	34.5	4.12	5.32	BDL	BDL
12-12-2022	51.6	23.4	3.51	5.23	BDL	BDL
15-12-2022	54.1	26.8	4.07	5.31	BDL	BDL
19-12-2022	61.3	31.3	3.93	5.87	BDL	BDL
22-12-2022	47.5	23.1	3.66	4.49	BDL	BDL
26-12-2022	52.9	26.7	4.72	4.71	BDL	BDL
29-12-2022	55.4	29.3	4.29	5.03	BDL	BDL
02-01-2023	53.6	29.1	3.78	4.83	BDL	BDL

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Venganoor (A1)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
05-01-2023	57.2	30.4	4.18	4.97	BDL	BDL
09-01-2023	61.3	33.7	4.67	5.67	BDL	BDL
12-01-2023	56.8	27.2	4.43	5.43	BDL	BDL
16-01-2023	49.7	24.6	3.86	4.75	BDL	BDL
19-01-2023	53.9	29.5	4.04	5.23	BDL	BDL
23-01-2023	46.4	26.3	3.62	4.68	BDL	BDL
26-01-2023	50.1	28.2	3.96	4.86	BDL	BDL
30-01-2023	52.6	28.6	3.85	4.93	BDL	BDL
02-02-2023	58.1	30.6	4.25	5.33	BDL	BDL
06-02-2023	59.4	33.4	4.31	5.52	BDL	BDL
08-02-2023	56.3	32.7	4.17	5.46	BDL	BDL
13-02-2023	52.9	28.1	3.88	5.11	BDL	BDL
16-02-2023	63.1	34.5	4.56	5.73	BDL	BDL
20-02-2023	62.2	33.2	4.27	5.91	BDL	BDL
23-02-2023	56.7	29.8	4.06	5.23	BDL	BDL
27-02-2023	58.5	31.3	4.23	5.33	BDL	BDL
02-03-2023	62.5	32.1	4.11	6.53	BDL	BDL
06-03-2023	64.1	33.9	4.56	5.89	BDL	BDL
09-03-2023	50.8	26.2	4.16	5.12	BDL	BDL
13-03-2023	61.3	31.4	4.12	6.25	BDL	BDL
16-03-2023	52.3	27.5	4.23	6.45	BDL	BDL
20-03-2023	58.6	30.8	4.12	6.89	BDL	BDL
23-03-2023	50.1	26.7	4.02	6.75	BDL	BDL
27-03-2023	58.3	30.1	4.36	6.99	BDL	BDL
30-03-2023	60.5	31.8	4.11	7.12	BDL	BDL
NAAQS 2009 Limits	100	60	80	80	4	-

BDL: Below Detectable Limit

Table 3.5: Location – Project Site (A2)

Project Site (A2)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
03-10-2022	52.4	27.4	2.36	3.89	BDL	BDL
06-10-2022	63.5	34.6	3.86	4.12	BDL	BDL
10-10-2022	62.3	32.5	3.44	3.96	BDL	BDL
13-10-2022	62.1	32.8	3.83	4.24	BDL	BDL
17-10-2022	52.3	27.2	2.63	3.89	BDL	BDL
20-10-2022	58.7	30.5	2.85	4.11	BDL	BDL
24-10-2022	60.2	31.6	2.96	4.78	BDL	BDL
27-10-2022	64.3	33.8	3.45	4.63	BDL	BDL
31-10-2022	51.8	26.3	2.96	3.11	BDL	BDL
03-11-2022	62.3	32.6	2.96	4.28	BDL	BDL
07-11-2022	58.7	30.5	4.12	5.86	BDL	BDL
10-11-2022	66.2	34.8	3.26	4.69	BDL	BDL
14-11-2022	70.1	36.4	2.85	4.12	BDL	BDL
17-11-2022	58.6	30.1	2.96	4.02	BDL	BDL
21-11-2022	64.2	33.7	2.46	3.92	BDL	BDL
24-11-2022	68.5	35.6	2.68	4.15	BDL	BDL
28-11-2022	58.3	30.4	3.96	5.21	BDL	BDL
01-12-2022	61.7	34.4	4.35	4.86	BDL	BDL
05-12-2022	64.3	36.1	4.87	4.92	BDL	BDL
08-12-2022	73.6	39.2	4.19	5.67	BDL	BDL
12-12-2022	76.1	40.3	4.63	5.83	BDL	BDL
15-12-2022	72.4	36.6	5.24	5.62	BDL	BDL
19-12-2022	77.8	39.5	5.47	5.91	BDL	BDL
22-12-2022	74.2	35.4	5.31	5.49	BDL	BDL
26-12-2022	75.1	38.3	5.29	5.64	BDL	BDL
29-12-2022	73.9	34.7	4.86	5.71	BDL	BDL
02-01-2023	67.4	36.5	4.87	5.82	BDL	BDL
05-01-2023	74.1	42.7	5.11	5.92	BDL	BDL
09-01-2023	78.3	45.6	5.62	6.24	BDL	BDL
12-01-2023	73.6	44.3	5.27	5.86	BDL	BDL

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Project Site (A2)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
16-01-2023	68.7	39.5	4.85	5.32	BDL	BDL
19-01-2023	77.1	41.9	5.2	6.36	BDL	BDL
23-01-2023	73.9	43.4	5.39	5.89	BDL	BDL
26-01-2023	69.2	36.1	4.86	5.35	BDL	BDL
30-01-2023	73.6	42.5	5.36	6.03	BDL	BDL
02-02-2023	68.6	36.3	4.67	5.38	BDL	BDL
06-02-2023	69.3	38.7	4.94	5.89	BDL	BDL
08-02-2023	65.2	36.9	4.36	5.71	BDL	BDL
13-02-2023	71.3	43.2	5.11	5.94	BDL	BDL
16-02-2023	79.6	47.3	5.09	6.12	BDL	BDL
20-02-2023	78.4	44.8	5.13	6.02	BDL	BDL
23-02-2023	77.1	43.1	5.26	5.63	BDL	BDL
27-02-2023	68.5	39.6	4.96	5.86	BDL	BDL
02-03-2023	78.6	40.1	4.36	6.45	BDL	BDL
06-03-2023	65.2	33.5	4.56	6.28	BDL	BDL
09-03-2023	66.1	33.4	4.36	6.89	BDL	BDL
13-03-2023	79.6	40.3	5.86	6.36	BDL	BDL
16-03-2023	64.3	38.4	4.96	6.15	BDL	BDL
20-03-2023	64.6	33.5	5.36	7.02	BDL	BDL
23-03-2023	70.1	36.2	5.12	7.45	BDL	BDL
27-03-2023	78.3	40.3	5.23	7.36	BDL	BDL
30-03-2023	68.2	35.6	5.45	6.89	BDL	BDL
NAAQS 2009 Limits	100	60	80	80	4	-

BDL: Below Detectable Limit

Table 3.6: Location – Proposed Port Estate Area (A3)

Proposed Port Estate Area (A3)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
03-10-2022	50.4	26.2	2.75	4.11	BDL	BDL
06-10-2022	55.6	28.5	3.45	4.96	BDL	BDL

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Proposed Port Estate Area (A3)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
10-10-2022	48.4	25.3	2.92	4.22	BDL	BDL
13-10-2022	52.4	27.4	2.63	3.91	BDL	BDL
17-10-2022	57.2	29.2	2.81	3.46	BDL	BDL
20-10-2022	50.3	26.5	2.85	4.02	BDL	BDL
24-10-2022	52.1	27.4	3.11	4.52	BDL	BDL
27-10-2022	49.4	26.5	2.12	3.46	BDL	BDL
31-10-2022	48.3	25.6	2.64	3.89	BDL	BDL
03-11-2022	58.6	30.50	2.96	4.52	BDL	BDL
07-11-2022	51.3	32.40	3.65	5.23	BDL	BDL
10-11-2022	47.6	26.3	3.26	5.12	BDL	BDL
14-11-2022	49.4	27.6	2.78	3.96	BDL	BDL
17-11-2022	54.8	31.7	3.23	5.22	BDL	BDL
21-11-2022	58.4	33.1	2.44	4.85	BDL	BDL
24-11-2022	49.4	30.4	3.52	5.46	BDL	BDL
28-11-2022	45.3	28.6	2.19	3.78	BDL	BDL
01-12-2022	53.5	27.8	3.62	4.73	BDL	BDL
05-12-2022	57.2	25.1	4.41	5.56	BDL	BDL
08-12-2022	48.1	21.7	3.03	4.81	BDL	BDL
12-12-2022	50.6	26.2	3.91	5.26	BDL	BDL
15-12-2022	54.3	29.4	4.39	5.63	BDL	BDL
19-12-2022	51.9	28.3	4.26	5.17	BDL	BDL
22-12-2022	52.7	28.5	3.85	5.39	BDL	BDL
26-12-2022	56.8	31.6	4.56	5.72	BDL	BDL
29-12-2022	51.9	24.6	4.11	4.56	BDL	BDL
02-01-2023	50.1	28.3	3.67	4.86	BDL	BDL
05-01-2023	49.4	25.7	3.53	4.72	BDL	BDL
09-01-2023	53.6	29.9	3.51	4.88	BDL	BDL
12-01-2023	51.8	28.4	3.46	4.79	BDL	BDL
16-01-2023	55.6	30.5	4.27	5.06	BDL	BDL
19-01-2023	59.7	32.6	4.41	5.31	BDL	BDL
23-01-2023	53.4	31.1	4.27	5.28	BDL	BDL
26-01-2023	56.1	33.8	4.36	5.43	BDL	BDL

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Proposed Port Estate Area (A3)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
30-01-2023	52.3	29	3.83	5.27	BDL	BDL
02-02-2023	50.3	26.4	3.88	5.19	BDL	BDL
06-02-2023	59.1	27.2	4.13	5.23	BDL	BDL
08-02-2023	53.7	29.6	3.78	4.96	BDL	BDL
13-02-2023	54.2	27.9	3.86	5.13	BDL	BDL
16-02-2023	58.3	30.3	3.75	5.19	BDL	BDL
20-02-2023	56.4	29.7	3.91	4.91	BDL	BDL
23-02-2023	58.2	31.9	4.24	5.02	BDL	BDL
27-02-2023	59.3	32.6	4.37	5.25	BDL	BDL
02-03-2023	58.6	30.2	4.02	5.86	BDL	BDL
06-03-2023	48.3	25.6	4.23	5.36	BDL	BDL
09-03-2023	60.8	31.6	4.15	5.78	BDL	BDL
13-03-2023	56.4	28.8	4.26	5.42	BDL	BDL
16-03-2023	60.2	31.5	4.18	6.55	BDL	BDL
20-03-2023	68.4	35.4	4.63	5.89	BDL	BDL
23-03-2023	54.2	28.6	4.12	5.78	BDL	BDL
27-03-2023	64.3	33.6	4.36	6.23	BDL	BDL
30-03-2023	59.3	30.8	4.96	6.58	BDL	BDL
NAAQS 2009 Limits	100	60	80	80	4	-

BDL: Below Detectable Limit

Table 3.7: Location – Chani (A4)

Chani (A4)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
03-10-2022	59.4	30.4	2.41	4.69	BDL	BDL
06-10-2022	48.2	25.2	2.63	4.75	BDL	BDL
10-10-2022	42.3	24.4	2.13	3.96	BDL	BDL
13-10-2022	50.6	26.4	2.96	4.30	BDL	BDL
17-10-2022	55.4	28.9	2.78	4.08	BDL	BDL
20-10-2022	54.6	28.4	2.96	4.56	BDL	BDL

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Chani (A4)						
Date	Parameters					
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	HC
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	ppm
24-10-2022	51.3	26.6	3.23	4.19	BDL	BDL
27-10-2022	55.9	28.7	2.45	4.08	BDL	BDL
31-10-2022	50.5	26.8	2.78	4.11	BDL	BDL
03-11-2022	52.2	27.8	2.63	4.25	BDL	BDL
07-11-2022	45.6	23.4	2.45	4.55	BDL	BDL
10-11-2022	48.2	25.7	2.55	4.03	BDL	BDL
14-11-2022	59.4	30.2	3.12	5.45	BDL	BDL
17-11-2022	52.1	26.8	2.96	3.96	BDL	BDL
21-11-2022	48.7	25.4	2.45	4.22	BDL	BDL
24-11-2022	55.3	29.6	3.98	5.23	BDL	BDL
28-11-2022	50.2	31.7	2.15	4.69	BDL	BDL
01-12-2022	47.9	24.6	3.82	4.59	BDL	BDL
05-12-2022	53.7	28.6	4.32	5.23	BDL	BDL
08-12-2022	51.4	25.7	3.97	4.92	BDL	BDL
12-12-2022	55.6	27.4	4.54	5.34	BDL	BDL
15-12-2022	51.2	28.5	3.71	5.61	BDL	BDL
19-12-2022	59.4	32.3	4.58	5.86	BDL	BDL
22-12-2022	61.2	34.8	4.75	5.94	BDL	BDL
26-12-2022	56.3	27.1	4.22	5.33	BDL	BDL
29-12-2022	53.9	28.2	4.03	5.26	BDL	BDL
02-01-2023	59.3	33.6	4.26	5.25	BDL	BDL
05-01-2023	54.2	31.7	3.86	5.11	BDL	BDL
09-01-2023	56.9	32.3	4.03	5.19	BDL	BDL
12-01-2023	50.1	29.6	3.59	4.78	BDL	BDL
16-01-2023	52.6	28.7	3.61	4.86	BDL	BDL
19-01-2023	55.4	34.3	4.03	5.39	BDL	BDL
23-01-2023	57.1	35.6	4.29	5.56	BDL	BDL
26-01-2023	53.5	29.1	4.43	5.12	BDL	BDL
30-01-2023	54.6	28.2	4.15	4.94	BDL	BDL
02-02-2023	56.8	29.5	3.67	4.83	BDL	BDL
06-02-2023	58.3	26.9	3.83	4.96	BDL	BDL
08-02-2023	61.4	25.7	4.16	4.62	BDL	BDL

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Chani (A4)						
Date	Parameters					
	PM₁₀	PM_{2.5}	SO₂	NO₂	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
13-02-2023	59.3	24.1	4.03	5.23	BDL	BDL
16-02-2023	55.2	29.4	3.76	3.87	BDL	BDL
20-02-2023	58.4	26.3	3.89	5.34	BDL	BDL
23-02-2023	53.7	27.2	3.47	4.75	BDL	BDL
27-02-2023	59.2	28.7	4.25	4.86	BDL	BDL
02-03-2023	66.3	34.2	4.75	5.96	BDL	BDL
06-03-2023	68.2	35.4	4.05	5.46	BDL	BDL
09-03-2023	59.7	30.1	4.36	5.78	BDL	BDL
13-03-2023	60.5	31.5	4.01	5.33	BDL	BDL
16-03-2023	61.2	31.8	4.13	5.88	BDL	BDL
20-03-2023	64.2	33.9	4.25	6.02	BDL	BDL
23-03-2023	60.8	31.1	4.18	6.23	BDL	BDL
27-03-2023	64.1	33.6	4.96	6.45	BDL	BDL
30-03-2023	68.3	35.7	4.75	5.89	BDL	BDL
NAAQS 2009 Limits	100	60	80	80	4	-

BDL: Below Detectable Limit

Table 3.8: Location – Balarampuram (A5)

Balarampuram (A5)						
Date	Parameters					
	PM₁₀	PM_{2.5}	SO₂	NO₂	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
03-10-2022	54.2	26.4	2.76	4.11	BDL	BDL
06-10-2022	52.6	27.5	2.42	3.78	BDL	BDL
10-10-2022	58.2	30.3	2.36	3.97	BDL	BDL
13-10-2022	60.3	31.2	2.68	4.20	BDL	BDL
17-10-2022	50.8	26.9	2.88	4.97	BDL	BDL
20-10-2022	50.1	26.4	2.26	3.65	BDL	BDL
24-10-2022	56.9	29.3	2.96	4.75	BDL	BDL
27-10-2022	52.3	32.6	2.63	4.15	BDL	BDL
31-10-2022	49.7	25.9	2.16	3.58	BDL	BDL
03-11-2022	60.5	31.2	3.86	4.63	BDL	BDL

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Balarampuram (A5)						
Date	Parameters					
	PM₁₀	PM_{2.5}	SO₂	NO₂	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
07-11-2022	54.3	27.80	2.16	4.11	BDL	BDL
10-11-2022	52.1	27.60	2.63	4.08	BDL	BDL
14-11-2022	58.6	29.1	2.45	4.11	BDL	BDL
17-11-2022	56.3	25.5	2.7	4.93	BDL	BDL
21-11-2022	57.9	24.4	2.33	4.23	BDL	BDL
24-11-2022	56.4	29.2	2.46	4.26	BDL	BDL
28-11-2022	51.4	30.4	2.96	4.19	BDL	BDL
01-12-2022	55.7	28.8	4.23	5.27	BDL	BDL
05-12-2022	61.8	34.6	4.47	5.41	BDL	BDL
08-12-2022	64.3	35.1	4.82	5.63	BDL	BDL
12-12-2022	57.3	26.9	4.26	4.96	BDL	BDL
15-12-2022	54.9	25.7	3.91	4.64	BDL	BDL
19-12-2022	53.2	30.5	3.69	4.75	BDL	BDL
22-12-2022	55.6	32.2	3.91	4.91	BDL	BDL
26-12-2022	64.7	35.3	4.34	5.22	BDL	BDL
29-12-2022	57.7	31.8	4.17	5.16	BDL	BDL
02-01-2023	58.3	34.4	4.16	5.36	BDL	BDL
05-01-2023	64.3	39.1	4.51	5.83	BDL	BDL
09-01-2023	67.1	40.2	4.67	5.92	BDL	BDL
12-01-2023	60.8	36.3	4.49	5.73	BDL	BDL
16-01-2023	64.3	37.4	4.66	5.84	BDL	BDL
19-01-2023	58.2	33.8	4.24	5.14	BDL	BDL
23-01-2023	59.7	32.9	4.35	5.23	BDL	BDL
26-01-2023	56.3	38.1	4.78	5.06	BDL	BDL
30-01-2023	60.4	36.2	4.91	5.18	BDL	BDL
02-02-2023	62.7	33.6	4.26	5.43	BDL	BDL
06-02-2023	65.1	35.1	4.33	5.62	BDL	BDL
08-02-2023	59.4	32.6	4.16	5.39	BDL	BDL
13-02-2023	57.2	30.5	4.07	5.11	BDL	BDL
16-02-2023	60.5	31.7	4.33	5.27	BDL	BDL
20-02-2023	58.3	29.3	4.17	5.43	BDL	BDL
23-02-2023	61.4	33.1	4.37	5.63	BDL	BDL

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Balarampuram (A5)						
Date	Parameters					
	PM₁₀	PM_{2.5}	SO₂	NO₂	CO	HC
	µg/m³	µg/m³	µg/m³	µg/m³	mg/m³	ppm
27-02-2023	63.6	34.7	4.25	5.28	BDL	BDL
02-03-2023	52.3	27.2	4.23	5.96	BDL	BDL
06-03-2023	72.6	37.5	4.89	5.78	BDL	BDL
09-03-2023	56.6	29.3	4.26	6.12	BDL	BDL
13-03-2023	68.3	35.2	4.12	6.36	BDL	BDL
16-03-2023	74.3	38.6	4.36	6.12	BDL	BDL
20-03-2023	66.9	34.2	4.02	5.48	BDL	BDL
23-03-2023	61.2	31.4	4.22	5.96	BDL	BDL
27-03-2023	52.5	27.8	4.89	6.23	BDL	BDL
30-03-2023	68.3	35.6	5.12	6.78	BDL	BDL
NAAQS 2009 Limits	100	60	80	80	4	-

BDL: Below Detectable Limit

HYR-3.5. Monthly Average Results of Ambient Air Quality Monitoring (October 2022 to March 2023)

Table 3.9: Monthly Average Results

Parameter, Unit	NAAQS 2009 Limits	Month	Venganoor (A1)			Port Site (A2)			Proposed Port Estate Area (A3)			Chani (A4)			Balarampuram (A5)		
			Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Particulate matter (size less than 10µm) or PM ₁₀ , µg/ m ³	100	Oct-22	56.2	51.4	45.6	64.3	58.6	51.8	57.2	51.6	48.3	59.4	52.0	42.3	60.3	53.9	49.7
		Nov-22	62.4	56.3	45.1	70.1	63.4	58.3	58.6	51.9	45.3	59.4	51.5	45.6	60.5	55.9	51.4
		Dec-22	61.3	54.1	47.5	77.8	72.1	61.7	57.2	53.0	48.1	61.2	54.5	47.9	64.7	58.4	53.2
		Jan-23	61.3	53.5	46.4	78.3	72.9	67.4	59.7	53.6	49.4	59.3	54.9	50.1	67.1	61.0	56.3
		Feb-23	63.1	58.4	52.9	79.6	72.3	65.2	59.3	56.2	50.3	61.4	57.8	53.7	65.1	61.0	57.2
		Mar-23	64.1	57.6	50.1	79.6	70.6	64.3	68.4	58.9	48.3	68.3	63.7	59.7	74.3	63.7	52.3
		Half Yearly	64.1	55.2	45.1	79.6	68.3	51.8	68.4	54.2	45.3	68.3	55.7	42.3	74.3	59.0	49.7
Particulate matter (size less than 2.5µm) or PM _{2.5} , µg/ m ³	60	Oct-22	28.4	25.8	23.3	34.6	30.7	26.3	29.2	27.0	25.3	30.4	27.3	24.4	32.6	28.5	25.9
		Nov-22	32.4	29.3	23.8	36.4	33.0	30.1	33.1	30.1	26.3	31.7	27.6	23.4	31.2	28.2	24.4
		Dec-22	34.5	28.2	23.1	40.3	37.2	34.4	31.6	27.0	21.7	34.8	28.6	24.6	35.3	31.2	25.7
		Jan-23	33.7	28.6	24.6	45.6	41.4	36.1	33.8	29.9	25.7	35.6	31.5	28.2	40.2	36.5	32.9
		Feb-23	34.5	31.7	28.1	47.3	41.2	36.3	32.6	29.5	26.4	29.5	27.2	24.1	35.1	32.6	29.3
		Mar-23	33.9	30.1	26.2	40.3	36.8	33.4	35.4	30.7	25.6	35.7	33.0	30.1	38.6	33.0	27.2
		Half Yearly	34.5	29.0	23.1	47.3	36.7	26.3	35.4	29.0	21.7	35.7	29.2	23.4	40.2	31.7	24.4
Sulphur dioxide (SO ₂), µg/ m ³	80	Oct-22	3.63	2.74	2.11	3.86	3.15	2.36	3.45	2.81	2.12	3.23	2.70	2.13	2.96	2.57	2.16
		Nov-22	3.23	2.87	2.46	4.12	3.16	2.46	3.65	3.00	2.19	3.98	2.79	2.15	3.86	2.69	2.16
		Dec-22	4.72	3.99	3.51	5.47	4.91	4.19	4.56	4.02	3.03	4.75	4.22	3.71	4.82	4.20	3.69
		Jan-23	4.67	4.04	3.62	5.62	5.17	4.85	4.41	3.92	3.46	4.43	4.03	3.59	4.91	4.49	4.16
		Feb-23	4.56	4.22	3.88	5.26	4.94	4.36	4.37	3.99	3.75	4.25	3.88	3.47	4.37	4.24	4.07
		Mar-23	4.56	4.20	4.02	5.86	5.03	4.36	4.96	4.32	4.02	4.96	4.38	4.01	5.12	4.46	4.02
		Half Yearly	4.72	3.68	2.11	5.86	4.39	2.36	4.96	3.68	2.12	4.96	3.67	2.13	5.12	3.78	2.16

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Parameter, Unit	NAAQS 2009 Limits	Month	Venganoor (A1)			Port Site (A2)			Proposed Port Estate Area (A3)			Chani (A4)			Balarampuram (A5)		
			Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min
Oxides of Nitrogen (NO _x), µg/m ³	80	Oct-22	5.23	4.23	3.56	4.78	4.08	3.11	4.96	4.06	3.46	4.75	4.30	3.96	4.97	4.13	3.58
		Nov-22	5.12	4.52	4.12	5.86	4.53	3.92	5.46	4.77	3.78	5.45	4.55	3.96	4.93	4.32	4.08
		Dec-22	5.87	5.10	4.49	5.91	5.52	4.86	5.72	5.20	4.56	5.94	5.34	4.59	5.63	5.11	4.64
		Jan-23	5.67	5.04	4.68	6.36	5.87	5.32	5.43	5.07	4.72	5.56	5.13	4.78	5.92	5.48	5.06
		Feb-23	5.91	5.45	5.11	6.12	5.82	5.38	5.25	5.11	4.91	5.34	4.81	3.87	5.63	5.40	5.11
		Mar-23	7.12	6.44	5.12	7.45	6.76	6.15	6.58	5.94	5.36	6.45	5.89	5.33	6.78	6.09	5.48
		Half Yearly	7.12	5.13	3.56	7.45	5.43	3.11	6.58	5.02	3.46	6.45	5.00	3.87	6.78	5.09	3.58
Carbon Monoxide (CO), mg/m ³	4	Oct-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Nov-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Dec-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Jan-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Feb-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Mar-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Half Yearly	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
Hydrocarbon (HC), ppm	-	Oct-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Nov-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Dec-22	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Jan-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Feb-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Mar-23	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--
		Half Yearly	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--	--	BDL	--

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HYR-3.6. Graphical representation of Half-Yearly Results (October-2022 to March-2023)

Figure 3.2: Respirable Particulate Matter (PM10)

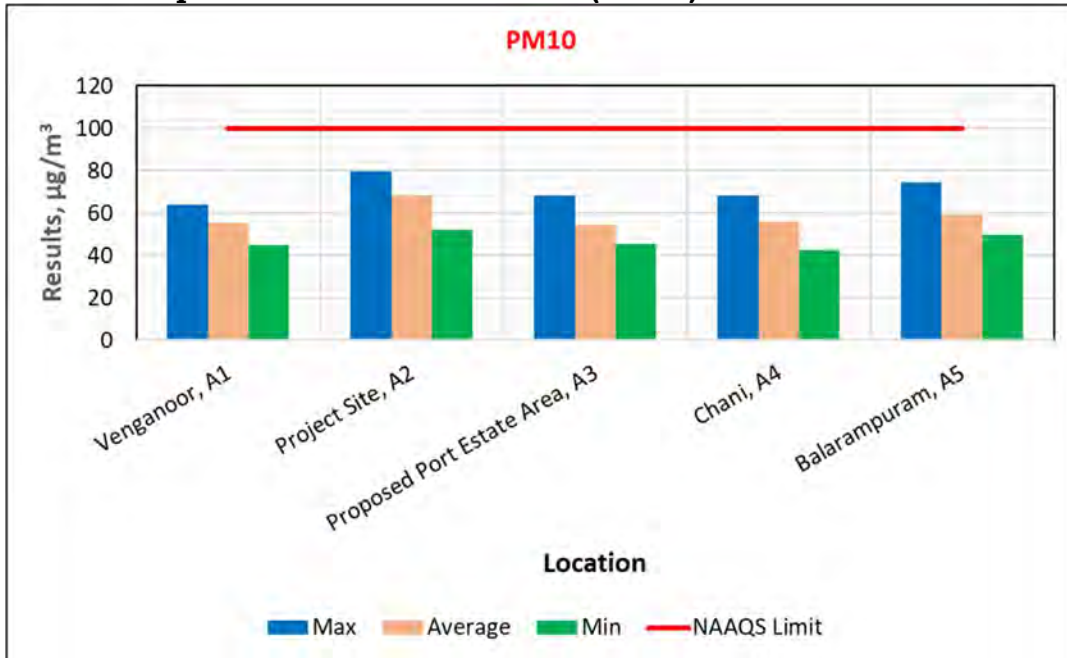


Figure 3.3: Fine Particulate matter (PM2.5)

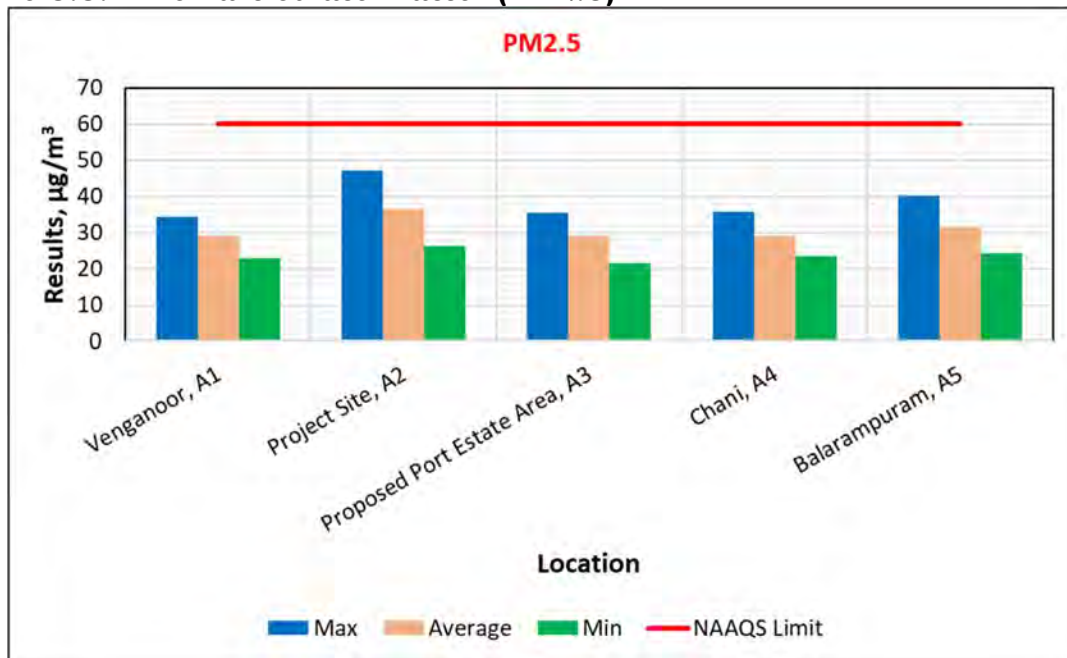


Figure 3.4: Sulphur Dioxide as SO₂

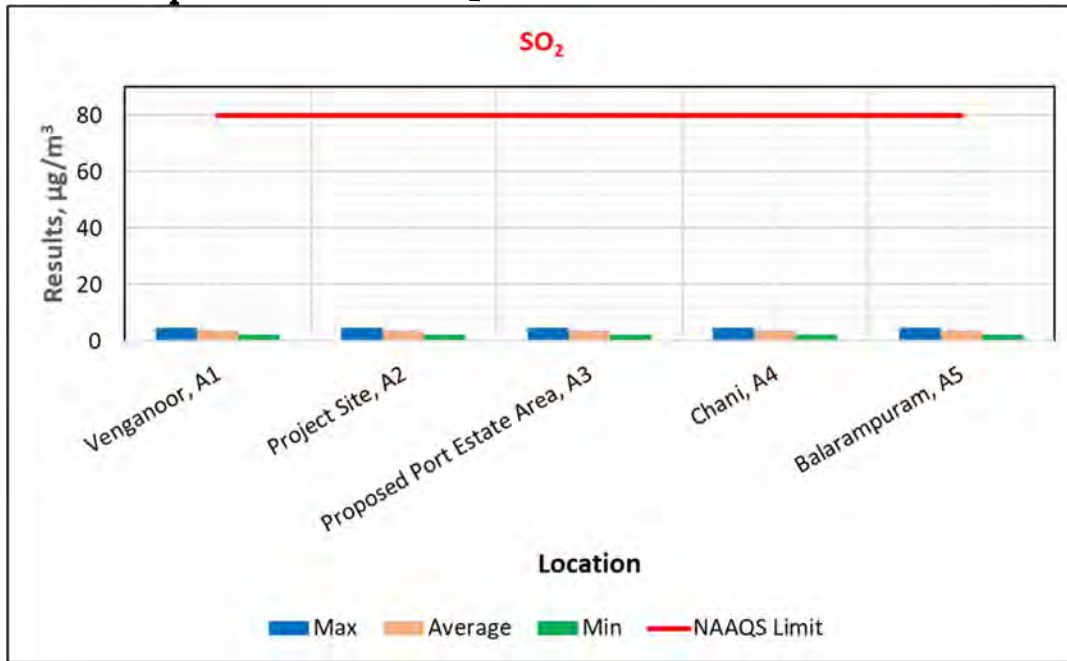
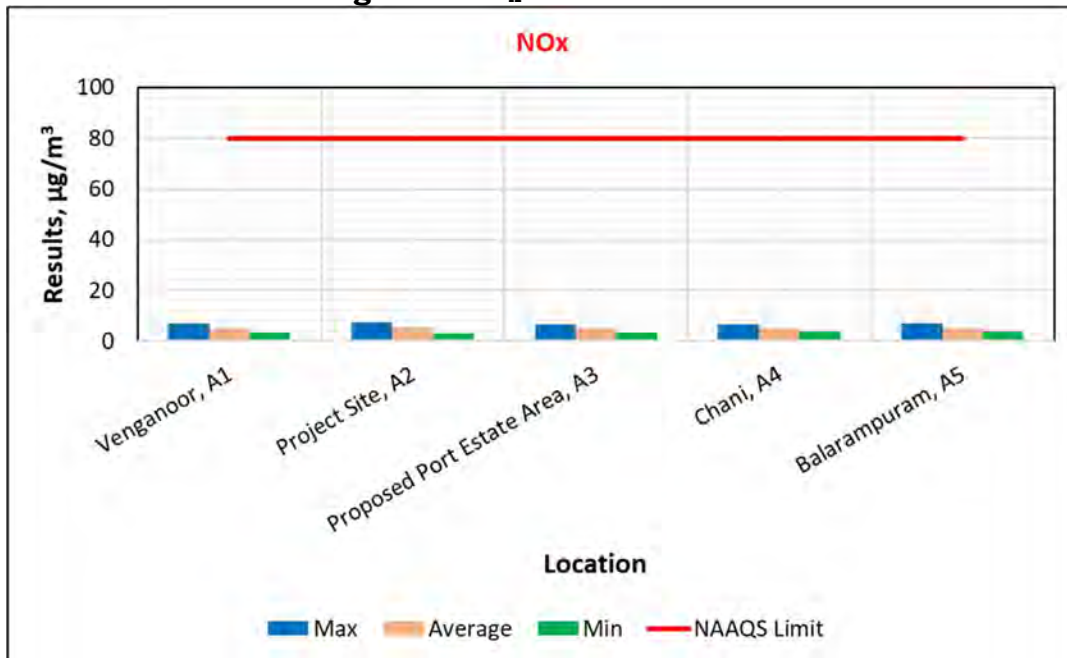


Figure 3.5: Oxides of Nitrogen as NO_x



HYR-3.7. Summary - Ambient Air Quality

During the period of October 2022 to March 2023, following is the summary of ambient air quality results:

a) At the location **Venganoor:**

- PM₁₀ was observed in the range between 45.1-64.1µg/m³ with an average of 55.2µg/m³
- PM_{2.5} was observed in the range between 23.1-34.5µg/m³ with an average of 29.0 µg/m³
- SO₂ was observed in the range between 2.11-4.72µg/m³ with an average of 3.68µg/m³
- NO₂ was observed in the range between 3.56 – 7.12µg/m³ with an average of 5.13µg/m³
- CO & HC were observed below detectable limits

b) At the location **Port Site:**

- PM₁₀ was observed in the range between 51.8-79.6µg/m³ with an average of 68.3 µg/m³
- PM_{2.5} was observed in the range between 26.3-47.3 µg/m³ with an average of 36.7µg/m³
- SO₂ was observed in the range between 2.36-5.86µg/m³ with an average of 4.39 µg/m³
- NO₂ was observed in the range between 3.11– 7.45µg/m³ with an average of 5.43µg/m³
- CO & HC were observed below detectable limits

c) At the location **Proposed Port Area:**

- PM₁₀ was observed in the range between 45.3-68.4µg/m³ with an average of 54.2µg/m³
- PM_{2.5} was observed in the range between 21.7-35.4µg/m³ with an average of 29.0µg/m³

- SO₂ was observed in the range between 2.12-4.96µg/m³ with an average of 3.68µg/m³
 - NO₂ was observed in the range between 3.46 – 6.58µg/m³ with an average of 5.02µg/m³
 - CO & HC were observed below detectable limits
- d) At the location **Chani**:
- PM₁₀ was observed in the range between 42.3-68.3µg/m³ with an average of 55.7µg/m³
 - PM_{2.5} was observed in the range between 23.4-35.7 µg/m³ with an average of 29.2 µg/m³
 - SO₂ was observed in the range between 2.13-4.96 µg/m³ with an average of 3.67 µg/m³
 - NO₂ was observed in the range between 3.87–6.45 µg/m³ with an average of 5.00 µg/m³
 - CO & HC were observed below detectable limits
- e) At the location **Balarampuram**:
- PM₁₀ was observed in the range between 49.7-74.3 µg/m³ with an average of 59.0 µg/m³
 - PM_{2.5} was observed in the range between 24.4-40.2 µg/m³ with an average of 31.7 µg/m³
 - SO₂ was observed in the range between 2.16-5.12 µg/m³ with an average of 3.78 µg/m³
 - NO₂ was observed in the range between 3.58 – 6.78 µg/m³ with an average of 5.09 µg/m³
 - CO & HC were observed below detectable limits
- f) Overall Comparison of Results from **all Locations**:
- PM₁₀ was observed a maximum of 79.6 µg/m³ at Port Site and a minimum of 42.3 µg/m³ at Chani. The overall average of all locations is 58.5 µg/m³

- PM_{2.5} was observed a maximum of 47.3 µg/m³ at Port Site and a minimum of 21.7 µg/m³ at Proposed Port Estate Area. The overall average of all locations is 31.1 µg/m³
- SO₂ was observed a maximum of 5.86 µg/m³ at Port Site and a minimum of 2.11 µg/m³ at Venganoor. The overall average of all locations is 3.84 µg/m³
- NO₂ was observed a maximum of 7.45 µg/m³ at Port Site and a minimum of 3.11 µg/m³ at Port Site. The overall average of all locations is 5.13 µg/m³
- CO & HC were observed below detectable limits at all times at all locations.

The obtained results were compared with National Ambient Air Quality Standards (NAAQS), 2009. The results were well within the limits on all monitoring days at all 5 locations during the monitoring months (from October 2022 to March 2023).

Table 3.10: Overall Summary of Results from all Locations

Parameter	Unit	NAAQS 2009 Limits	Max	Avg.	Min
PM10	µg/m ³	100	79.6	58.5	42.3
PM 2.5	µg/m ³	60	47.3	31.1	21.7
SO ₂	µg/m ³	80	5.86	3.84	2.11
NO _x	µg/m ³	80	7.45	5.13	3.11
CO	mg/m ³	4	BDL	BDL	BDL
HC	ppm	--	BDL	BDL	BDL

HYR-4	Ambient Noise Monitoring
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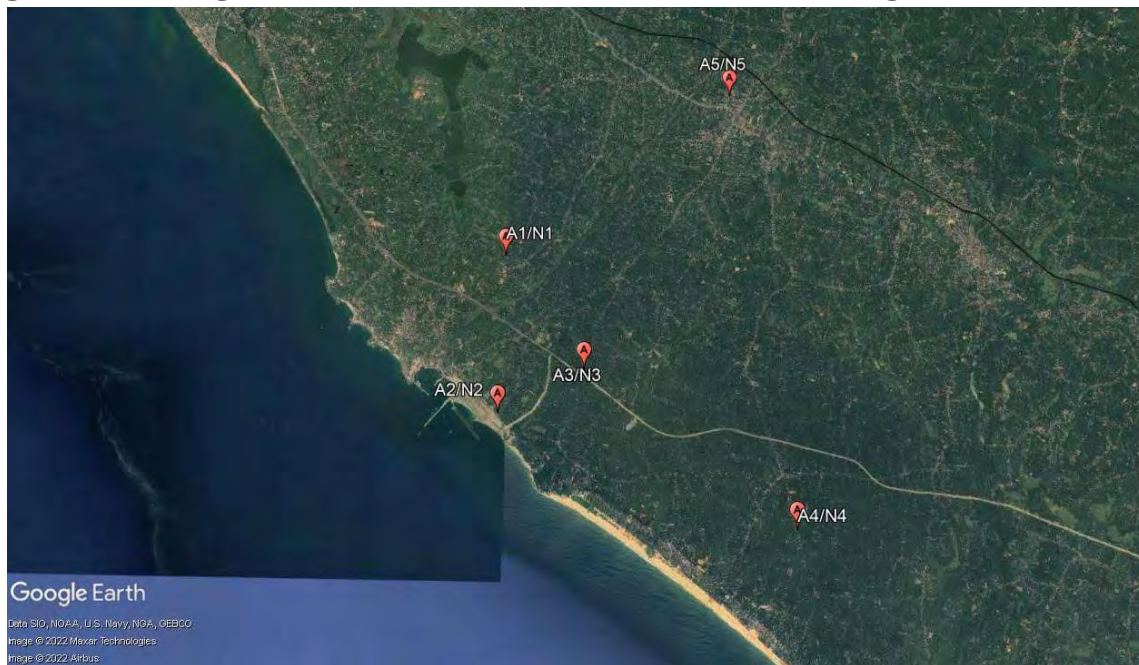
HYR-4.1. Ambient Noise Monitoring location details

This section describes the sampling location, methodology adopted for monitoring ambient noise and analysis of monitored results. Ambient Noise Monitoring during October 2022 to March 2023 was carried out at Venganoor, Port Site, Proposed Port Estate Area, Chani and Balarampukuram. Classification of locations as per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) are as below.

Table 4.1: Coordinates of Ambient Noise Monitoring Locations

Location	Legend	Area Type	Latitude	Longitude
Venganoor	N1	Residential	8°23'55.10"N	77°00'12.19"E
Port Site	N2	Industrial	8°22'13.73"N	77°00'08.39"E
Proposed Port Estate Area	N3	Residential	8°22'41.37"N	77°01'03.17"E
Chani	N4	Residential	8°21'02.11"N	77°03'16.59"E
Balarampukuram	N5	Commercial	8°25'43.73"N	77°02'39.99"E

Figure 4.1: Google Earth View of Ambient Noise Monitoring Locations



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HYR-4.2. Methodology of Sampling

Ambient Noise Monitoring is being carried out as per IS 9989:1981.

HYR-4.3. Ambient Noise Standards

The results obtained were compared with the standards as per the Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) given in the Table 4.2.

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

HYR-4.4. Ambient Noise Monitoring Results for the period from October 2022 to March 2023.

Table 4.3: Location – Venganoor, N1 - (Residential Area)

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Oct-22	04-10-2022	64.2	46.9	40.7	34.8	52.8	41.1
	18-10-2022	63.8	45.1	39.6	34.1	52.3	40.9
Nov-22	04-11-2022	62.7	47.3	41.9	31.4	53.4	40.7
	18-11-2022	61.5	46.4	38.7	33.5	52.9	41.3
Dec-22	02-12-2022	64.1	49.8	42.1	30.6	52.1	41.8
	16-12-2022	66.5	48.5	40.6	32.9	54.3	42.7
Jan-23	03-01-2023	66.9	54.6	38.5	33.6	54.8	48.7
	20-01-2023	67.2	55.3	37.4	32.7	54.6	47.6

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Feb-23	03-02-2023	76.4	62.9	36.5	32.9	54.0	37.2
	17-02-2023	74.3	63.1	37.1	35.9	51.6	44.5
Mar-23	05-03-2023	83.7	70.6	34.7	32.5	50.7	43.8
	19-03-2023	89.8	71.2	34.3	32.5	54.9	43.7
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

Table 4.4: Location – Port Site, N2 - (Industrial Area)

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Oct-22	05-10-2022	68.3	56.4	50.2	44.3	58.4	52.6
	19-10-2022	66.9	54.2	49.1	44.7	57.2	51.8
Nov-22	05-11-2022	72.8	59.6	51.1	42.8	59.6	53.5
	19-11-2022	70.7	58.4	48.8	43.7	58.6	52.7
Dec-22	06-12-2022	75.3	61.7	52.9	43.5	61.4	56.3
	20-12-2022	89.8	65.3	58.2	46.4	67.5	58.6
Jan-23	04-01-2023	88.2	81.6	48.5	47.1	65.6	59.8
	21-01-2023	87.8	79.3	47.4	45.6	63.1	60.0
Feb-23	04-02-2023	88.9	76.2	47.8	44.7	64.2	57.1
	18-02-2023	86.3	71.4	48.2	43.1	62.1	55.4
Mar-23	07-03-2023	93.9	80.4	45.3	40.3	66.8	61.4
	21-03-2023	88.2	83.6	45.2	44.1	62.8	59.7
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						75	70

Table 4.5: Location – Proposed Port Estate Area, N3 - (Residential Area)

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Oct-22	07-10-2022	60.4	44.1	38.5	33.6	51.6	39.7
	21-10-2022	59.8	45.4	38.1	34.2	52.4	40.5
Nov-22	08-11-2022	63.5	47.3	37.1	31.8	54.2	40.1
	22-11-2022	62.7	48.5	36.7	32.9	53.5	39.1
Dec-22	07-12-2022	66.2	48.5	39.6	31.5	53.7	42.5
	21-12-2022	65.7	47.9	34.4	31.1	52.6	40.1
Jan-23	06-01-2023	69.1	56.8	36.3	32.2	54.1	45.3
	24-01-2023	81.4	76.3	40.7	36.2	59.5	47.7
Feb-23	14-02-2023	75.1	69.4	40.0	33.7	53.6	44.0
	28-02-2023	70.5	68.5	37.3	32.7	53.9	44.1
Mar-23	08-03-2023	79.9	70.9	36.8	32.7	54.4	43.6
	22-03-2023	82.5	76.9	37.4	32.5	54.2	44.1
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

Table 4.6: Location – Chani, N4 - (Residential Area)

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Oct-22	11-10-2022	58.9	44.7	38.8	34.1	51.1	38.2
	25-10-2022	59.3	44.5	39.6	34.2	51.8	39.6
Nov-22	09-11-2022	61.3	46.1	37.9	32.7	52.4	37.5
	23-11-2022	60.9	46.3	38.1	33.6	51.1	38.3
Dec-22	09-12-2022	67.5	48.4	35.3	30.5	54.3	39.8
	23-12-2022	65.1	47.3	36.2	32.6	53.7	40.3
Jan-23	10-01-2023	68.3	59.7	35.3	32.5	53.9	43.1

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Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
	25-01-2023	70.6	63.5	36.1	31.6	54.5	44.6
Feb-23	07-02-2023	77.4	70.4	36.6	31.8	53.2	43.7
	21-02-2023	75.5	70.4	37.8	32.2	53.6	43.0
Mar-23	14-03-2023	86.3	73.2	34.2	31.8	53.4	43.8
	28-03-2023	82.9	73.9	36.5	32.2	54.8	43.7
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						55	45

Table 4.7: Location – Balarampuram, N5 - (Commercial Area)

Month	Date	L _{max} Day time	L _{max} Night time	L _{min} Day time	L _{min} Night time	Leq Day time	Leq Night time
		dB (A)					
Oct-22	12-10-2022	63.2	45.2	40.4	36.1	54.2	46.1
	26-10-2022	62.4	43.8	40.8	36.6	53.8	44.7
Nov-22	11-11-2022	66.1	54.6	44.9	38.3	55.9	47.2
	25-11-2022	65.7	53.6	43.1	37.4	54.3	45.9
Dec-22	13-12-2022	64.9	49.1	40.3	33.7	54.1	45.4
	27-12-2022	68.2	54.1	46.3	34.2	59.8	51.5
Jan-23	13-01-2023	76.4	69.1	38.6	34.3	58.5	48.7
	27-01-2023	77.5	67.9	37.1	35.4	59.4	49.3
Feb-23	11-02-2023	81.0	73.3	40.5	35.1	59.2	49.1
	25-02-2023	81.3	73.2	40.1	36.3	58.3	50.4
Mar-23	17-03-2023	81.6	78.6	39.8	33.5	58.0	50.2
	31-03-2023	86.0	76.3	40.7	36.1	57.8	50.9
As per the Noise Pollution (Regulation & Control) Rules, 2000 [Rules 3 (1) and 4(1)]						65	55

HYR-4.5. Half Yearly Average Results of Ambient Noise Monitoring (October-2022 to March-2023)

Table 4.8: Half Yearly Average Results

Parameter		Venganoor (N1)	Proposed Port Estate Area (N3)	Chani (N4)	Port Site (N2)	Balarampuram (N5)
		Residential	Residential	Residential	Industrial	Commercial
L_{max} Day time dB (A)	Max	89.8	82.5	86.3	93.9	86.0
	Min	61.5	59.8	58.9	66.9	43.8
	Avg.	70.1	69.7	69.5	81.4	67.2
L_{max} Night time dB (A)	Max	71.2	76.9	73.9	83.6	78.6
	Min	45.1	44.1	44.5	54.2	43.8
	Avg.	55.1	58.4	57.4	69.0	61.6
L_{min} Day time dB (A)	Max	42.1	40.7	39.6	58.2	46.3
	Min	34.3	34.4	34.2	45.2	37.1
	Avg.	38.5	37.7	36.9	49.4	41.1
L_{min} Night time dB (A)	Max	35.9	36.2	34.2	47.1	38.3
	Min	30.6	31.1	30.5	40.3	33.5
	Avg.	33.1	32.9	32.5	44.2	35.6
Leq Day time dB (A)	Max	54.9	59.5	54.8	67.5	59.8
	Min	50.7	51.6	51.1	57.2	53.8
	Avg.	53.2	54.0	53.2	62.3	56.9
	Limit	55	55	55	75	65
Leq Night time dB (A)	Max	48.7	47.7	44.6	61.4	51.5
	Min	37.2	39.1	37.5	51.8	44.7
	Avg.	42.8	42.6	41.3	56.6	48.3
	Limit	45	45	45	70	55

HYR-4.6. Graphical Representation of Half Yearly Results (October-2022 to March-2023)

Figure 4.2: Residential Area Noise Level

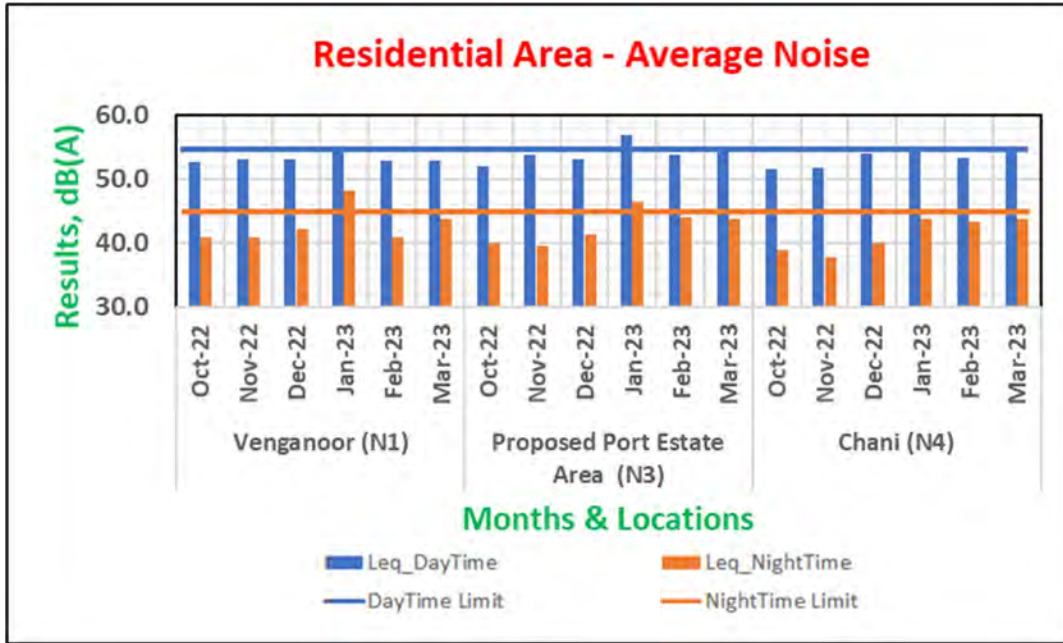


Figure 4.3: Industrial Area Noise Level

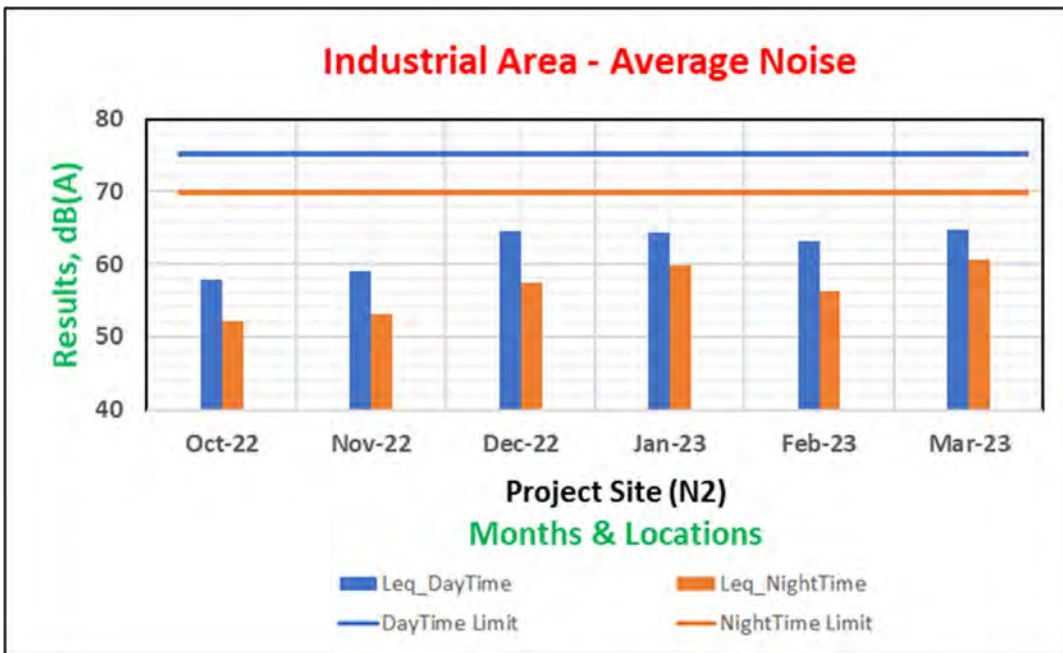
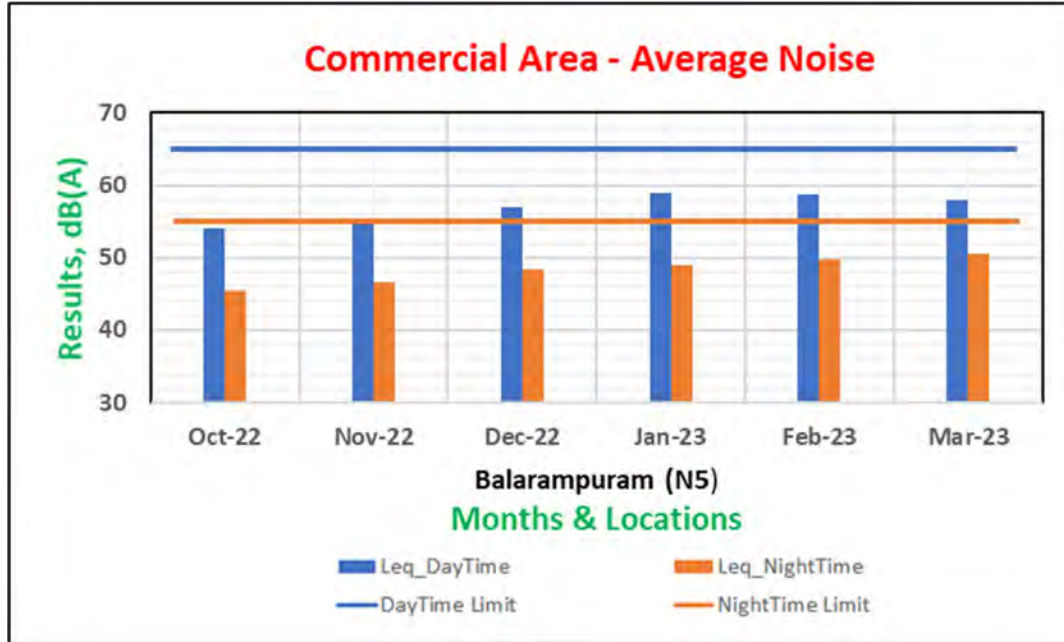


Figure 4.4: Commercial Area Noise Level



HYR-4.7. Summary - Ambient Noise Monitoring

During the period from October 2022 to March 2023, the following is the average noise levels observed.

Table 4.9: Summary - Ambient Noise Monitoring

Parameter		Venganoor (N1)	Proposed Port Estate Area (N3)	Chani (N4)	Port Site (N2)	Balarampuram (N5)
		Residential	Residential	Residential	Industrial	Commercial
		Day Time (Limit: 55) Night Time (Limit: 45)			Day Time (Limit: 75) Night Time (Limit: 70)	Day Time (Limit: 65) Night Time (Limit: 55)
Leq Day time dB (A)	Avg	53.2	54.0	53.2	62.3	56.9
Leq Night time dB (A)	Avg	42.8	42.6	41.3	56.6	48.3

- The average Leq values observed at day time and night time are 53.2 dB(A) and 42.8 respectively at Venganoor

- The average Leq values observed at day time and night time are 62.3 dB(A) and 56.6 respectively at Port Site
- The average Leq values observed at day time and night time are 54.0 dB(A) and 42.6 respectively at Proposed Port Estate Area
- The average Leq values observed at day time and night time are 53.2 dB(A) and 41.3 respectively at Chani
- The average Leq values observed at day time and night time are 56.9 dB(A) and 48.3 respectively at Balarampuram

The results obtained were compared with Noise Pollution (Regulation & Control) Rule, 2000 (Rule 3(1) and 4(1)) and it is observed that noise readings were within limits during the monitoring months (from October 2022 to March 2023) except Proposed Port Estate on 24-01-2023 during both Day time and Night time due to the noise from the Loud Speaker from the nearby Temple on account of “Ulsavam” and the Night time readings of Venganoor on both monitoring days (03-01-2023 & 20-01-2023) due to the progress of house-revamping work.

HYR-5	Marine Water & Sediment Analysis
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HYR-5.1. Marine Water and Sediment Sampling Location Details:

This section 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 from October 2022 to March 2023 carried out at different locations such as Near Kovalam Beach, Proposed Dredging site, South of Break Water, Port Basin, Inner Approach Channel and Kovalam Beach.

Table 5.1: Coordinates of Marine Water and Sediment Sampling Locations

Location	Legend	Latitude	Longitude
Near Kovalam Beach	M1/MS1	8°22'49.29"N	76°58'40.77"E
Proposed Dredging Site	M2/MS2	8°22'31.11"N	76°58'57.92"E
Port Basin	M3/MS3	8°22'06.96"N	76°59'27.85"E
South of Breakwater	M4/MS4	8°21'51.07"N	77°00'00.21"E
Inner Approach Channel	M5/MS5	8°21'12.68"N	77°00'35.14"E
Kovalam Beach	M6/MS6	8°23'08.16"N	76°58'26.09"E

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



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HYR-5.2. Methodology of Sampling and Analysis

Table 5.2: Sampling and Analysis Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Marine Water Analysis				
1.	Temperature	°C	1	IS 3025 Part 9 : 1984 RA 2017
2.	pH Value	-	1	IS 3025 Part 11: 1983 RA 2017
3.	Turbidity	N.T.U.	0.1	IS 3025 Part 10: 1984 RA 2017
4.	Electrical Conductivity (at 25°C)	µmho/cm	1	IS 3025 Part 14:1984 RA 2019
5.	Total Suspended Solids	mg/L	1	IS 3025 Part 17: 1984 RA 2017
6.	Total Dissolved Solids	mg/L	1	IS 3025 Part 16: 1984 RA 2017
7.	Dissolved Oxygen	mg/L	0.2	IS 3025 Part 38:1989 RA 2019
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	IS 3025 Part 44:1993 RA 2019
9.	Floating Materials – Oil, Grease and Scum (Including Petroleum Products)	mg/L	1	IS 3025 Part 39:1991 RA 2019
10.	Nitrite (as NO ₂)	mg/L	0.02	IS 3025 Part 34:1988 RA 2019
11.	Nitrate (as NO ₃)	mg/L	1	APHA 23 rd Edition 4500 -NO ₃ B: 2017
12.	Phenolic Compounds (as C ₆ H ₅ OH)	mg/L	0.001	IS 3025 Part 43: 1992 RA 2019
13.	Ammonical Nitrogen (as NH ₃ -N)	mg/L	1	IS 3025 Part 34:1988 RA 2019
14.	Total Nitrogen (as N)	mg/L	1	IS 3025 Part 34:1988 RA 2019
15.	Total Phosphorous (as P)	mg/L	0.01	IS 3025 Part 31 :1988 RA2019
16.	Reactive Phosphorous	mg/L	0.01	IS 3025 Part 31 :1988 RA2019
17.	Polycyclic Aromatic Hydrocarbon	mg/L	0.000005	SEAAL/INS/RWM/SOP/02
18.	Salinity	ppt	0.0036	APHA 23 rd Edition 2520 – B : 2017
19.	Total Chlorophyll	mg/m ³	0.1	APHA 23 rd Edn:10200.H
20.	Total Coliforms	MPN/ 100 ml	2	IS 1622: 1981
21.	Faecal Coliforms	MPN /100ml	2	IS 1622: 1981
22.	Phytoplanktons	No./100ml	--	APHA 23 rd Edn:10200.F
23.	Zooplanktons	No./100ml	--	APHA 23 rd Edn:10200.G
Sediment Analysis				
1.	Texture	-	--	SEAAL/EN/SLS/SOP/14
2.	Organic Matter	%	0.1	IS 2720 Part 22:1972
3.	Total Phosphorus (as P)	mg/kg	10	IS 10158: 1982

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Sr. No.	Parameter	Unit	Detection Limit	Method Reference
4.	Aluminium (as Al)	mg/kg	5	USEPA 7000B : 2017
5.	Chromium (as Cr)	mg/kg	5	USEPA 7000B : 2007
6.	Copper (as Cu)	mg/kg	1.5	EPA 7000B : 2007
7.	Iron (as Fe)	mg/kg	2.5	USEPA 7000B : 2007
8.	Lead (as Pb)	mg/kg	5	EPA 7000B : 2007
9.	Manganese (as Mn)	mg/kg	1.5	EPA 7000B : 2007
10.	Mercury (as Hg)	mg/kg	0.10	SEAAL/EN/SLS/SOP/13
11.	Zinc (as Zn)	mg/kg	1	USEPA 7000B : 2007
12.	Nickel (as Ni)	mg/kg	2.5	EPA 7000B : 2007
13.	Benthic Organism	No./m ²	1	APHA 23 rd Edn:10750.B

HYR-5.3. Marine Water Standards

As per the Environment (Protection) Rules, 1986 Schedule I.

Table 5.3: Marine Water Standard

Parameter	Unit	# E(P)A Rules, 1986
pH Value	-	6.5-9.0
Dissolved Oxygen	mg/L	3.0 mg/L or 40% saturation value; whichever is higher
Colour and Odour	-	No visible colour or offensive odour
Floating Materials (Oil, Grease and Scum) (Including Petroleum Products)	mg/L	Max. 10
Faecal Coliforms	MPN/100ml	Max. 500
Biochemical Oxygen Demand (3 days, 27°C)	mg/L	Max. 5
#: Environment (Protection) Rules, 1986, Schedule I, Table 1.4, Primary Water Quality Criteria for Class – IV Water (For Harbour Waters).		

HYR-5.4. Marine Water Analysis Results for the period from October 2022 to March 2023.

Table 5.4: Marine Water Analysis Results

Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)			
1	Temperature (°C)	Oct-22	High tide	26.5	27.1	26.5	24.6	26.5	27.1		
			Low tide	25.4	24.5	25	24.2	25.1	26.2		
		Nov-22	High tide	26.9	28.4	24.9	26.8	28.2	27.5		
			Low tide	28.7	29.5	27.2	28.5	29.0	28.9		
		Dec-22	High tide	25.4	25.9	25.2	25.4	24.9	25.7		
			Low tide	27.7	27.8	27.6	27.8	27.3	27.6		
		Jan-23	High tide	26.8	26.3	26.9	26.5	26.1	25.7		
			Low tide	27.3	27.4	28.1	28.6	27.8	27.2		
		Feb-23	High tide	28.8	28.5	29.1	28.6	26.4	28.6		
			Low tide	29.1	26.5	28.1	28.1	28.3	28.4		
		Mar-23	High tide	28.8	27.5	28.5	28.8	29.1	28.3		
			Low tide	29.1	26.5	27.6	28.1	26.7	27.3		
		2	Colour	Oct-22	High tide	1	1	1	1	1	1
					Low tide	1	1	1	1	1	1
Nov-22	High tide			1	1	1	1	1	1		
	Low tide			1	1	1	1	1	1		
Dec-22	High tide			1	1	1	1	1	1		
	Low tide			1	1	1	1	1	1		
Jan-23	High tide			1	1	1	1	1	1		
	Low tide			1	1	1	1	1	1		
Feb-23	High tide			1	1	1	1	1	1		

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)	
3	pH Value	Mar-23	Low tide	1	1	1	1	1	
			High tide	1	1	1	1	1	
			Low tide	1	1	1	1	1	
		Oct-22	High tide	7.77	7.78	7.78	7.75	7.8	7.76
			Low tide	7.78	7.68	7.77	7.51	7.81	7.76
		Nov-22	High tide	7.88	8	8.02	8.03	7.94	8.04
			Low tide	8.07	8.01	8.06	8.1	7.98	8.06
		Dec-22	High tide	7.73	7.91	7.88	7.91	7.87	7.86
			Low tide	7.92	7.98	7.93	7.95	7.99	7.91
		Jan-23	High tide	7.88	7.74	7.81	7.82	7.82	7.65
			Low tide	8.01	7.86	7.85	7.86	7.89	7.74
		Feb-23	High tide	7.94	7.97	8.01	7.87	7.98	7.91
			Low tide	7.96	8	8.05	7.98	7.98	7.98
		Mar-23	High tide	7.87	7.94	7.83	7.96	7.95	7.84
			Low tide	7.85	7.96	7.86	7.99	7.98	7.91
4	Turbidity (N.T.U.)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)	
5	Electrical Conductivity (at 25°C) (µmho/cm)	Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Oct-22	High tide	63110	63100	63030	63120	63310	63410
			Low tide	63210	63560	63980	63630	63490	63970
		Nov-22	High tide	62980	63500	63110	63200	63100	63540
			Low tide	63800	63850	63800	63950	63500	63890
		Dec-22	High tide	61700	61130	61750	61730	61490	61950
			Low tide	62160	61560	61930	62220	61870	62100
		Jan-23	High tide	58380	58800	58630	58720	58280	58120
			Low tide	58620	58920	58870	58820	58340	58840
		Feb-23	High tide	54140	56315	55090	56680	55540	55150
			Low tide	54210	56460	55520	56955	55920	55620
		Mar-23	High tide	50090	50060	50410	50210	50390	50400
			Low tide	50110	50200	50520	50890	50940	50800
6	Total Suspended Solids (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)	
7	Total Dissolved Solids (mg/L)	Oct-22	Low tide	BDL	BDL	BDL	BDL	BDL	BDL
			High tide	40940	40945	40950	40955	41120	41140
		Nov-22	Low tide	41010	41230	41510	41280	41220	41500
			High tide	40920	41260	41000	41050	40995	41280
		Dec-22	Low tide	41450	41480	41450	41540	41110	41500
			High tide	40085	39720	40125	40110	39940	40025
		Jan-23	Low tide	40380	39990	40245	40420	40180	40340
			High tide	37920	38210	38080	38140	37850	37750
		Feb-23	Low tide	38080	38260	38250	38210	37900	38210
			High tide	35560	36700	35540	35920	35840	35580
		Mar-23	Low tide	35610	36780	35820	36110	36078	35890
			High tide	32548	32530	32750	32625	32740	33400
			Low tide	32560	32610	32820	33060	33108	34310
			High tide	6.9	7.1	6.8	7.1	6.8	6.8
8	Dissolved Oxygen (mg/L)	Oct-22	Low tide	7.1	7.2	7.1	7.2	7.1	6.9
			High tide	6.8	6.9	7.1	6.8	6.8	6.9
		Nov-22	Low tide	6.9	6.9	7.2	6.9	6.9	7.1
			High tide	6.9	6.8	6.9	6.9	7.1	6.9
		Dec-22	Low tide	7.1	6.9	7.1	7.2	7.1	6.9
			High tide	6.8	6.9	6.8	7.1	6.9	6.8
		Jan-23	Low tide	7.1	7.1	7.2	7.2	7.2	6.9
			High tide	6.8	7	7	7.1	6.8	7.1
		Feb-23	Low tide	6.9	7.2	7.1	7.1	7.1	7.2
			High tide	6.9	6.8	6.9	6.8	6.9	6.8
		Mar-23	Low tide	7.1	6.9	7.2	6.9	7.2	6.9

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)			
9	Biochemical Oxygen Demand (3 days, 27°C) (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		10	Floating Materials (Oil, Grease and Scum) (Including Petroleum Products) (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
					Low tide	BDL	BDL	BDL	BDL	BDL	BDL
Nov-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dec-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Jan-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Feb-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Mar-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
11				Oct-22	High tide	0.02	0.03	0.04	0.04	0.03	0.04

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)			
	Nitrite (as NO ₂) (mg/L)	Nov-22	Low tide	0.05	0.05	0.08	0.05	0.04	0.08		
			High tide	0.02	0.04	0.03	0.04	0.02	0.08		
		Dec-22	Low tide	0.03	0.08	0.09	0.1	0.05	0.1		
			High tide	0.05	0.05	0.02	0.07	0.02	0.02		
		Jan-23	Low tide	0.09	0.07	0.04	0.09	0.04	0.08		
			High tide	BDL	0.02	0.050	0.040	0.020	0.040		
		Feb-23	Low tide	BDL	0.05	0.060	0.06	0.020	0.060		
			High tide	0.08	0.04	BDL	0.070	0.080	0.050		
		Mar-23	Low tide	0.09	0.07	BDL	0.09	0.100	0.070		
			High tide	0.03	0.02	BDL	0.04	0.05	0.04		
			Low tide	0.05	0.07	BDL	0.06	0.08	0.08		
			High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
12	Nitrate (as NO ₃) (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		13		Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
					Low tide	BDL	BDL	BDL	BDL	BDL	BDL

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)			
	Phenolic Compounds (as C ₆ H ₅ OH) (mg/L)	Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
		14	Ammonical Nitrogen (as NH ₃ -N) (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL
					Low tide	BDL	BDL	BDL	BDL	BDL	BDL
Nov-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dec-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Jan-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Feb-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Mar-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL	
15	Total Nitrogen (as N)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)		
	(mg/L)		Low tide	BDL	BDL	BDL	BDL	BDL		
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL		
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL		
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL		
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL		
16	Total Phosphorous (as P) (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL		
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		17	Reactive Phosphorous (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL
					Low tide	BDL	BDL	BDL	BDL	BDL
Nov-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)				
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL			
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL			
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
		18	Polycyclic Aromatic Hydrocarbon (mg/L)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
					Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
				Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
					Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dec-22	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Jan-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Feb-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Mar-23	High tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide			BDL	BDL	BDL	BDL	BDL	BDL	BDL		
19	Salinity (ppt)	Oct-22	High tide	34.277	34.271	34.228	34.283	34.399	34.46			
			Low tide	34.338	34.552	34.81	34.595	34.509	34.804			
		Nov-22	High tide	34.072	34.389	34.151	34.206	34.145	34.413			
			Low tide	34.572	34.603	34.572	34.664	34.389	34.627			
		Dec-22	High tide	34.558	34.198	34.589	34.577	34.425	34.716			

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Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)			
		Jan-23	Low tide	34.848	34.469	34.703	34.886	34.665	34.81		
			High tide	33.760	34.033	33.922	33.981	33.695	33.590		
		Feb-23	Low tide	33.916	34.111	34.079	34.046	33.734	34.059		
			High tide	33.144	33.475	33.307	33.746	33.542	33.452		
		Mar-23	Low tide	33.196	33.582	33.627	33.951	33.725	33.702		
			High tide	33.118	33.096	33.356	33.207	33.341	33.348		
			Low tide	33.133	33.200	33.438	33.714	33.751	33.646		
		20	Total Chlorophyll (mg/m ³)	Oct-22	High tide	0.5	0.3	0.5	0.4	0.4	0.4
					Low tide	0.7	0.7	0.7	0.6	0.8	0.7
				Nov-22	High tide	0.4	0.5	0.4	0.6	0.5	0.6
					Low tide	0.5	0.8	0.5	0.8	0.8	0.8
				Dec-22	High tide	0.6	0.4	0.6	0.5	0.4	0.4
Low tide	0.8				0.8	0.7	0.7	0.5	0.6		
Jan-23	High tide			0.5	0.5	0.5	0.4	0.5	0.4		
	Low tide			0.7	0.6	0.6	0.5	0.8	0.6		
Feb-23	High tide			0.4	0.6	0.5	0.6	0.6	0.4		
	Low tide			0.7	0.7	0.8	0.8	0.7	0.5		
Mar-23	High tide			0.6	0.4	0.6	0.4	0.6	0.4		
	Low tide			0.8	0.5	0.7	0.8	0.7	0.5		
21	Total Coliforms (MPN Index/100 mL)	Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL		
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL		

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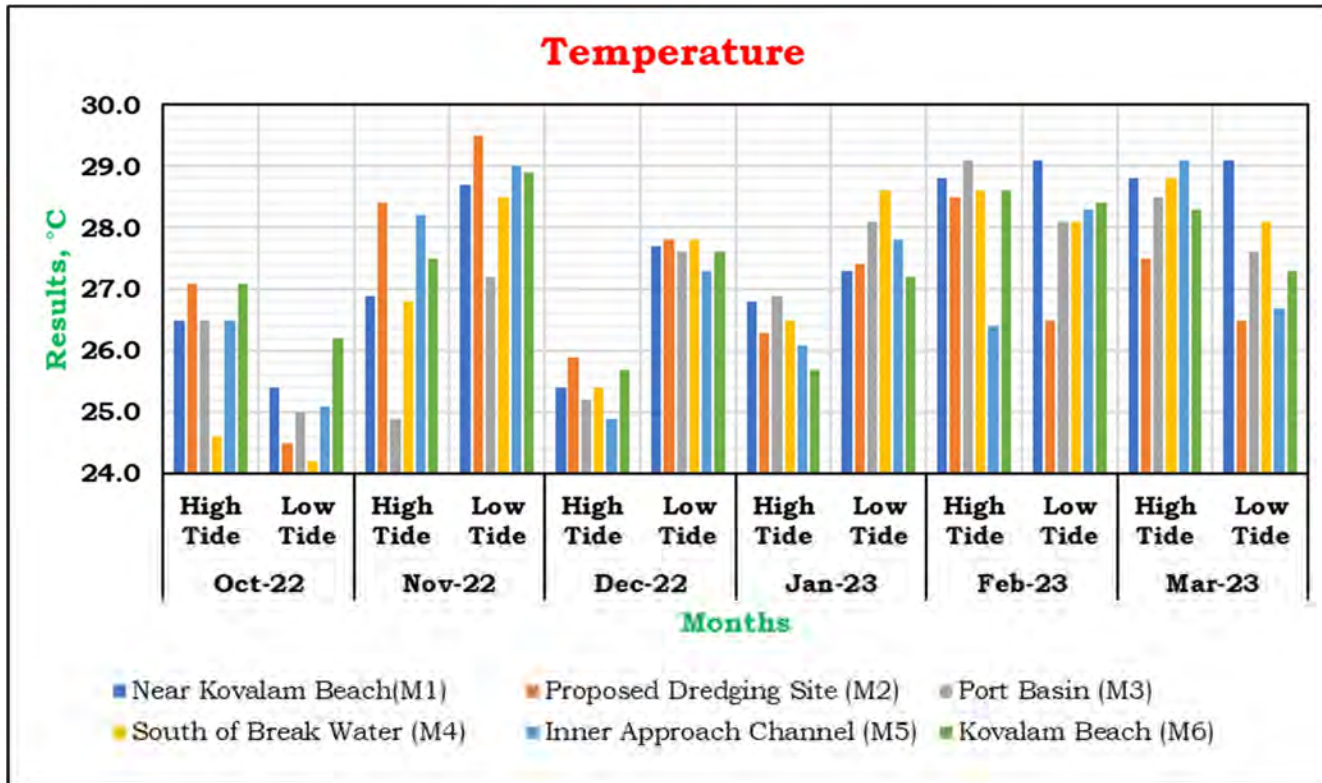
Sl. No.	Parameter /unit	Month/Tide	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)		
		Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	
		Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Oct-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Nov-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
		Dec-22	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
			Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Jan-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Feb-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Mar-23	High tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
	Low tide	BDL	BDL	BDL	BDL	BDL	BDL	BDL		

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HYR-5.5. Graphical representation of Results for marine water

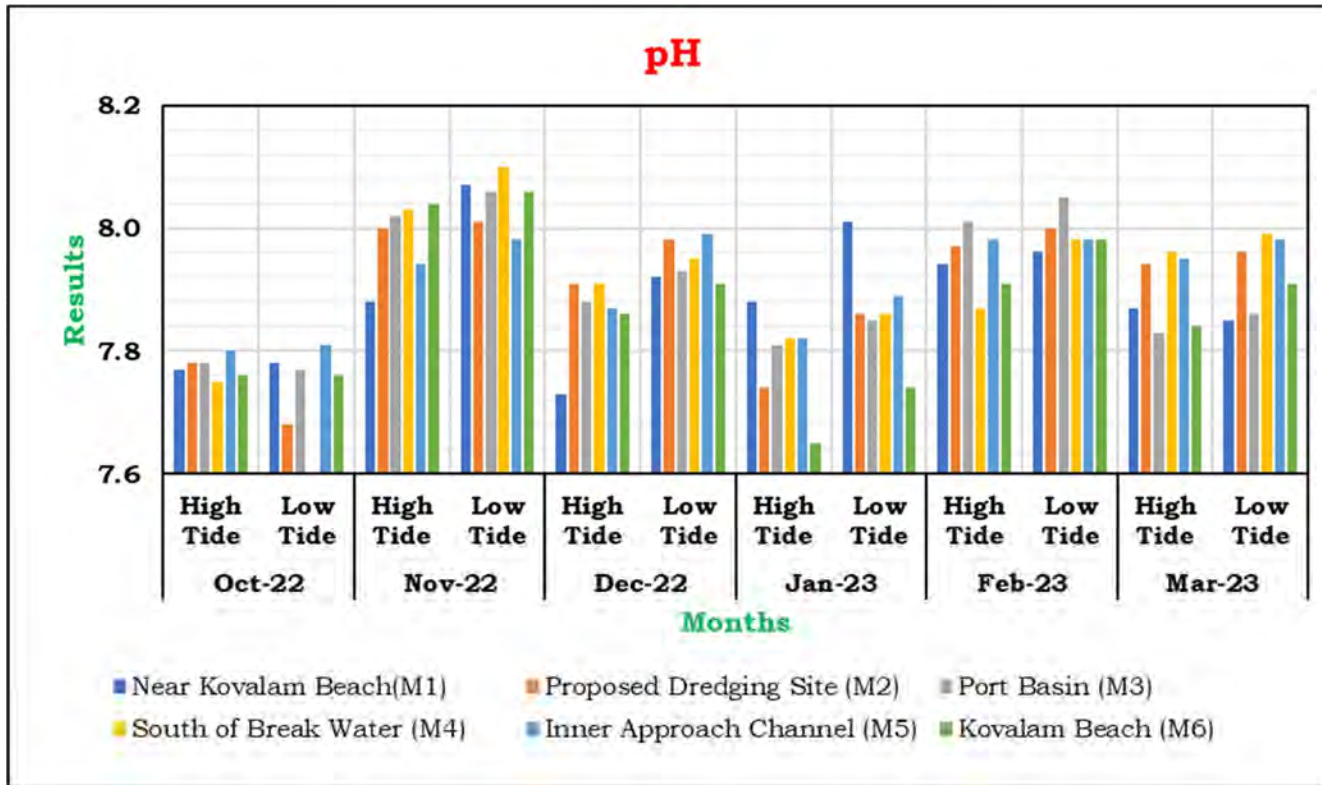
Figure 5.2: Marine Water Analysis for Temperature



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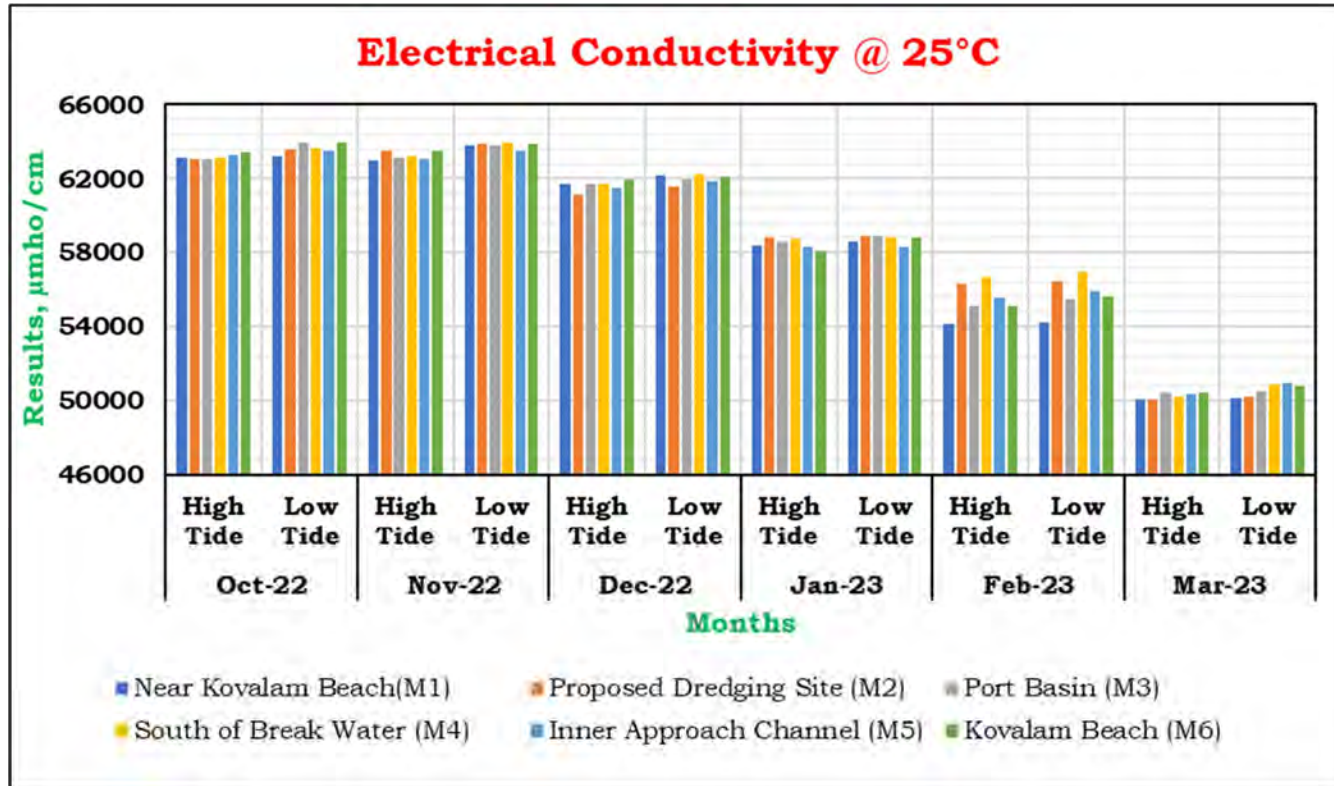
Figure 5.3: Marine Water Analysis for pH



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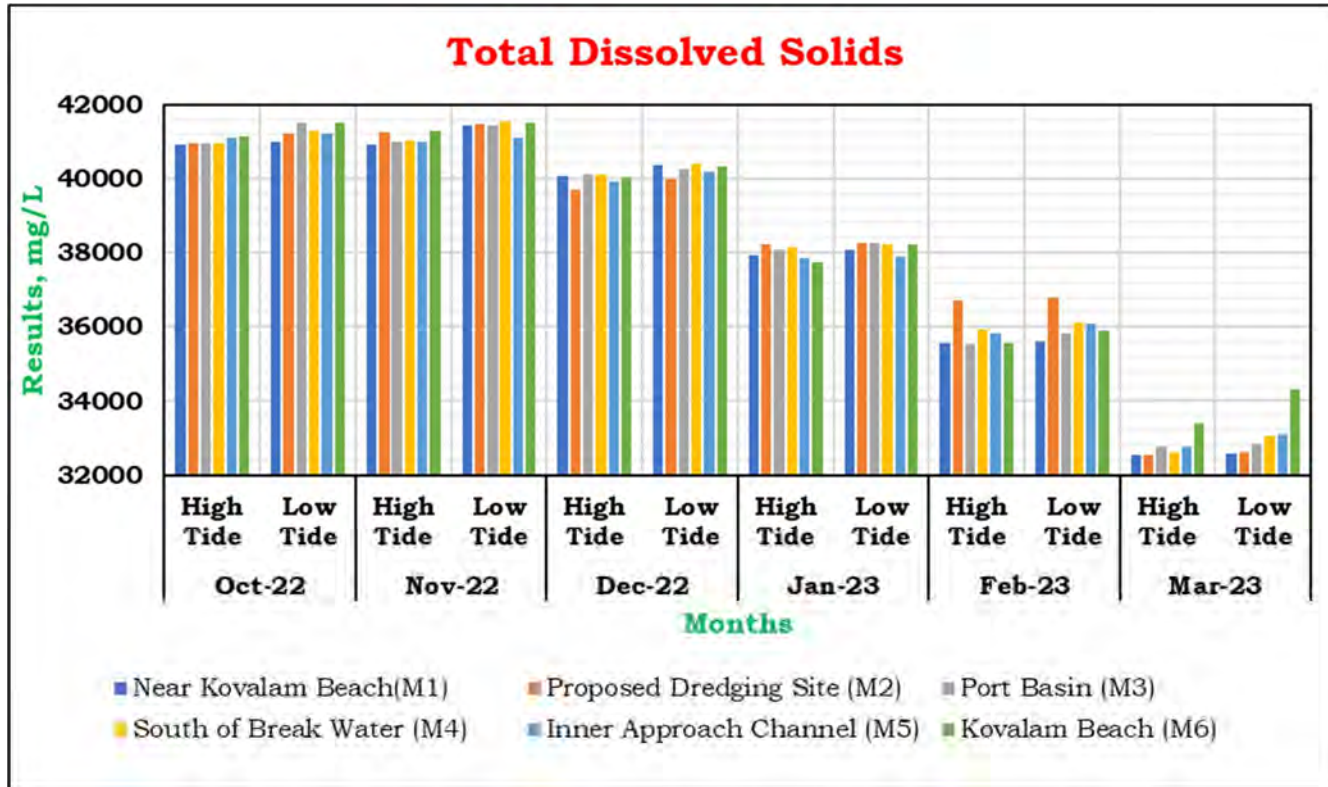
Figure 5.4: Marine Water Analysis for Electrical Conductivity



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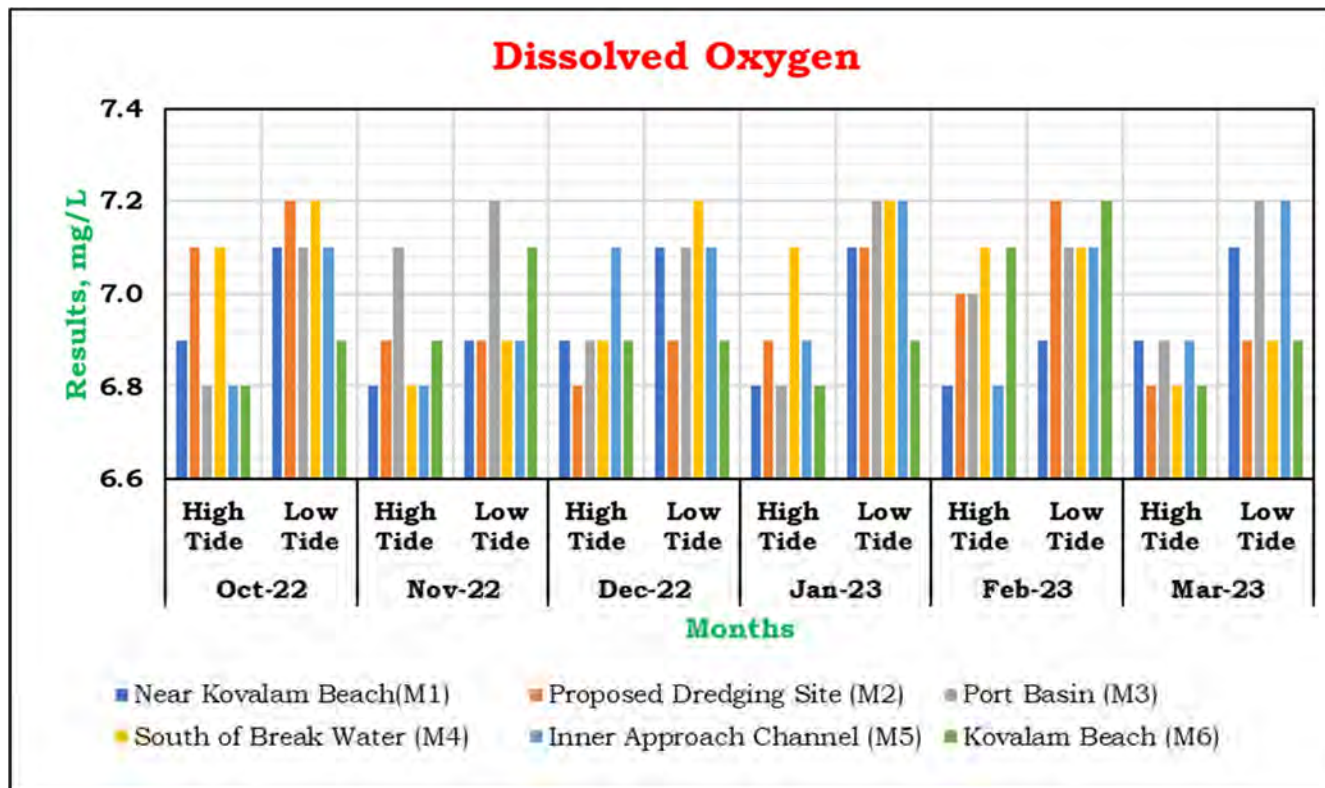
Figure 5.5: Marine Water Analysis for Total Dissolved Solids



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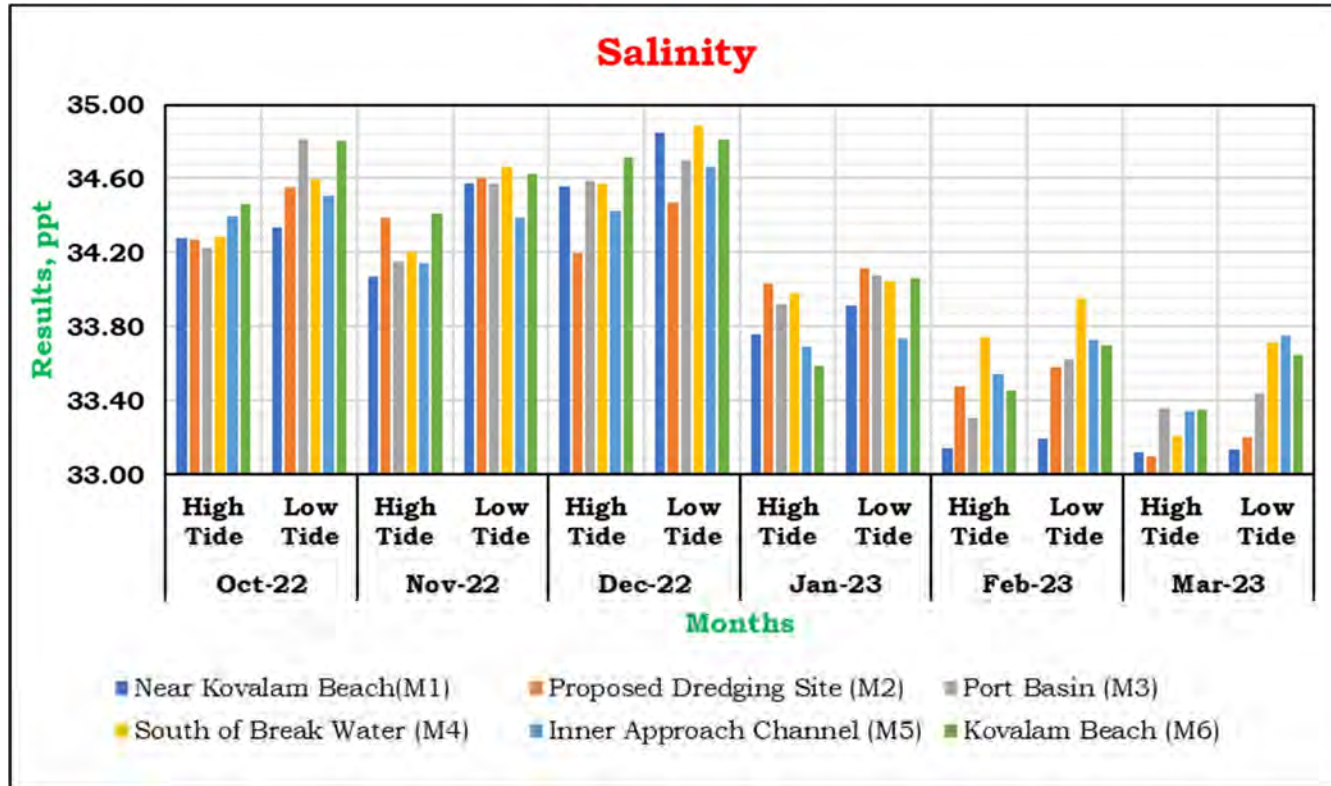
Figure 5.6: Marine Water Analysis for Dissolved Oxygen



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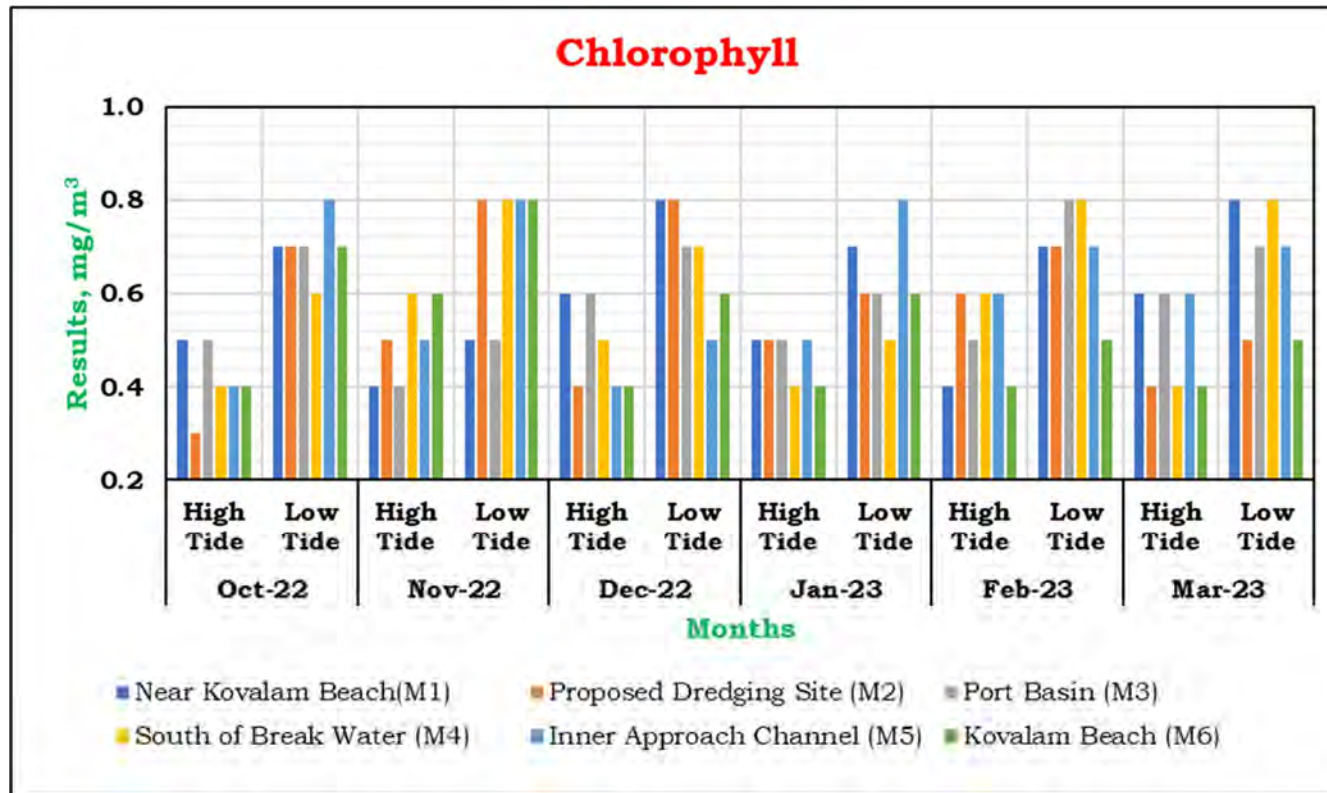
Figure 5.7: Marine Water Analysis for Salinity



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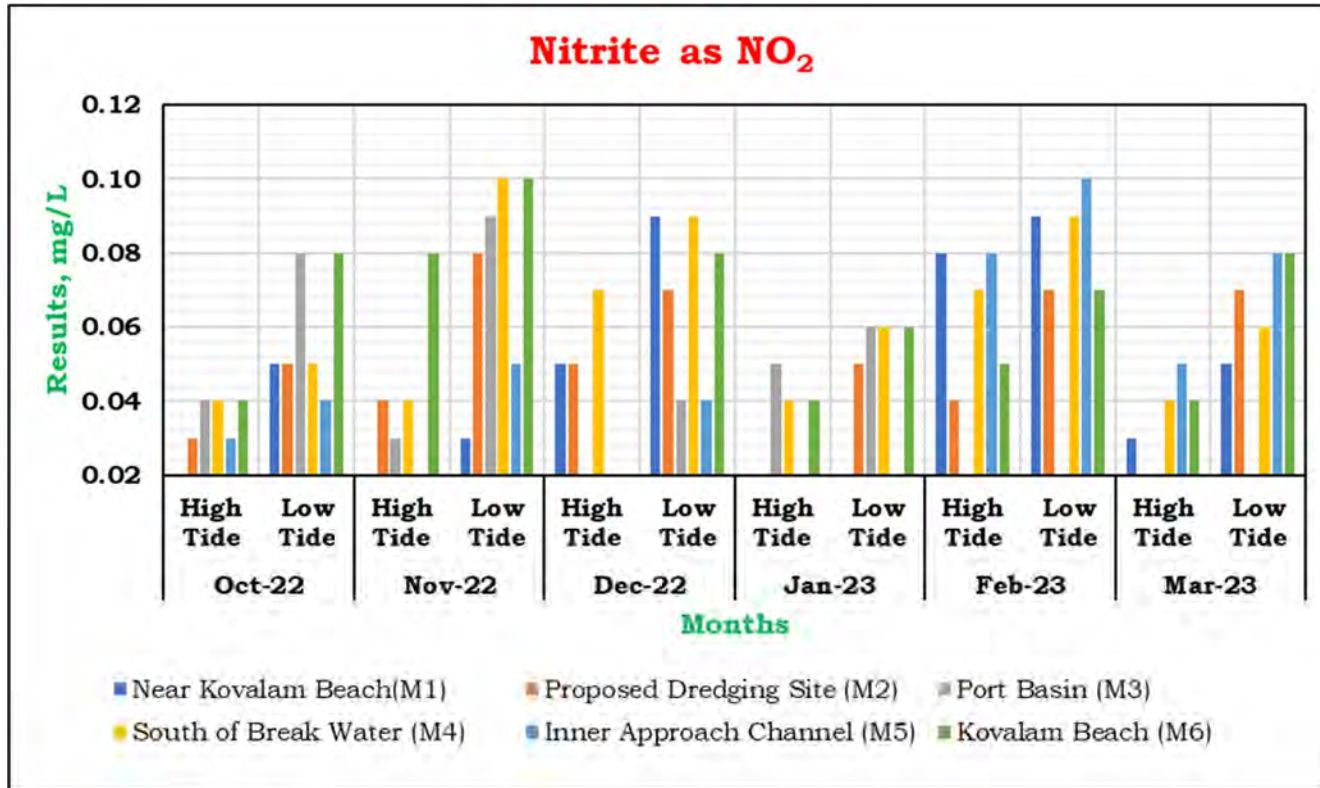
Figure 5.8: Marine Water Analysis for Chlorophyll



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Figure 5.9: Marine Water Analysis for Nitrite



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HYR-5.6. Summary - Marine water analysis:

During the months from October 2022 to March 2023, following is the summary of the marine water analysis:

- a) At the location **Near Kovalam Beach** (low tide & high tide),
- Temperature was observed in the range from 25.4 to 29.1°C
 - No visible colour was observed
 - pH was observed in the range from 7.73 to 8.07
 - Electrical Conductivity (at 25°C) was observed in the range from 50090 to 63800 µmho/cm
 - Total Dissolved Solids were observed in the range from 32548 to 41450 mg/L
 - Dissolved Oxygen was observed in the range from 6.8 to 7.1 mg/L
 - Nitrite (as NO₂) was observed in the range from 0.02 to 0.09 mg/L
 - Salinity was observed in the range from 33.118 to 34.848 ppt
 - Total Chlorophyll was observed in the range from 0.4 to 0.8 mg/m³
 - Turbidity, Total Suspended Solids, Nitrate (as NO₃), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C₆H₅OH), Ammonical Nitrogen (as NH₃-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.
- b) At the location **Proposed Dredging Site** (low tide & high tide),
- Temperature was observed in the range from 24.5 to 29.5°C
 - No visible colour was observed
 - pH was observed in the range from 7.68 to 8.01
 - Electrical Conductivity (at 25°C) was observed in the range from 50060 to 63850 µmho/cm
 - Total Dissolved Solids were observed in the range from 32530 to 41480 mg/L
 - Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L

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- Nitrite (as NO₂) was observed in the range from 0.02 to 0.08 mg/L
- Salinity was observed in the range from 33.096 to 34.603 ppt
- Total Chlorophyll was observed in the range from 0.3 to 0.8 mg/m³
- Turbidity, Total Suspended Solids, Nitrate (as NO₃), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C₆H₅OH), Ammonical Nitrogen (as NH₃-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

c) At the location **Port basin** (low tide & high tide),

- Temperature was observed in the range from 24.9 to 29.1°C
- No visible colour was observed
- pH was observed in the range from 7.77 to 8.06
- Electrical Conductivity (at 25°C) was observed in the range from 50410 to 63980 µmho/cm
- Total Dissolved Solids were observed in the range from 32750 to 41510 mg/L
- Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
- Nitrite (as NO₂) was observed in the range from 0.02 to 0.09 mg/L
- Salinity was observed in the range from 33.307 to 34.810 ppt
- Total Chlorophyll was observed in the range from 0.4 to 0.8 mg/m³
- Turbidity, Total Suspended Solids, Nitrate (as NO₃), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as C₆H₅OH), Ammonical Nitrogen (as NH₃-N), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

d) At the location **South of Break Water** (low tide & high tide),

- Temperature was observed in the range from 24.2 to 28.8°C
- No visible colour was observed
- pH was observed in the range from 7.51 to 8.10

- Electrical Conductivity (at 25°C) was observed in the range from 50210 to 63950 $\mu\text{mho/cm}$
 - Total Dissolved Solids were observed in the range from 32625 to 41540 mg/L
 - Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
 - Nitrite (as NO_2) was observed in the range from 0.04 to 0.10 mg/L
 - Salinity was observed in the range from 33.207 to 34.886 ppt
 - Total Chlorophyll was observed in the range from 0.4 to 0.8 mg/m^3
 - Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as $\text{C}_6\text{H}_5\text{OH}$), Ammonical Nitrogen (as $\text{NH}_3\text{-N}$), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.
- e) At the location **Inner Approach Channel** (low tide & high tide),
- Temperature was observed in the range from 24.9 to 29.1°C
 - No visible colour was observed
 - pH was observed in the range from 7.80 to 7.99
 - Electrical Conductivity (at 25°C) was observed in the range from 50390 to 63500 $\mu\text{mho/cm}$
 - Total Dissolved Solids were observed in the range from 32740 to 41220 mg/L
 - Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
 - Nitrite (as NO_2) was observed in the range from 0.02 to 0.10 mg/L
 - Salinity was observed in the range from 33.341 to 34.665 ppt
 - Total Chlorophyll was observed in the range from 0.4 to 0.8 mg/m^3
 - Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as $\text{C}_6\text{H}_5\text{OH}$), Ammonical Nitrogen (as $\text{NH}_3\text{-N}$), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

- f) At the location **Kovalam Beach** (low tide & high tide),
- Temperature was observed in the range from 25.7 to 28.9°C
 - No visible colour was observed
 - pH was observed in the range from 7.65 to 8.06
 - Electrical Conductivity (at 25°C) was observed in the range from 50400 to 63970 $\mu\text{mho/cm}$
 - Total Dissolved Solids were observed in the range from 33400 to 41500 mg/L
 - Dissolved Oxygen was observed in the range from 6.8 to 7.2 mg/L
 - Nitrite (as NO_2) was observed in the range from 0.02 to 0.10 mg/L
 - Salinity was observed in the range from 33.348 to 34.810 ppt
 - Total Chlorophyll was observed in the range from 0.4 to 0.8 mg/m^3
 - Turbidity, Total Suspended Solids, Nitrate (as NO_3), Total Nitrogen (as N), Total Phosphorous (as P), Reactive Phosphorous, Biological Oxygen Demand, Floating materials, Phenolic Compounds (as $\text{C}_6\text{H}_5\text{OH}$), Ammonical Nitrogen (as $\text{NH}_3\text{-N}$), Polycyclic Aromatic Hydrocarbon, Total Coliforms and Faecal Coliforms were observed below the detection limits.

HYR-5.7. Maximum Values observed - Marine water analysis:

During the period from October 2022 to March 2023, the following is the maximum value observed.

Table 5.5: Maximum Values observed

Sl. No.	Parameter /unit	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
1	Temperature (°C)	29.1	29.5	29.1	28.8	29.1	28.9
2	Colour	1	1	1	1	1	1
3	pH Value	8.07	8.01	8.06	8.10	7.99	8.06
4	Turbidity (N.T.U.)	BDL	BDL	BDL	BDL	BDL	BDL
5	Electrical Conductivity (at 25°C) (µmho/cm)	63800	63850	63980	63950	63500	63970
6	Total Suspended Solids (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
7	Total Dissolved Solids (mg/L)	41450	41480	41510	41540	41220	41500
8	Dissolved Oxygen (mg/L)	7.1	7.2	7.2	7.2	7.2	7.2
9	Biochemical Oxygen Demand (3 days, 27°C) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
10	Floating Materials (Oil, Grease and Scum) (Including Petroleum Products) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
11	Nitrite (as NO ₂) (mg/L)	0.09	0.08	0.09	0.10	0.10	0.10
12	Nitrate (as NO ₃) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL

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Sl. No.	Parameter /unit	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break Water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
13	Phenolic Compounds (as C ₆ H ₅ OH) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
14	Ammonical Nitrogen (as NH ₃ -N) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
15	Total Nitrogen (as N) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
16	Total Phosphorous (as P) (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
17	Reactive Phosphorous (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
18	Polycyclic Aromatic Hydrocarbon (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL
19	Salinity (ppt)	34.848	34.603	34.810	34.886	34.665	34.810
20	Total Chlorophyll (mg/m ³)	0.8	0.8	0.8	0.8	0.8	0.8
21	Total Coliforms (MPN Index/100 mL)	BDL	BDL	BDL	BDL	BDL	BDL
22	Faecal Coliforms (MPN Index/100 mL)	BDL	BDL	BDL	BDL	BDL	BDL

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HYR-5.8. Sediment Analysis Results
Table 5.6: Sediment Analysis Results

Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
1	Texture	-	Oct-22	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Nov-22	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Dec-22	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Jan-23	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Feb-23	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
			Mar-23	Sandy	Sandy	Sandy Loam	Sandy	Sandy	Sandy
2	Organic Matter	%	Oct-22	0.62	0.35	2.15	0.45	0.40	0.38
			Nov-22	0.48	0.36	2.46	0.66	0.29	0.32
			Dec-22	0.41	0.44	2.61	0.74	0.36	0.27
			Jan-23	0.36	0.42	2.22	0.46	0.38	0.39
			Feb-23	0.42	0.35	2.19	0.41	0.25	0.29
			Mar-23	0.36	0.35	0.82	0.41	0.25	0.29
3	Total Phosphorus (as P)	mg/kg	Oct-22	240	325	160	110	98.2	202
			Nov-22	215	365	210	186	72.3	268
			Dec-22	278	347	236	187	102	236
			Jan-23	246	320	289	145	108	240

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Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
			Feb-23	215	260	320	110	148	356
			Mar-23	248	195	470	158	102	256
4	Aluminium (as Al)	mg/kg	Oct-22	1745	1260	1974	1230	985	7546
			Nov-22	1865	1052	1269	1104	750	4563
			Dec-22	2364	1327	1428	983	814	3717
			Jan-23	1465	1210	1456	1013	896	2689
			Feb-23	1065	1425	1016	1289	658	2153
			Mar-23	1185	1036	1285	1326	458	1875
			Oct-22	BDL	BDL	BDL	BDL	BDL	BDL
5	Chromium (as Cr)	mg/kg	Nov-22	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL	BDL	BDL	BDL
6	Copper (as Cu)	mg/kg	Nov-22	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL	BDL	BDL	BDL
			Oct-22	7896	4520	8156	4698	2136	1496
7	Iron (as Fe)	mg/kg	Nov-22	8854	2656	10265	2456	1850	1245
			Dec-22	7562	2189	9317	2831	2305	1427
			Jan-23	9586	3246	7549	2136	1200	1432
			Feb-23	7463	2156	9546	1978	956	1032

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Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
			Mar-23	5285	1958	7586	1245	946	945
8	Lead (as Pb)	mg/kg	Oct-22	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL	BDL	BDL	BDL
9	Manganese (as Mn)	mg/kg	Oct-22	2.45	4.30	2.63	2.44	3.12	1.96
			Nov-22	3.84	2.40	4.75	1.86	2.78	2.63
			Dec-22	2.16	2.73	3.82	1.98	2.47	2.85
			Jan-23	4.52	2.55	3.20	1.20	1.65	2.10
			Feb-23	4.52	2.16	2.96	1.52	1.11	1.56
			Mar-23	2.56	1.89	2.14	1.02	1.48	1.63
10	Mercury (as Hg)	mg/kg	Oct-22	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL	BDL	BDL	BDL
11	Zinc (as Zn)	mg/kg	Oct-22	2.08	1.32	5.20	1.60	5.11	2.35
			Nov-22	2.55	1.1	4.50	1.35	4.89	4.65
			Dec-22	2.84	1.63	4.76	1.51	5.04	4.77
			Jan-23	1.22	1.63	2.50	1.10	2.63	3.28
			Feb-23	1.08	1.26	1.63	1.44	1.89	2.56
			Mar-23	1.22	1.45	1.86	1.96	1.25	1.56

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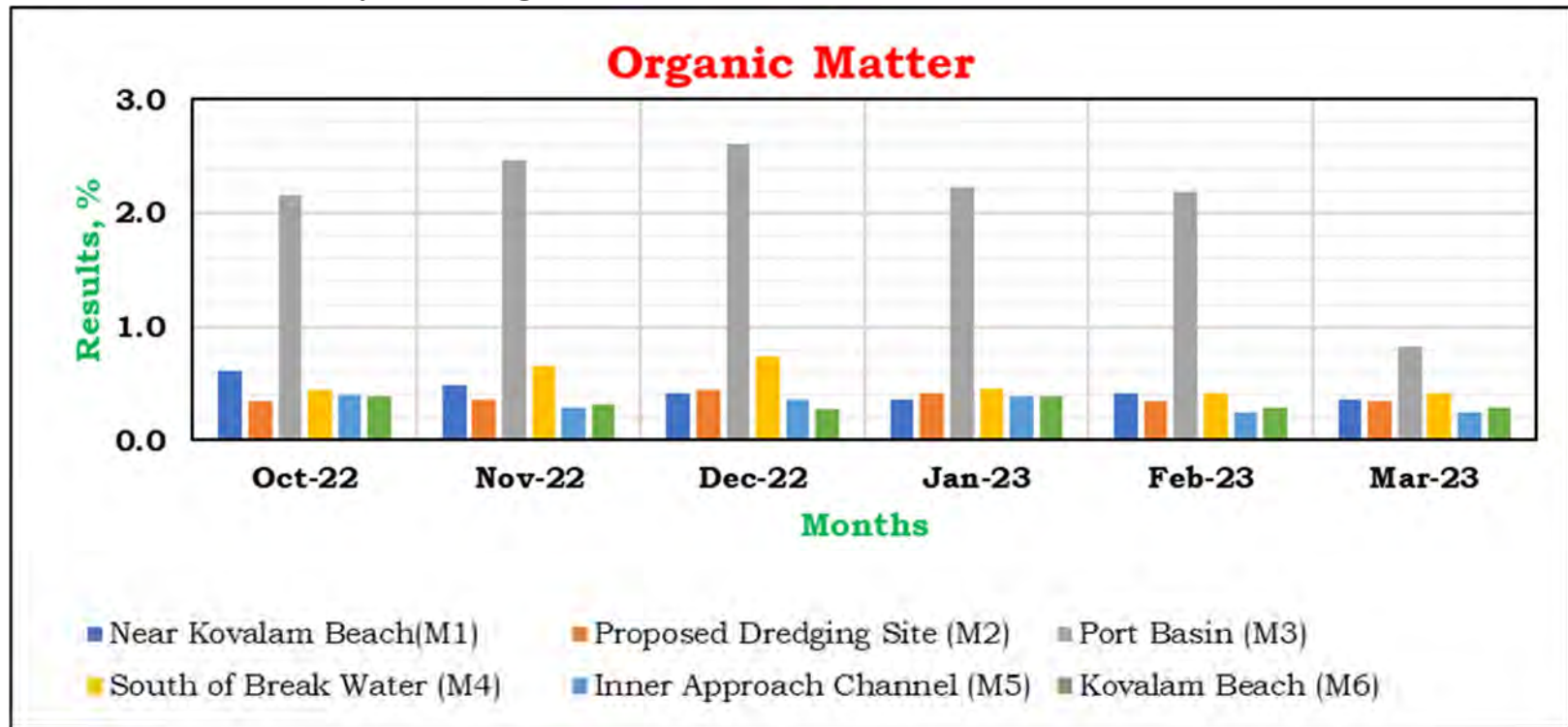
Sl. No.	Parameter	Unit	Month	Near Kovalam Beach (MS1)	Proposed Dredging Site (MS2)	Port Basin (MS3)	South of Break Water (MS4)	Inner Approach Channel (MS5)	Kovalam Beach (MS6)
12	Nickel (as Ni)	mg/kg	Oct-22	BDL	BDL	BDL	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL	BDL	BDL	BDL
Benthic Organism									
13	Micro Benthic Organism	No./m ²	Oct-22	62200	61200	69800	58100	64500	62200
			Nov-22	64000	62000	68400	56000	66400	64200
			Dec-22	62200	61200	69600	58500	64800	62800
			Jan-23	60800	60500	71200	58900	63600	63500
			Feb-23	61300	58800	68600	65300	65100	68800
			Mar-23	66700	54200	62200	69100	62700	60100
14	Macro Benthic Organism	No./m ²	Oct-22	56000	45800	40500	46500	56100	49600
			Nov-22	58000	46000	38000	44000	58000	52000
			Dec-22	56200	45300	40500	46500	56300	49300
			Jan-23	59100	47100	42400	47800	56700	50100
			Feb-23	57600	49600	48100	49000	54300	56500
			Mar-23	59100	53300	50900	47300	51800	57400
15	Total Benthos	No./m ²	Oct-22	118200	107000	110300	104600	120600	111800
			Nov-22	122000	108000	106400	100000	124400	116200
			Dec-22	118400	106500	110100	105000	121100	112100
			Jan-23	119900	107600	113600	106700	120300	113600
			Feb-23	118900	108400	116700	114300	119400	125300
			Mar-23	125800	107500	113100	116400	114500	117500

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HYR-5.9. Graphical representation of Results for Sediment analysis

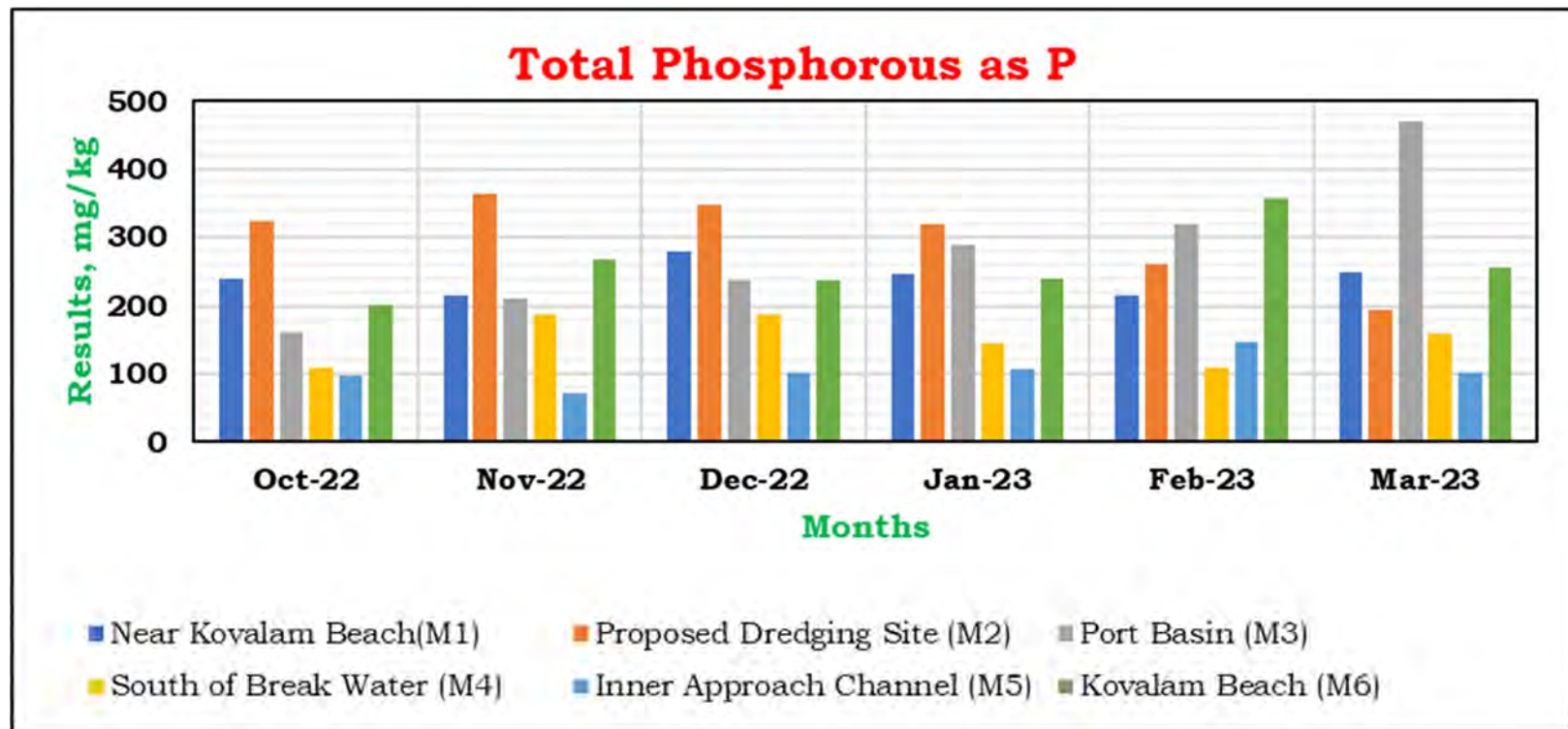
Figure 5.10: Sediment Analysis for Organic Matter



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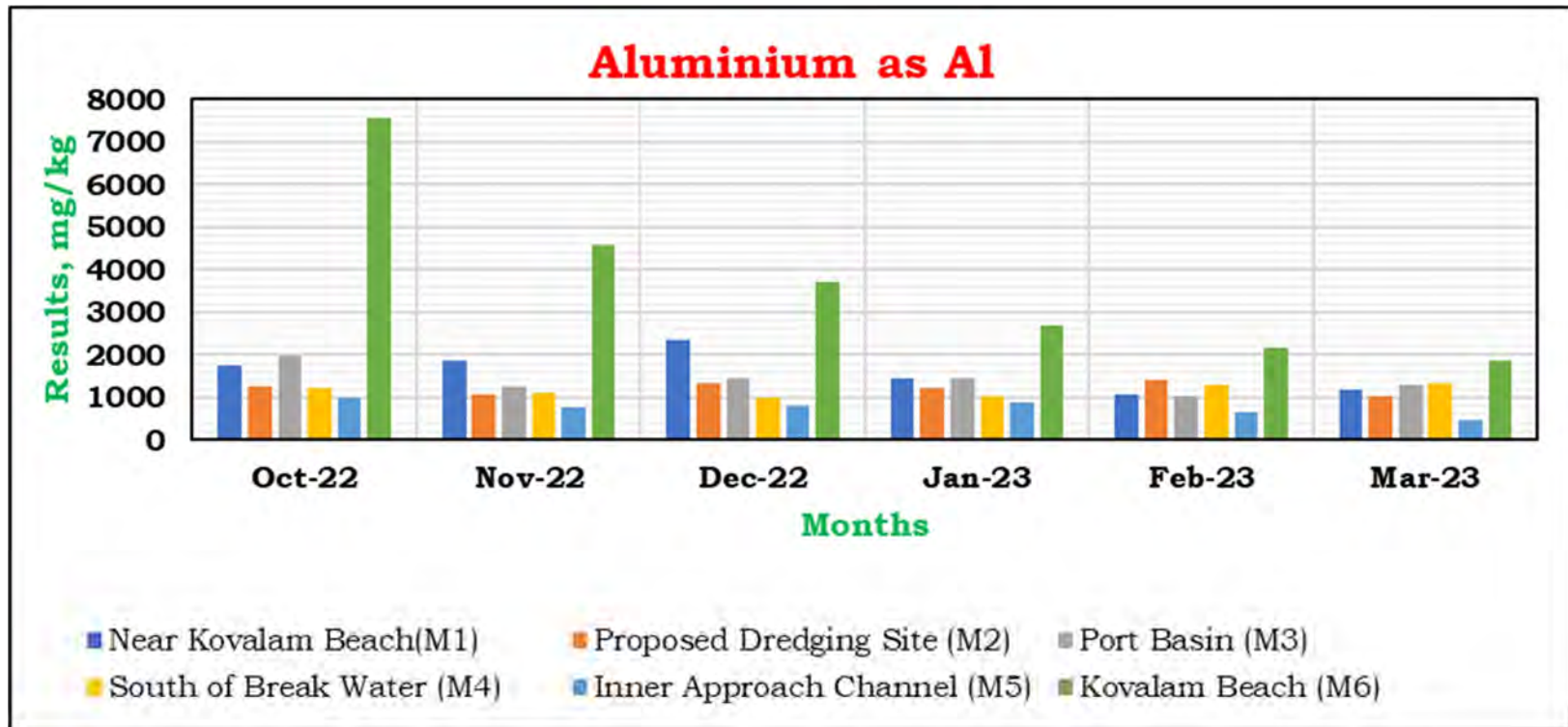
Figure 5.11: Sediment Analysis for Total Phosphorous as P



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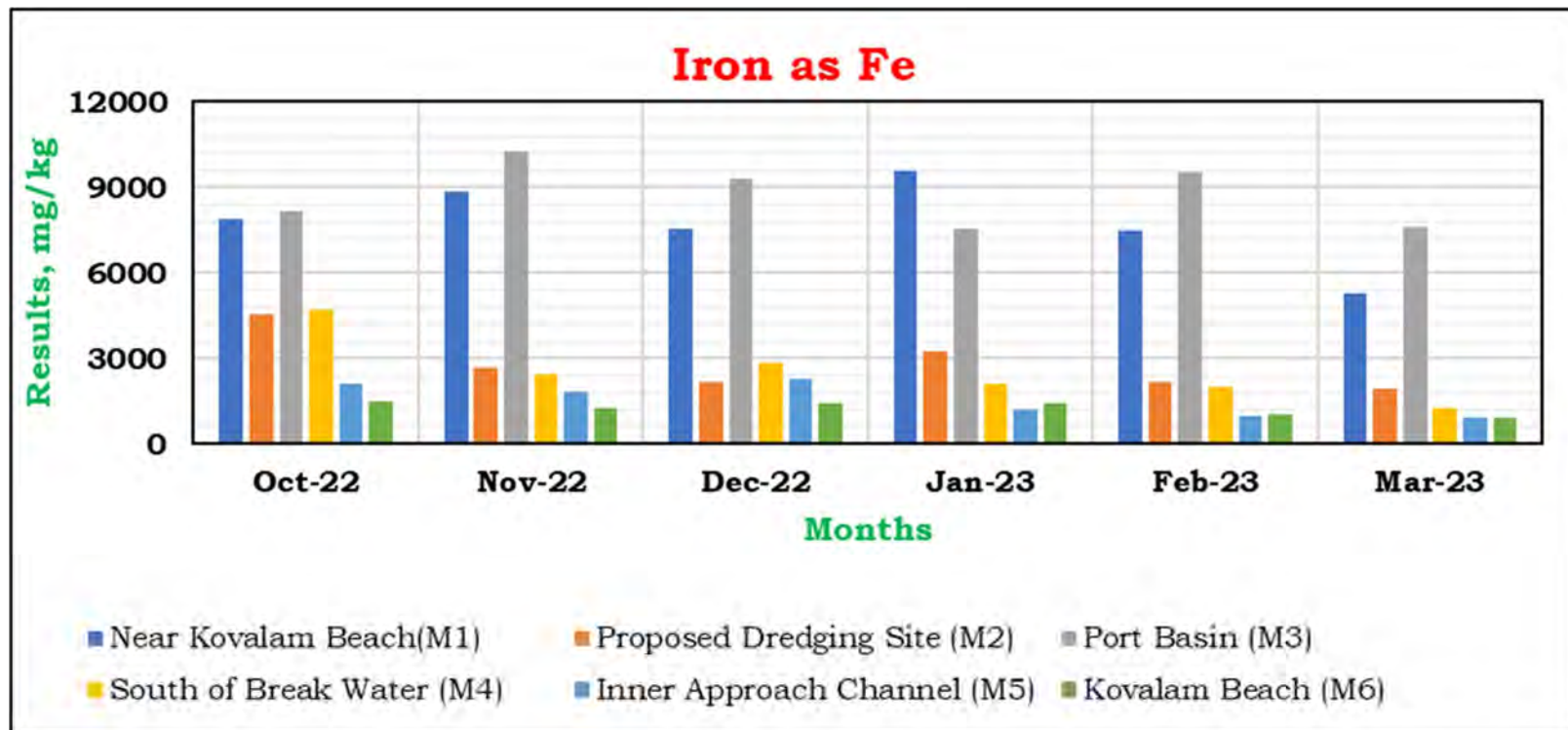
Figure 5.12: Sediment Analysis for Aluminium as Al



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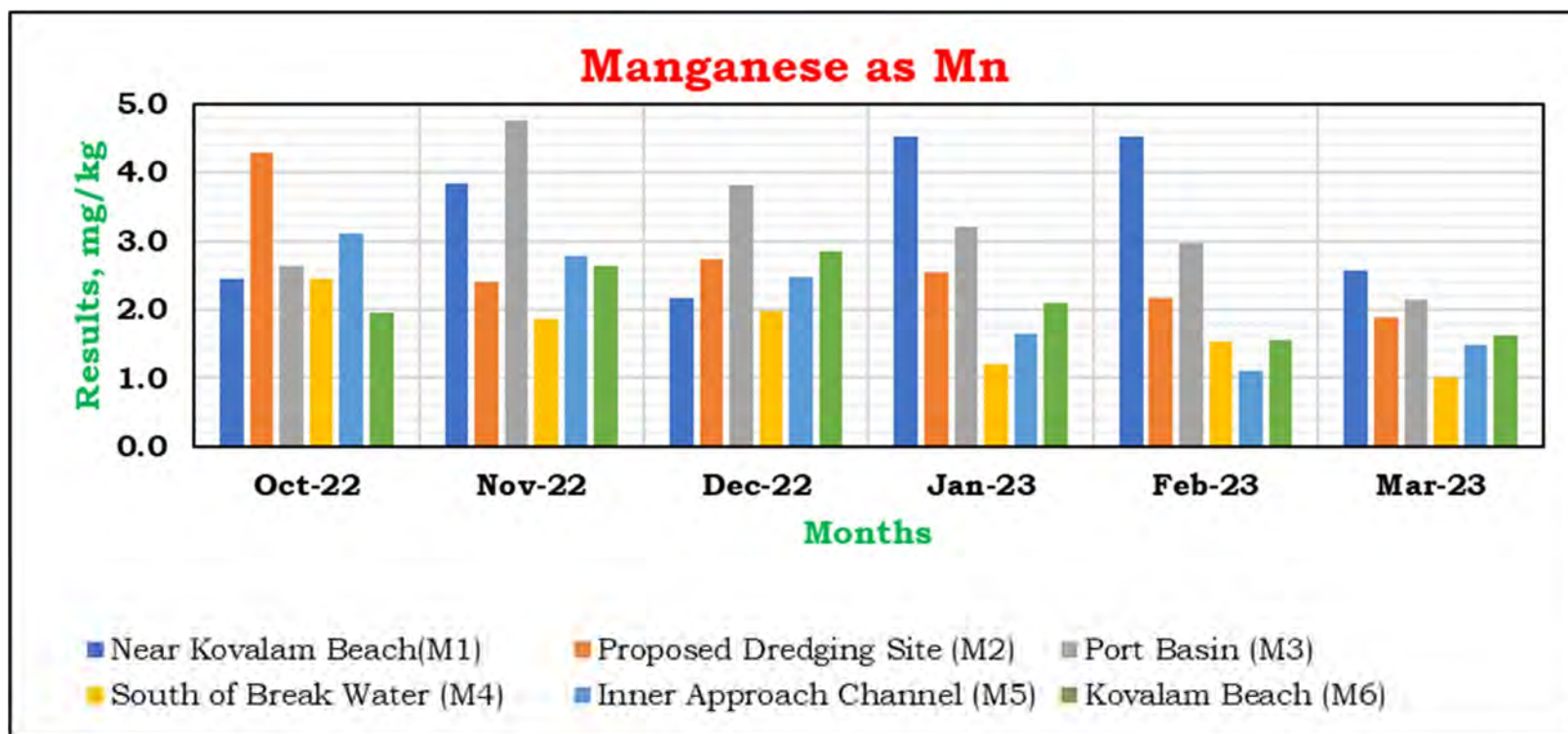
Figure 5.13: Sediment Analysis for Iron as Fe



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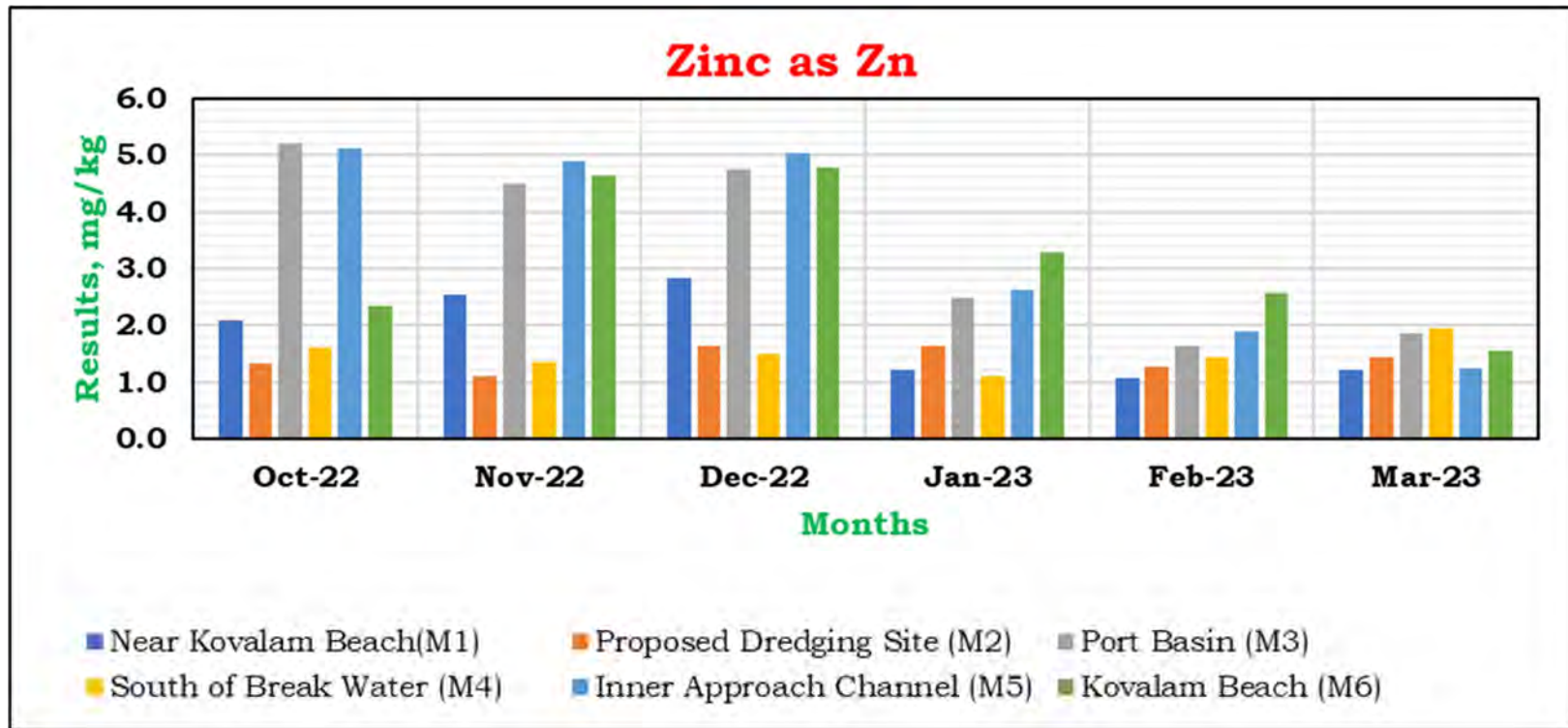
Figure 5.14: Sediment Analysis for Manganese as Mn



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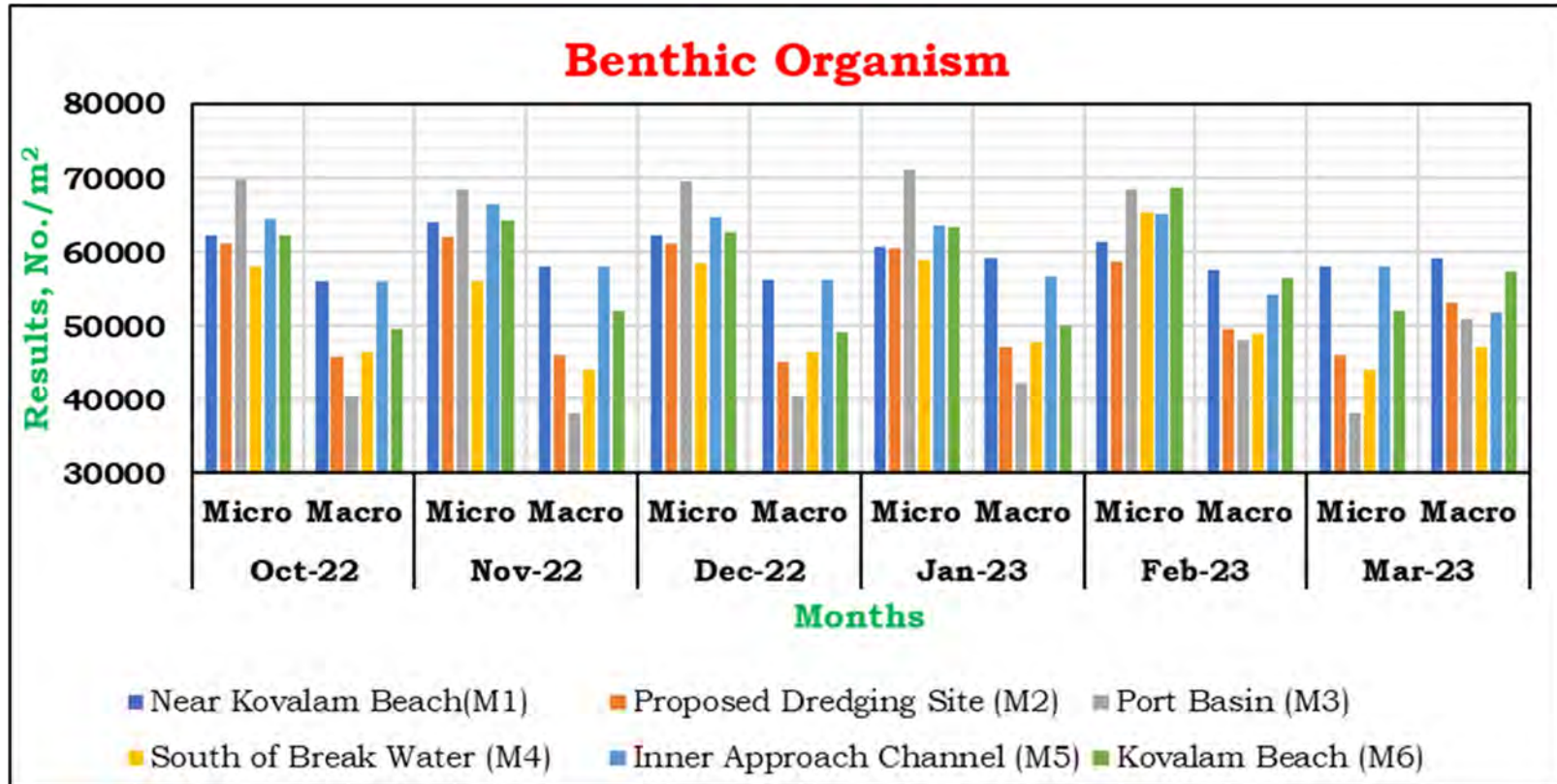
Figure 5.15: Sediment Analysis for Zinc as Zn



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Figure 5.16: Sediment Analysis for Benthic Organism



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HYR-5.10. Summary - Sediment Analysis:

During the months from October 2022 to March 2023, following is the summary of sediment analysis:

- a) At the location **Near Kovalam Beach**,
- The observed texture was sandy
 - Organic matter was observed in the range from 0.36 to 0.62 %
 - Total Phosphorus (as P) was observed in the range from 215 to 278mg/kg
 - Aluminium (as Al) was observed in the range from 1065 to 2364 mg/kg
 - Iron (as Fe) was observed in the range from 5285 to 9586 mg/kg
 - Manganese (as Mn) was observed in the range from 2.16 to 4.52 mg/kg
 - Zinc (as Zn) was observed in the range from 1.08 to 2.84 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 60800 to 66700/m²
 - Macro benthic organisms were observed in the range from 56000 to 59100/m²
- b) At the location **Proposed Dredging Site**,
- The observed texture was sandy
 - Organic matter was observed in the range from 0.35 to 0.44 %
 - Total Phosphorus (as P) was observed in the range from 195 to 365 mg/kg
 - Aluminium (as Al) was observed in the range from 1036 to 1425 mg/kg
 - Iron (as Fe) was observed in the range from 1958 to 4520 mg/kg
 - Manganese (as Mn) was observed in the range from 1.89 to 4.30 mg/kg
 - Zinc (as Zn) was observed in the range from 1.10 to 1.63 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 54200 to 62000/m²

- Macro benthic organisms were observed in the range from 45300 to 53300/m²
- c) At the location **Port Basin**,
- The observed texture was sandy loam
 - Organic matter was observed in the range from 0.82 to 2.61 %
 - Total Phosphorus (as P) was observed in the range from 160 to 470 mg/kg
 - Aluminium (as Al) was observed in the range from 1016 to 1974 mg/kg
 - Iron (as Fe) was observed in the range from 7549 to 10265 mg/kg
 - Manganese (as Mn) was observed in the range from 2.14 to 4.75 mg/kg
 - Zinc (as Zn) was observed in the range from 1.63 to 5.20 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 62200 to 71200/m²
 - Macro benthic organisms were observed in the range from 38000 to 50900/m²
- d) At the location **South of Break Water**,
- The observed texture was sandy
 - Organic matter was observed in the range from 0.41 to 0.74 %
 - Total Phosphorus (as P) was observed in the range from 110 to 187 mg/kg
 - Aluminium (as Al) was observed in the range from 983 to 1326 mg/kg
 - Iron (as Fe) was observed in the range from 1245 to 4698 mg/kg
 - Manganese (as Mn) was observed in the range from 1.02 to 2.44 mg/kg
 - Zinc (as Zn) was observed in the range from 1.10 to 1.96 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 56000 to 69100/m²
 - Macro benthic organisms were observed in the range from 44000 to 49000/m²
- e) At the location **Inner Approach Channel**,
- The observed texture was sandy

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- Organic matter was observed in the range from 0.25 to 0.40 %
 - Total Phosphorus (as P) was observed in the range from 72 to 148mg/kg
 - Aluminium (as Al) was observed in the range from 458 to 985 mg/kg
 - Iron (as Fe) was observed in the range from 946 to 2305 mg/kg
 - Manganese (as Mn) was observed in the range from 1.11 to 3.12 mg/kg
 - Zinc (as Zn) was observed in the range from 1.25 to 5.11 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 62700 to 66400/m²
 - Macro benthic organisms were observed in the range from 51800 to 58000/m²
- f) At the location **Kovalam Beach**,
- The observed texture was sandy
 - Organic matter was observed in the range from 0.27 to 0.39 %
 - Total Phosphorus (as P) was observed in the range from 202 to 356 mg/kg
 - Aluminium (as Al) was observed in the range from 1875 to 7546 mg/kg
 - Iron (as Fe) was observed in the range from 945 to 1496 mg/kg
 - Manganese (as Mn) was observed in the range from 1.56 to 2.85 mg/kg
 - Zinc (as Zn) was observed in the range from 1.56 to 4.77 mg/kg
 - Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits
 - Micro benthic organisms were observed in the range from 60100 to 68800/m²
 - Macro benthic organisms were observed in the range from 49300 to 57400/m²
- g) Summary – Comparison of Results of **All Locations**,
- The observed texture was sandy in all locations except Port Basin which was sandy loam
 - Maximum value of Organic matter observed was 2.61 % at Port Basin

- Maximum value of Total Phosphorus (as P) observed was 470 mg/kg at Port Basin
- Maximum value of Aluminium (as Al) observed was 7546 mg/kg at Kovalm Beach
- Maximum value of Iron (as Fe) observed was 10265 mg/kg at Port Basin
- Maximum value of Manganese (as Mn) observed was 4.75 mg/kg at Port Basin
- Maximum value of Zinc (as Zn) observed was 5.2 mg/kg at Port Basin
- Chromium (as Cr), Copper (as Cu), Lead (as Pb), Mercury (as Hg) and Nickel (as Ni) were observed below the detection limits at all locations
- Maximum value of Micro benthic organisms observed was 71200/m² at Near Port Basin
- Maximum value of Macro benthic organisms observed was 59100/m² at Near Kovalam Beach.

HYR-5.11. Marine Water Analysis for Phytoplankton and Zooplankton

Table 5.7: Total Phytoplankton and Zooplankton Results

Parameter	Month	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
Total Phytoplankton No/100 mL	Oct-22	66152	55056	68160	52588	57766	44190
	Nov-22	71974	52246	70152	56442	62148	46454
	Dec-22	69495	52807	66404	55606	57782	47334
	Jan-23	67302	56329	67067	56780	57504	43036
	Feb-23	73411	65824	69862	61786	67756	51332
	Mar-23	74584	74122	72343	63764	67675	60479
Total Zooplankton No/100 mL	Oct-22	6786	5562	8728	8382	7168	6462
	Nov-22	6730	5590	8054	7392	7626	7062
	Dec-22	7156	6239	9865	8912	8012	7391
	Jan-23	7245	5913	9590	9519	7427	6926
	Feb-23	8370	5736	9534	10064	7477	6794
	Mar-23	8492	5552	9678	10055	8164	7315

HYR-5.12. Graphical representation of Results for Marine Phytoplankton and Zooplankton

Figure 5.17: Marine Water Analysis for Total Phytoplankton

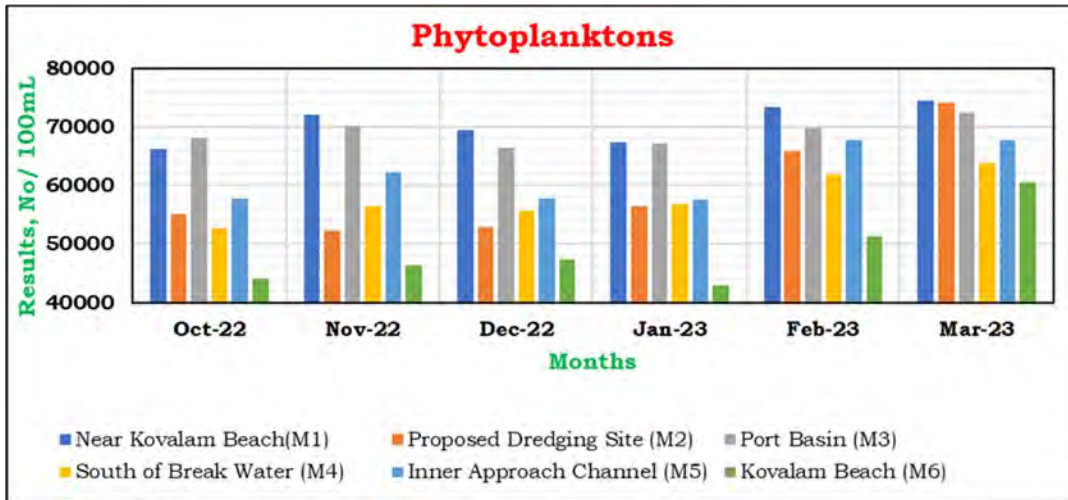
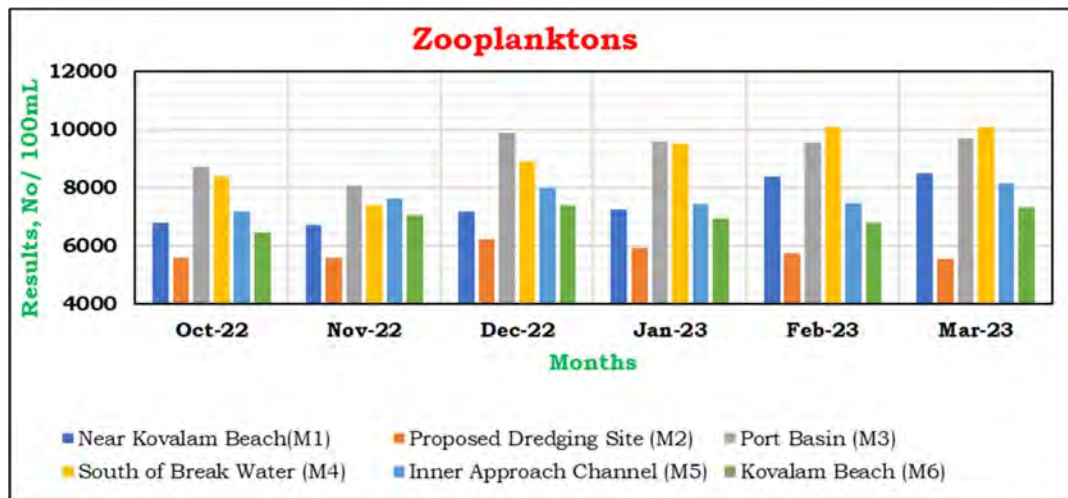


Figure 5.18: Marine Water Analysis for Total Zooplankton



HYR-5.13. Summary-Marine Water Analysis for Phytoplankton and Zooplankton

During the months from October 2022 to March 2023, following is the summary of Marine Water Analysis for Phytoplankton and Zooplankton:

Table 5.8: Summary-Marine Water Analysis for Phytoplankton and Zooplankton Results

Parameter	Range	Near Kovalam Beach (M1)	Proposed Dredging Site (M2)	Port Basin (M3)	South of Break water (M4)	Inner Approach Channel (M5)	Kovalam Beach (M6)
Total Phytoplankton No/100 mL	From	66152	52246	66404	52588	57504	43036
	To	74584	74122	72343	63764	67756	60479
Total Zooplankton No/100 mL	From	6730	5552	8054	7392	7168	6462
	To	8492	6239	9865	10064	8164	7391

- a) At the location **Near Kovalam Beach**,
 - Total Phytoplankton were observed in the range from 66152 to 74584 No/100 mL
 - Total Zooplankton were observed in the range from 6730 to 8492 No/100 mL
- b) At the location **Proposed Dredging Site**,
 - Total Phytoplankton were observed in the range from 52246 to 74122 No/100 mL
 - Total Zooplankton were observed in the range from 5552 to 6239 No/100 mL
- c) At the location **Port Basin**,
 - Total Phytoplankton were observed in the range from 66404 to 72343 No/100 mL
 - Total Zooplankton were observed in the range from 8054 to 9865 No/100 mL
- d) At the location **South of Break Water**,

- Total Phytoplankton were observed in the range from 52588 to 63764 No/100 mL
 - Total Zooplankton were observed in the range from 7392 to 10064 No/100 mL
- e) At the location **Inner Approach Channel**,
- Total Phytoplankton were observed in the range from 57504 to 67756 No/100 mL
 - Total Zooplankton were observed in the range from 7168 to 8164 No/100 mL
- f) At the location **Kovalam Beach**,
- Total Phytoplankton were observed in the range from 43036 to 60479 No/100 mL
 - Total Zooplankton were observed in the range from 6462 to 7391 No/100 mL
- g) Summary – Comparison of Results of **All Locations**,
- Maximum value of Total Phytoplankton observed was 74584 No/100 mL at Near Kovalam Beach
 - Maximum value of Total Zooplankton observed was 10064 No/100 mL at South of Break water.

HYR-6	Ground Water & Surface Water Analysis
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HYR-6.1. Ground Water & Surface Water Location Details:

This section describes the sampling location, methodology adopted for analysis and analysis results of Ground Water and Surface Water during the period from October 2022 to March 2023.

Ground water sampling was carried out at three locations including Port Site, PAF Area and Proposed Port Estate Area.

Surface water sampling was carried out at three locations including Poovar West Canal, Vizhinjam Branch Canal and Vellayani Lake.

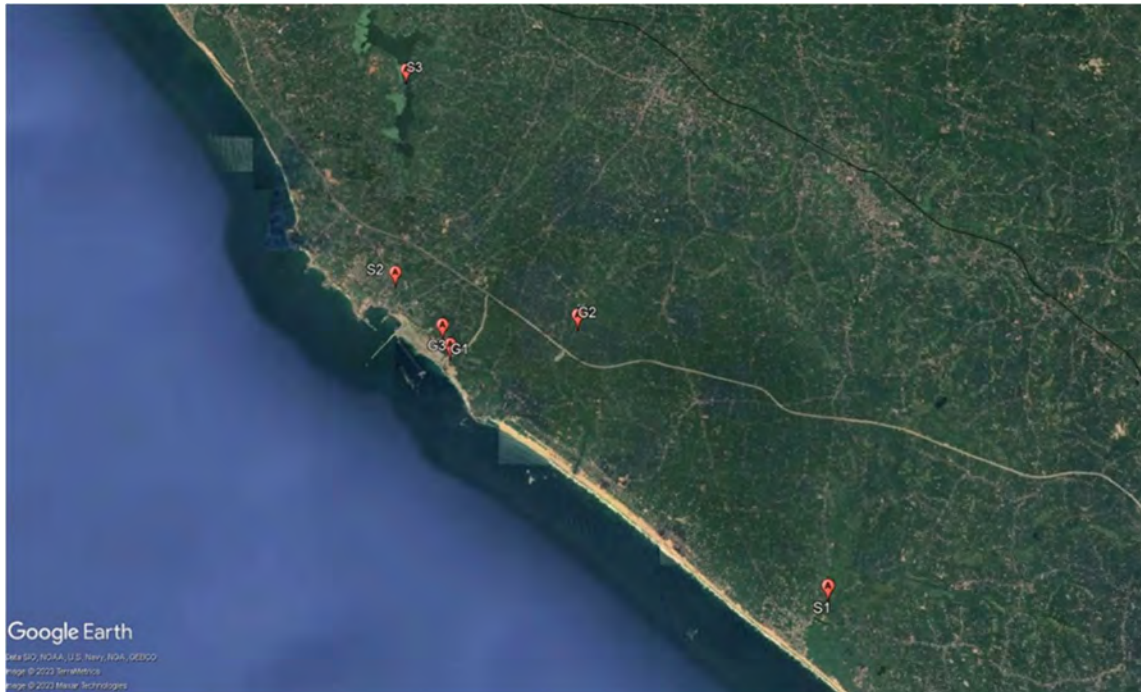
Table 6.1: Coordinates of Ground Water Location

Location	Legend	Latitude	Longitude
Project Site	G1	8°22'03.72"N	77°00'16.92"E
Proposed Port Estate Area	G2	8°22'24.96"N	77°00'45.84"E
PAF Area	G3	8°22'17.60"N	77°00'11.12"E

Table 6.2: Coordinates of Surface Water Location

Location	Legend	Latitude	Longitude
Poovar West Canal	S1	8°19'22.66"N	77°04'31.70"E
Vizhinjam Branch Canal	S2	8°22'55.59"N	76°59'36.29"E
Vellayani Lake	S3	8°25'31.91"N	76°59'37.10"E

Figure 6.1: Google earth views of Ground Water & Surface Water Sampling Locations



HYR-6.2. Methodology of Sampling and Analysis:

Table 6.3: Ground Water & Surface Water Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Surface and Ground Water Analysis				
1.	Colour	Hazen Units	1	IS 3025 Part 4: 1983 RA 2017
2.	Odour	-	--	IS 3025 Part 5: 1983 RA 2018
3.	pH Value	-	1	IS 3025 Part 11: 1983 RA 2017
4.	Turbidity	N.T.U.	0.1	IS 3025 Part 10: 1984 RA 2017
5.	Electrical Conductivity (at 25°C)	µmho/cm	0.001	IS 3025 Part 14:1984 RA 2019
6.	Total Dissolved Solids	mg/L	1	IS 3025 Part 16: 1984 RA 2017
7.	Dissolved Oxygen	mg/L	0.2	IS 3025 Part 38:1989 RA 2019
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	2	IS 3025 Part 44:1993 RA 2019

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Sr. No.	Parameter	Unit	Detection Limit	Method Reference
9.	Oil & Grease	mg/L	1	IS 3025 Part 39: 1991 RA 2019
10.	Aluminium (as Al)	mg/L	0.03	IS 3025 Part 55:2003 RA 2019
11.	Ammonia (as NH ₃ - N)	mg/L	1	IS 3025 Part 34:1988 RA 2019
12.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	0.01	IS 13428 Annex K:2005
13.	Barium (as Ba)	mg/L	0.17	APHA 23 rd Edition 3111D:2017
14.	Boron (as B)	mg/L	0.2	IS 3025 Part 57 :2005 RA 2017
15.	Calcium (as Ca)	mg/L	1	IS 3025 Part 40: 1991 RA 2019
16.	Chloramines (as Cl ₂)	mg/L	1	APHA 23 rd Edition 4500 Cl ₂ G:2017
17.	Chloride (as Cl)	mg/L	1	IS 3025 Part 32: 1988 RA 2019
18.	Copper (as Cu)	mg/L	0.016	IS 3025 Part 42: 1992 RA 2019
19.	Fluoride (as F)	mg/L	0.1	APHA 23 rd Edition 4500 -F- B, D: 2017
20.	Iron (as Fe)	mg/L	0.1	IS 3025 Part 53: 2003 RA 2019
21.	Magnesium (as Mg)	mg/L	1	IS 3025 Part 46: 1994 RA 2019
22.	Manganese (as Mn)	mg/L	0.016	IS 3025 Part 59: 2006 RA 2017
23.	Mineral Oil	mg/L	0.50	IS 3025 Part 39: 1991 RA 2019
24.	Nitrate (as NO ₃)	mg/L	1	APHA 23 rd Edition 4500 -NO ₃ B: 2017
25.	Phenolic Compounds (as C ₆ H ₅ OH)	mg/L	0.001	IS 3025 Part 43: 1992 RA 2019
26.	Selenium (as Se)	mg/L	0.001	APHA 23 rd Edition 3114C:2017
27.	Silver (as Ag)	mg/L	0.03	APHA 23 rd Edition 3111B:2017
28.	Sulphate (as SO ₄)	mg/L	1	IS 3025 Part 24: 1986 RA 2019
29.	Sulphide (as H ₂ S)	mg/L	0.01	IS 3025 Part 29 : 1986 RA 2019
30.	Total Phosphate (as PO ₄)	mg/L	0.1	IS 3025 Part 31:1988 RA 2019
31.	Total Alkalinity (as CaCO ₃)	mg/L	1	IS 3025 Part 23: 1986 RA 2019
32.	Total Hardness (as CaCO ₃)	mg/L	1	IS 3025 Part 21: 2009 RA 2019
33.	Calcium Hardness (as CaCO ₃)	mg/L	1	IS 3025 Part 40: 1991 RA 2019
34.	Zinc (as Zn)	mg/L	0.008	APHA 23 rd Edition 3111B:2017
35.	Sodium (as Na)	mg/L	1	IS 3025 Part 45: 1993 RA 2019
36.	Potassium (as K)	mg/L	0.5	IS 3025 Part 45: 1993 RA 2019
37.	Sodium Absorption Ratio	-	1	IS 11624 : 1986
38.	Cadmium (as Cd)	mg/L	0.003	IS 3025 Part 41: 1992 RA 2019
39.	Cyanide (as CN)	mg/L	0.01	IS 3025 Part 27: 1986 RA 2019
40.	Lead (as Pb)	mg/L	0.01	IS 3025 Part 47: 1994 RA 2019
41.	Mercury (as Hg)	mg/L	0.001	IS 3025 Part 48: 1994 RA 2019
42.	Molybdenum (as Mo)	mg/L	0.07	APHA 23 rd Edition 3111D:2017
43.	Nickel (as Ni)	mg/L	0.02	IS 3025 Part 54: 2003 RA 2019
44.	Pesticide Residues			
i.	Alachlor	µg/L	0.005	SEAAL/INS/RWM/SOP/01

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Sr. No.	Parameter	Unit	Detection Limit	Method Reference
ii.	Atrazine	µg/L	0.005	SEAAL/INS/RWM/SOP/01
iii.	Aldrin/Dieldrin	µg/L	0.005	SEAAL/INS/RWM/SOP/01
iv.	Alpha HCH	µg/L	0.005	SEAAL/INS/RWM/SOP/01
v.	Beta HCH	µg/L	0.005	SEAAL/INS/RWM/SOP/01
vi.	Butachlor	µg/L	0.005	SEAAL/INS/RWM/SOP/01
vii.	Chlorpyrifos	µg/L	0.005	SEAAL/INS/RWM/SOP/01
viii.	Delta HCH	µg/L	0.005	SEAAL/INS/RWM/SOP/01
ix.	2,4D chlorophenoxyacetic acid	µg/L	0.005	SEAAL/INS/RWM/SOP/01
x.	DDT (o,p & p,p- Isomers of DDT, DDE, DDD)	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xi.	Endosulfan (□, □ & Sulphate)	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xii.	Ethion	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xiii.	γ HCH (Lindane)	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xiv.	Isoproturon	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xv.	Malathion	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xvi.	Methyl Parathion	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xvii.	Monocrotophos	µg/L	0.005	SEAAL/INS/RWM/SOP/01
xviii.	Phorate	µg/L	0.005	SEAAL/INS/RWM/SOP/01
45.	Polychlorinated Biphenyls (PCB)	mg/L	0.000005	SEAAL/INS/RWM/SOP/03
46.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	0.000005	SEAAL/INS/RWM/SOP/02
47.	Total Arsenic (as As)	mg/L	0.002	IS 3025 Part 37:1988 RA 2019
48.	Total Chromium (as Cr)	mg/L	0.05	IS 3025 Part 52 :2003 RA 2019
49.				
a)	Bromoform	mg/L	0.005	SEAAL/INS/RWM/SOP/04
b)	Dibromochloromethane	mg/L	0.005	SEAAL/INS/RWM/SOP/04
c)	Bromodichloroethane	mg/L	0.005	SEAAL/INS/RWM/SOP/04
d)	Chloroform	mg/L	0.005	SEAAL/INS/RWM/SOP/04
50.	<i>E.coli</i>	MPN/100 ml	2	IS 1622: 1981
51.	Total Coliforms	MPN/100 ml	2	IS 1622: 1981
52.	Faecal Coliforms	MPN/100 ml	2	IS 1622: 1981

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HYR-6.3. Ground Water Analysis Results for the period from October 2022 to March 2023:

Table 6.4: Ground Water Analysis Results

Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
Organoleptic & Physical Parameters							
1.	Colour	Hazen Units	Max. 5	Oct-22	1	1	1
				Nov-22	1	1	1
				Dec-22	1	1	1
				Jan-23	1	1	1
				Feb-23	1	1	1
				Mar-23	1	1	1
2.	Odour	-	Agreeable	Oct-22	Agreeable	Agreeable	Agreeable
				Nov-22	Agreeable	Agreeable	Agreeable
				Dec-22	Agreeable	Agreeable	Agreeable
				Jan-23	Agreeable	Agreeable	Agreeable
				Feb-23	Agreeable	Agreeable	Agreeable
				Mar-23	Agreeable	Agreeable	Agreeable
3.	pH Value	-	6.5 to 8.5	Oct-22	7.54	7.18	6.65
				Nov-22	7.15	7.08	6.84
				Dec-22	7.57	7.22	6.82
				Jan-23	7.63	6.57	6.63
				Feb-23	7.51	7.09	6.88
				Mar-23	7.41	7.11	6.81
4.	Turbidity	N.T.U.	Max. 1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
5.	Total Dissolved Solids	mg/L	Max. 500	Oct-22	260	92	285
				Nov-22	310	90.0	247
				Dec-22	280	109	272
				Jan-23	274	110	285
				Feb-23	271	62	290
				Mar-23	268	129	288

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
General Parameters concerning substances undesirable in excessive amounts							
6.	Aluminium (as Al)	mg/L	Max. 0.03	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
7.	Ammonia (as NH ₃ -N)	mg/L	Max.0.5	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
8.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	Max. 0.2	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
9.	Barium (as Ba)	mg/L	Max. 0.7	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
10.	Boron (as B)	mg/L	Max. 0.5	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
11.	Calcium (as Ca)	mg/L	Max. 75	Oct-22	25.6	7.20	9.60
				Nov-22	30.4	7.20	9.60
				Dec-22	22.4	7.20	9.60
				Jan-23	24.0	6.40	10.4
				Feb-23	24.0	6.40	10.40
				Mar-23	24.8	14.40	11.2
		mg/L	Max. 4.0	Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
12.	Chloramines (as Cl ₂)			Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
13.	Chloride (as Cl)	mg/L	Max.250	Oct-22	78.0	22.0	128
				Nov-22	90.6	31.2	117
				Dec-22	42.1	38.1	106
				Jan-23	78.5	49.3	109
				Feb-23	81.5	21.1	119
				Mar-23	111	70.0	176
14.	Copper (as Cu)	mg/L	Max.0.05	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
15.	Fluoride (as F)	mg/L	Max. 1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
16.	Iron (as Fe)	mg/L	Max.0.3	Oct-22	0.150	0.160	0.110
				Nov-22	0.140	0.310	0.220
				Dec-22	BDL	0.10	BDL
				Jan-23	0.140	0.100	BDL
				Feb-23	BDL	0.14	0.100
				Mar-23	0.160	0.120	0.180
17.	Magnesium (as Mg)	mg/L	Max. 30	Oct-22	9.93	1.49	11.9
				Nov-22	5.84	1.95	5.84
				Dec-22	12.7	2.92	10.7
				Jan-23	5.90	2.46	9.35
				Feb-23	6.89	1.97	8.4
				Mar-23	8.77	6.85	9.25
18.	Manganese (as Mn)	mg/L	Max.0.1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
19.	Mineral Oil	mg/L	Max.0.5	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
20.	Nitrate (as NO ₃)	mg/L	Max.45	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	6.20	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
21.	Phenolic Compounds (as C ₆ H ₅ OH)	mg/L	Max. 0.001	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
22.	Selenium (as Se)	mg/L	Max. 0.01	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
23.	Silver (as Ag)	mg/L	Max. 0.1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
24.	Sulphate (as SO ₄)	mg/L	Max. 200	Oct-22	17.8	9.89	46.5
				Nov-22	26.4	11.9	42.8
				Dec-22	22.2	12.4	46.2
				Jan-23	22.3	12.1	47.9
				Feb-23	18.5	5.2	33.6

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Mar-23	23.8	9.35	28.5
25.	Sulphide (as H ₂ S)	mg/L	Max. 0.05	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
26.	Total Alkalinity (as CaCO ₃)	mg/L	Max.200	Oct-22	92.5	10.1	6.03
				Nov-22	103	11.9	7.96
				Dec-22	87.6	11.9	7.96
				Jan-23	64.3	10.1	6.03
				Feb-23	70.4	12.1	6.03
				Mar-23	67.7	7.96	11.9
27.	Total Hardness (as CaCO ₃)	mg/L	Max. 200	Oct-22	97.9	22.4	73.4
				Nov-22	100	26.0	72.0
				Dec-22	108	30.0	68.0
				Jan-23	84.8	26.3	64.6
				Feb-23	88.9	16.2	56.6
				Mar-23	98.0	36.2	66.0
28.	Zinc (as Zn)	mg/L	Max. 5	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
Parameters Concerning Toxic Substances							
29.	Cadmium (as Cd)	mg/L	Max. 0.003	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
30.	Cyanide (as CN)	mg/L	Max.0.05	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
31.	Lead (as Pb)	mg/L	Max. 0.01	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
32.	Mercury (as Hg)	mg/L	Max. 0.001	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
33.	Molybdenum (as Mo)	mg/L	Max. 0.07	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
34.	Nickel (as Ni)	mg/L	Max.0.02	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
35. Pesticide Residues							
i.	Alachlor	µg/L	20	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
ii.	Atrazine	µg/L	2	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
	Aldrin/Dieldrin	µg/L	0.03	Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
iii.				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
iv.	Alpha HCH	µg/L	0.01	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
v.	Beta HCH	µg/L	0.04	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
vi.	Butachlor	µg/L	125	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
vii.	Chlorpyrifos	µg/L	30	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
viii.	Delta HCH	µg/L	0.04	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
ix.	2,4D chlorophenoxyacetic acid	µg/L	30	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
x.	DDT (o,p & p,p-Isomers of DDT, DDE, DDD)	µg/L	1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xi.	Endosulfan (α,β & Sulphate)	µg/L	0.4	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xii.	Ethion	µg/L	3	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xiii.	γ HCH (Lindane)	µg/L	2	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xiv.	Isoproturon	µg/L	9	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xv.	Malathion	µg/L	190	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
				Mar-23	BDL	BDL	BDL
xvi.	Methyl Parathion	µg/L	0.3	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xvii.	Monocrotophos	µg/L	1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
xviii.	Phorate	µg/L	2	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
36.	Polychlorinated Biphenyls (PCB)	mg/L	Max.0.0005	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
37.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	Max.0.0001	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
38.	Total Arsenic (as As)	mg/L	Max. 0.01	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
39.		mg/L	Max. 0.05	Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
	Total Chromium (as Cr)			Nov-22	BDL	BDL	BDL
Dec-22				BDL	BDL	BDL	
Jan-23				BDL	BDL	BDL	
Feb-23				BDL	BDL	BDL	
Mar-23				BDL	BDL	BDL	
40. Trihalomethanes							
a)	Bromoform	mg/L	Max. 0.1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
b)	Dibromochloroethane	mg/L	Max. 0.1	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
c)	Bromodichloroethane	mg/L	Max. 0.06	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
d)	Chloroform	mg/L	Max. 0.2	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
Bacteriological Analysis							
41.	E.coli	MPN Index /100 ml	Not Detectable	Oct-22	BDL	BDL	BDL
				Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL
42.	Total Coliforms			Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Acceptable Limit as per IS 10500: 2012	Month	Port Site (Open well) G1	Proposed Port Estate Area (Open well) G2	PAF Area (Open well) G3
		MPN Index /100 ml	Not Detectable	Nov-22	BDL	BDL	BDL
				Dec-22	BDL	BDL	BDL
				Jan-23	BDL	BDL	BDL
				Feb-23	BDL	BDL	BDL
				Mar-23	BDL	BDL	BDL

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**HYR-6.4. Graphical representation of Results for Ground Water Analysis:
Figure 6.2: Ground Water Analysis for pH**

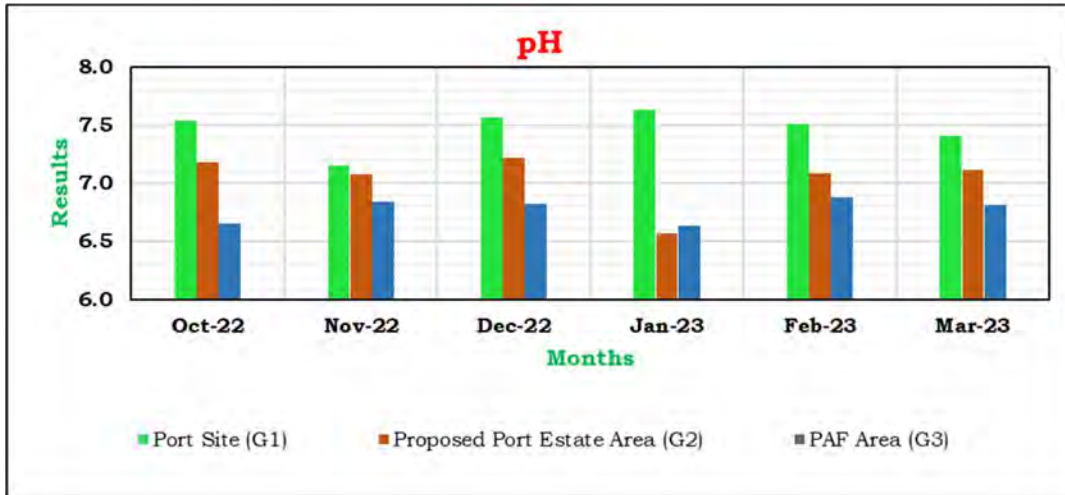


Figure 6.3: Ground Water Analysis for Total Dissolved Solids



Figure 6.4: Ground Water Analysis for Chloride

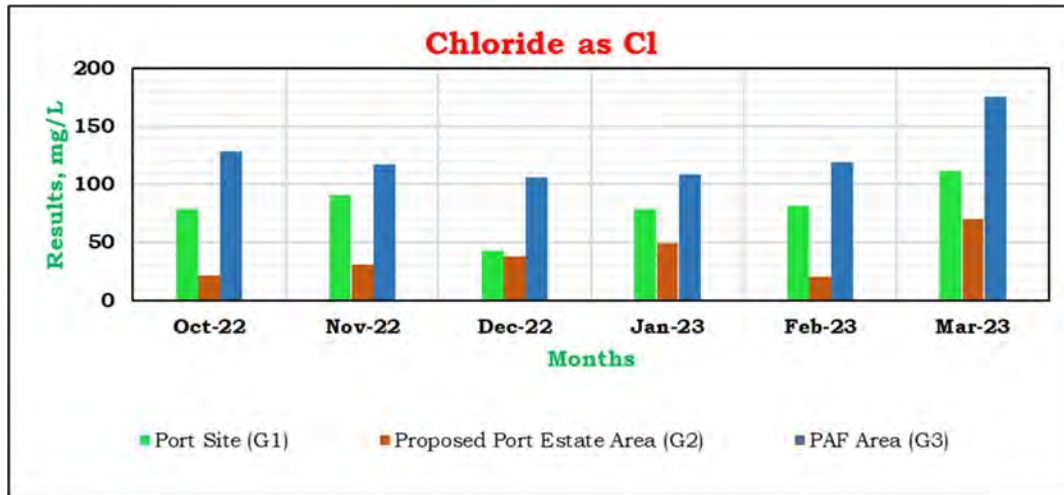


Figure 6.5: Ground Water Analysis for Sulphate as SO₄

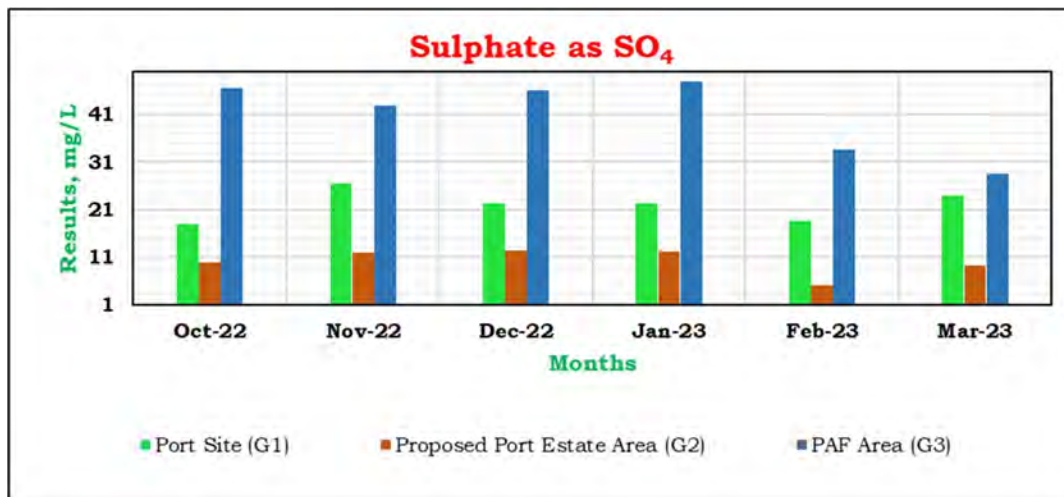


Figure 6.6: Ground Water Analysis for Calcium as Ca

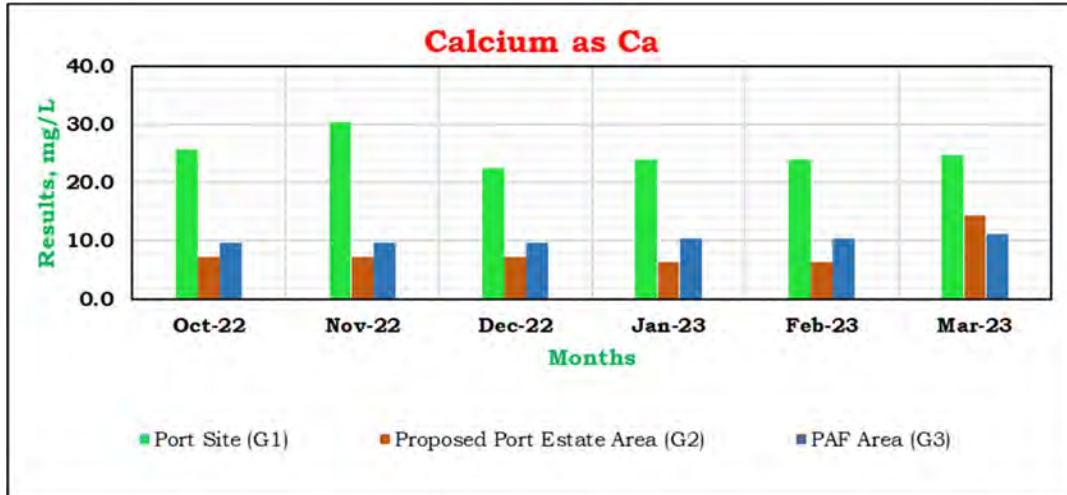


Figure 6.7: Ground Water Analysis for Magnesium as Mg

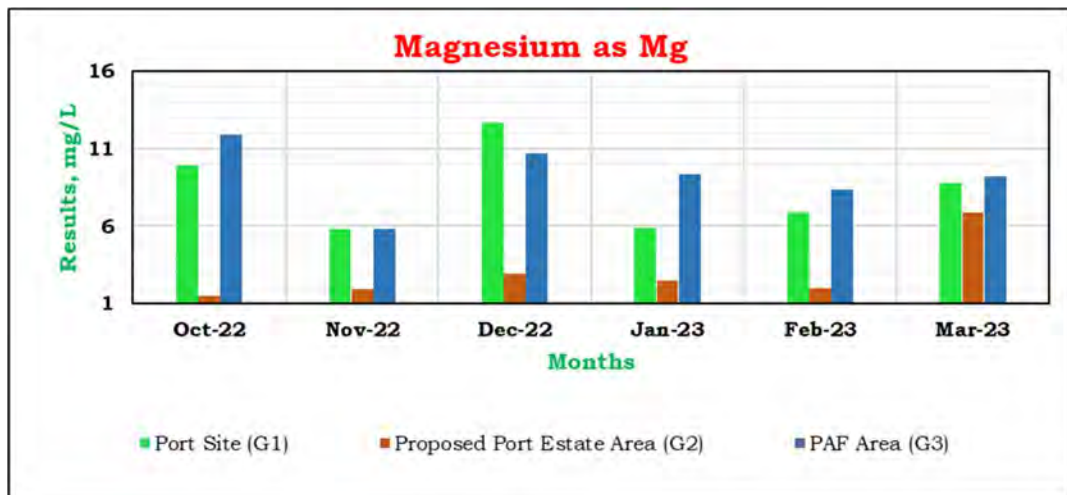


Figure 6.8: Ground Water Analysis for Iron as Fe

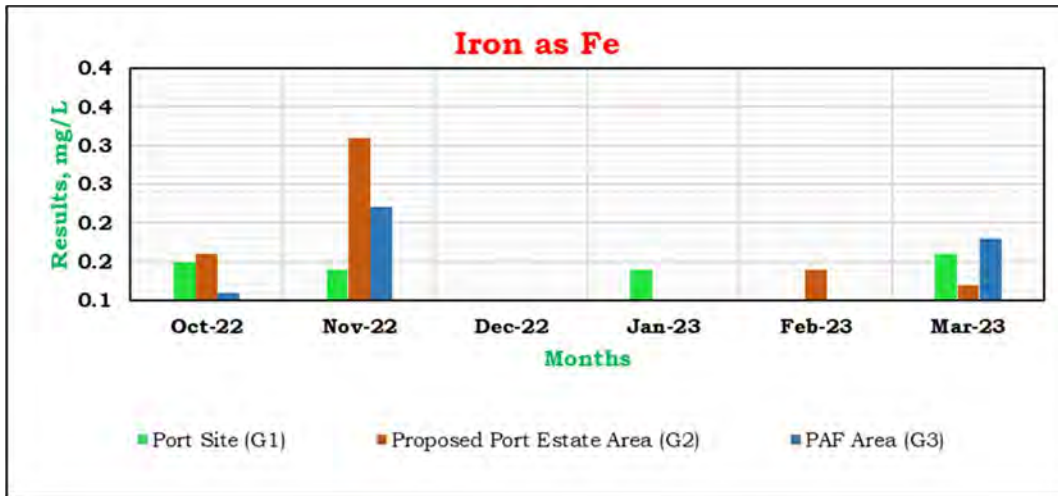


Figure 6.9: Ground Water Analysis for Total Alkalinity as CaCO₃

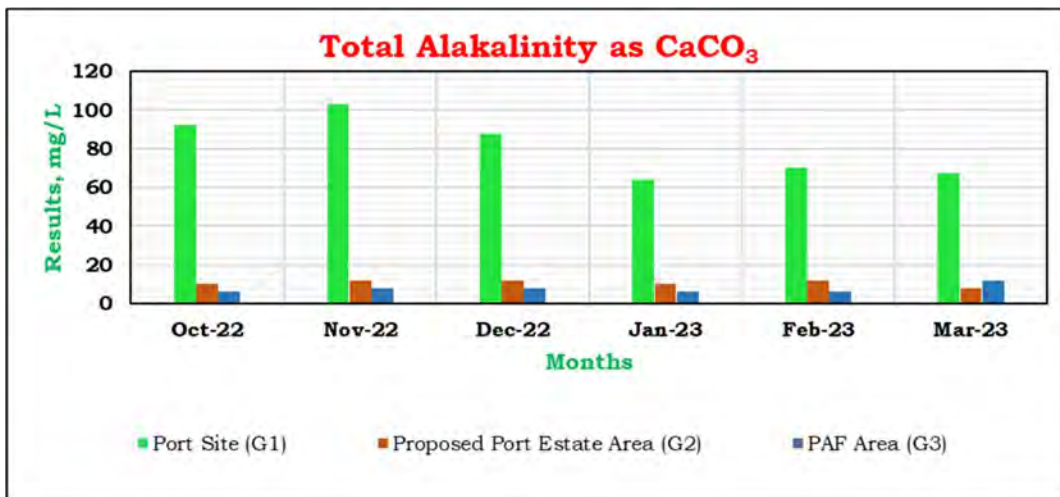
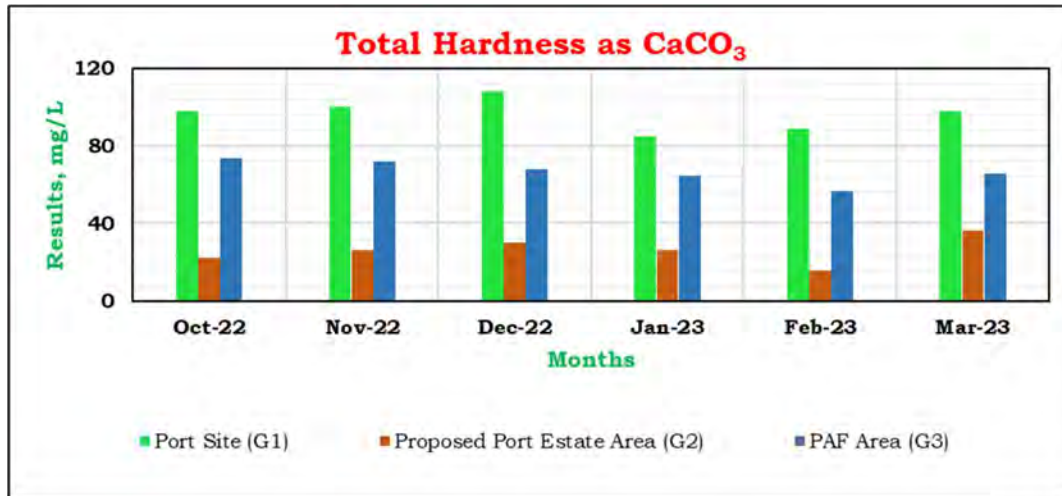


Figure 6.10: Ground Water Analysis for Total Hardness as CaCO₃



HYR-6.5. Summary- Ground Water Analysis

During the period from October 2022 to March 2023, following is the summary of ground water analysis:

- a) At the location **Port Site** (Open Well),
 - Colour observed was 1 Hazen unit and the odour was agreeable
 - pH was observed in the range from 7.15 to 7.63
 - Total Dissolved Solids were observed in the range from 260 to 310 mg/L
 - Calcium (as Ca) was observed in the range from 22.4 to 30.4 mg/L
 - Chloride (as Cl) was observed in the range from 42.1 to 111 mg/L
 - Iron (as Fe) was observed in the range from 0.14 to 0.16 mg/L
 - Magnesium (as Mg) was observed in the range from 5.84 to 12.7 mg/L
 - Sulphate (as SO₄) was observed in the range from 17.8 to 26.4 mg/L
 - Total Alkalinity (as CaCO₃) was observed in the range from 64.3 to 103 mg/L
 - Total Hardness (as CaCO₃) was observed in the range from 84.8 to 108 mg/L
 - Turbidity, Ammonia (as NH₃-N), Manganese (as Mn), Nitrate (as NO₃), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba),

Boron (as B) Chloramines (as Cl₂), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C₆H₅OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H₂S), 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 detectable limits

- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.
- b) At the location **Proposed Port Estate Area** (Open Well),
- Colour observed was 1 Hazen unit and the odour was agreeable
 - pH was observed in the range from 6.57 to 7.22
 - Total Dissolved Solids were observed in the range from 62 to 129 mg/L
 - Calcium (as Ca) was observed in the range from 6.4 to 14.4 mg/L
 - Chloride (as Cl) was observed in the range from 21.1 to 70 mg/L
 - Iron (as Fe) was observed in the range from 0.1 to 0.31 mg/L
 - Magnesium (as Mg) was observed in the range from 1.49 to 6.85 mg/L
 - Sulphate (as SO₄) was observed in the range from 5.21 to 12.4 mg/L
 - Total Alkalinity (as CaCO₃) was observed in the range from 7.96 to 12.1 mg/L
 - Total Hardness (as CaCO₃) was observed in the range from 16.2 to 36.2 mg/L
 - Turbidity, Ammonia (as NH₃-N), Manganese (as Mn), Nitrate (as NO₃), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl₂), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C₆H₅OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H₂S), 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 detectable limits
 - Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.
- c) At the location **PAF Area** (Open Well),
- Colour observed was 1 Hazen unit and the odour was agreeable
 - pH was observed in the range from 6.63 to 6.88

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- Total Dissolved Solids were observed in the range from 247 to 290 mg/L
- Calcium (as Ca) was observed in the range from 9.6 to 11.2 mg/L
- Chloride (as Cl) was observed in the range from 106 to 176 mg/L
- Iron (as Fe) was observed in the range from 0.1 to 0.22 mg/L
- Magnesium (as Mg) was observed in the range from 5.84 to 11.9 mg/L
- Sulphate (as SO₄) was observed in the range from 28.5 to 47.9 mg/L
- Total Alkalinity (as CaCO₃) was observed in the range from 6.03 to 11.9 mg/L
- Total Hardness (as CaCO₃) was observed in the range from 56.6 to 73.4 mg/L
- Turbidity, Ammonia (as NH₃-N), Manganese (as Mn), Nitrate (as NO₃), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl₂), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C₆H₅OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H₂S), 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 detectable limits
- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected.

d) Summary – Comparison of Results of **All Locations**,

- Colour observed was 1 Hazen unit and the odour was agreeable in all locations
- Maximum value of pH observed was 7.63 at Port Site
- Maximum value of Total Dissolved Solids observed was 310 mg/L at Port Site
- Maximum value of Calcium (as Ca) observed was 30.4 mg/L at Port Site
- Maximum value of Chloride (as Cl) observed was 176 mg/L at PAF area
- Maximum value of Iron (as Fe) observed was 0.31 mg/L at Proposed Port Estate Area
- Maximum value of Magnesium (as Mg) observed was 12.7 mg/L at Port Site
- Maximum value of Sulphate (as SO₄) observed was 47.9 mg/L at PAF area

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- Maximum value of Total Alkalinity (as CaCO₃) observed was 103 mg/L at Port Site
- Maximum value of Total Hardness (as CaCO₃) observed was 108 mg/L at Port Site
- Turbidity, Ammonia (as NH₃-N), Manganese (as Mn), Nitrate (as NO₃), Aluminium (as Al), Zinc (as Zn), Anionic Detergents, Barium (as Ba), Boron (as B) Chloramines (as Cl₂), Fluoride (as F), Copper (as Cu), Mineral Oil, Phenolic Compounds(as C₆H₅OH), Selenium (as Se), Silver (as Ag), Hydrogen Sulphide (as H₂S), 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 detectable limits at all locations
- Bacteriological parameters such as *E.coli* and Total Coliforms were not detected at all locations.

HYR-6.6. Surface Water Analysis Results for the period from October 2022 to March 2023:

Table 6.5: Surface Water Analysis Results

Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
Physical Parameters						
1.	Colour	Hazen Units	Oct-22	1	1	1
			Nov-22	1	1	1
			Dec-22	1	1	1
			Jan-23	1	1	1
			Feb-23	1	1	1
			Mar-23	1	1	1
2.	Odour	-	Oct-22	Agreeable	Agreeable	Agreeable
			Nov-22	Agreeable	Agreeable	Agreeable
			Dec-22	Agreeable	Agreeable	Agreeable
			Jan-23	Agreeable	Agreeable	Agreeable
			Feb-23	Agreeable	Agreeable	Agreeable
			Mar-23	Agreeable	Agreeable	Agreeable
3.	pH Value	-	Oct-22	6.85	7.58	7.2
			Nov-22	6.89	7.48	7.26
			Dec-22	7.23	7.63	7.47
			Jan-23	7.09	7.05	7.11
			Feb-23	7.32	7.28	7.29
			Mar-23	7.03	7.14	7.41
4.	Turbidity	N.T.U.	Oct-22	0.7	0.5	BDL
			Nov-22	3	1	BDL
			Dec-22	0.5	1	BDL
			Jan-23	0.6	1.00	0.1
			Feb-23	1.6	2.7	0.7
			Mar-23	0.4	0.90	0.8
5.	Electrical Conductivity (at 25°C)	µmho/cm	Oct-22	1716	400	270
			Nov-22	345	384	276
			Dec-22	556	328	290
			Jan-23	596	302	250
			Feb-23	518	306	279
			Mar-23	207	770	523
6.	Total Dissolved Solids	mg/L	Oct-22	944	180	135
			Nov-22	138	154	138
			Dec-22	358	155	165
			Jan-23	328	150	145
			Feb-23	310	152	156
			Mar-23	102	402	294

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
Chemical Parameters						
7.	Dissolved Oxygen	mg/L	Oct-22	6.5	7.1	6.9
			Nov-22	6.8	6.9	7.1
			Dec-22	6.9	7.1	6.8
			Jan-23	6.8	6.9	6.9
			Feb-23	6.8	7.1	6.9
			Mar-23	6.9	7.2	7.1
8.	Biochemical Oxygen Demand (3 days, 27°C)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
9.	Oil & Grease	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
10.	Free Ammonia	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
11.	Anionic Detergents (as MBAS) Calculated as LAS mol.wt. 288.38	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
12.	Barium (as Ba)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
13.	Boron (as B)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
14.	Calcium (as Ca)	mg/L	Oct-22	24.0	16.8	9.60

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
			Nov-22	5.6	12.8	8.80
			Dec-22	22.4	13.6	12.8
			Jan-23	16.0	8.0	9.6
			Feb-23	9.6	9.6	12.0
			Mar-23	5.6	15.2	14.4
15.	Chloride (as Cl)	mg/L	Oct-22	450	48	38.9
			Nov-22	51.3	41.3	36.2
			Dec-22	58.7	40.1	55.8
			Jan-23	137	39.3	51.4
			Feb-23	161	42.3	48.3
16.	Copper (as Cu)	mg/L	Mar-23	35.2	176	195
			Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
17.	Fluoride (as F)	mg/L	Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
18.	Iron (as Fe)	mg/L	Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	0.56	0.14	BDL
			Nov-22	0.83	0.52	BDL
19.	Magnesium (as Mg)	mg/L	Dec-22	0.25	0.25	BDL
			Jan-23	0.44	1.12	BDL
			Feb-23	0.42	0.67	BDL
			Mar-23	0.48	0.81	BDL
			Oct-22	29.5	2.48	1.95
20.	Manganese (as Mn)	mg/L	Nov-22	2.92	2.44	1.95
			Dec-22	15.6	3.89	3.41
			Jan-23	2.95	2.95	4.43
			Feb-23	8.85	3.93	3.44
			Mar-23	3.90	11.7	12.6
21.	Mineral Oil	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
22.	Nitrate (as NO ₃)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
23.	Phenolic Compounds (as C ₆ H ₅ OH)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
24.	Selenium (as Se)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
25.	Silver (as Ag)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
26.	Sulphate (as SO ₄)	mg/L	Oct-22	60.4	10.4	8.26
			Nov-22	5.71	5.35	5.16
			Dec-22	36.2	5.27	6.47
			Jan-23	17.6	5.27	6.57
			Feb-23	16.1	7.19	6.57
			Mar-23	4.99	15.8	17.8
27.	Total Phosphate (as PO ₄)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
28.	Total Alkalinity (as CaCO ₃)	mg/L	Oct-22	16.1	38.2	30.2
			Nov-22	17.9	39.8	33.8
			Dec-22	15.9	37.8	27.9
			Jan-23	20.1	30.2	36.2
			Feb-23	24.1	42.2	38.2

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
29.	Total Hardness (as CaCO ₃)	mg/L	Mar-23	25.9	41.8	6.65
			Oct-22	182	40.8	32.0
			Nov-22	26	42.0	30.0
			Dec-22	120	50.0	46.0
			Jan-23	52.5	32.3	42.4
			Feb-23	61	40.4	44.4
30.	Calcium Hardness (as CaCO ₃)	mg/L	Mar-23	30.0	86.0	67.3
			Oct-22	70.0	34.0	24.0
			Nov-22	14.0	32.0	22.0
			Dec-22	56.0	34.0	32.0
			Jan-23	40.4	20.2	24.2
			Feb-23	24.2	24.2	30.3
31.	Zinc (as Zn)	mg/L	Mar-23	24.2	24.2	36.0
			Oct-22	0.055	BDL	BDL
			Nov-22	0.025	BDL	BDL
			Dec-22	0.025	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
32.	Sodium (as Na)	mg/L	Mar-23	18.5	78.0	97.6
			Oct-22	215	24.92	19.75
			Nov-22	22.01	22.06	14.38
			Dec-22	110	19.0	22.3
			Jan-23	68.23	18.92	39.1
			Feb-23	77	22.8	21.7
33.	Potassium (as K)	mg/L	Mar-23	1.24	10.5	7.83
			Oct-22	15.64	6.13	3.99
			Nov-22	2.31	3.56	3.38
			Dec-22	6.77	4.44	4.27
			Jan-23	5.02	4.46	8.9
			Feb-23	6.43	5.57	3.55
34.	Sodium Adsorption Ratio	-	Mar-23	1.467	3.654	4.455
			Oct-22	6.941	1.474	1.517
			Nov-22	1.876	1.479	1.141
			Dec-22	4.363	1.166	1.426
			Jan-23	4.108	1.451	2.616
			Feb-23	4.290	1.566	1.417
35.	Cadmium (as Cd)	mg/L	Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
36.	Cyanide (as CN)	mg/L	Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
37.	Lead (as Pb)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
38.	Mercury (as Hg)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
39. Pesticide Residues						
i.	Alachlor	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
ii.	Atrazine	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
iii.	Aldrin/Dieldrin	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
iv.	Alpha HCH	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
v.	Beta HCH	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
vi.	Butachlor	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
vii.	Chlorpyrifos	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
viii.	Delta HCH	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
ix.	2,4D chlorophenoxyacetic acid	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
x.	DDT (o,p & p,p-Isomers of DDT, DDE, DDD)	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
xi.	Endosulfan (α,β & Sulphate)	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
xii.	Ethion	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
xiii.	γ HCH (Lindane)	µg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
xiv.	Isoproturon	µg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
xv.	Malathion	µg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
xvi.	Methyl Parathion	µg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
xvii.	Monocrotophos	µg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
xviii.	Phorate	µg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL
40.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/L	Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
			Oct-22	BDL	BDL	BDL

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Sl. No.	Parameters	Unit	Month	Poovar West Canal (S1)	Vizhinjam Branch Canal (S2)	Vellayani Lake (S3)
41.	Total Arsenic (as As)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
42.	Total Chromium (as Cr)	mg/L	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
Biological Analysis						
43.	Total Coliforms	MPN Index/100 ml	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL
44.	Faecal Coliforms	MPN Index/100 ml	Oct-22	BDL	BDL	BDL
			Nov-22	BDL	BDL	BDL
			Dec-22	BDL	BDL	BDL
			Jan-23	BDL	BDL	BDL
			Feb-23	BDL	BDL	BDL
			Mar-23	BDL	BDL	BDL

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HYR-6.7. Graphical representation of Results for Surface Water Analysis:

Figure 6.10: Surface Water Analysis for pH value

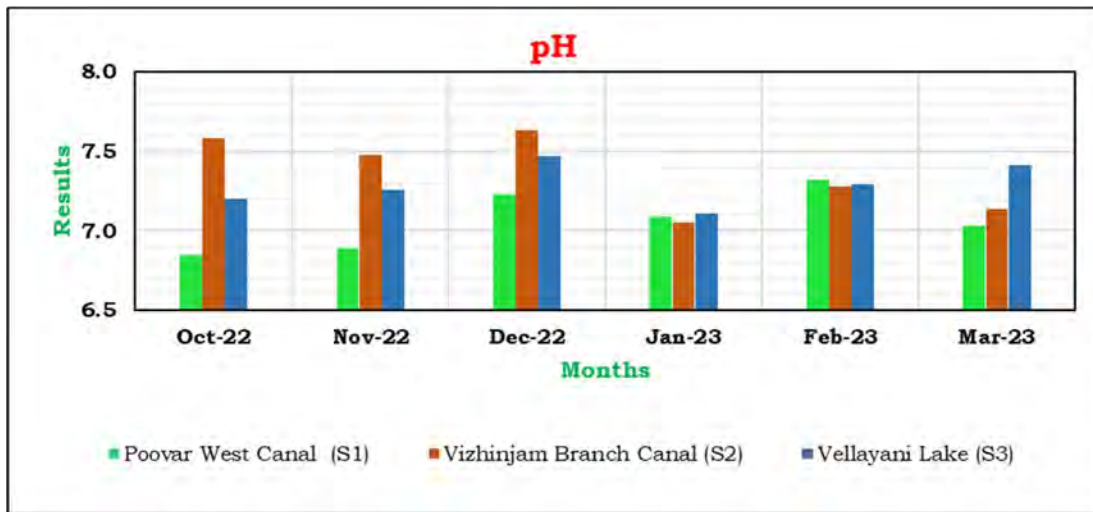


Figure 6.11: Surface Water Analysis for Turbidity

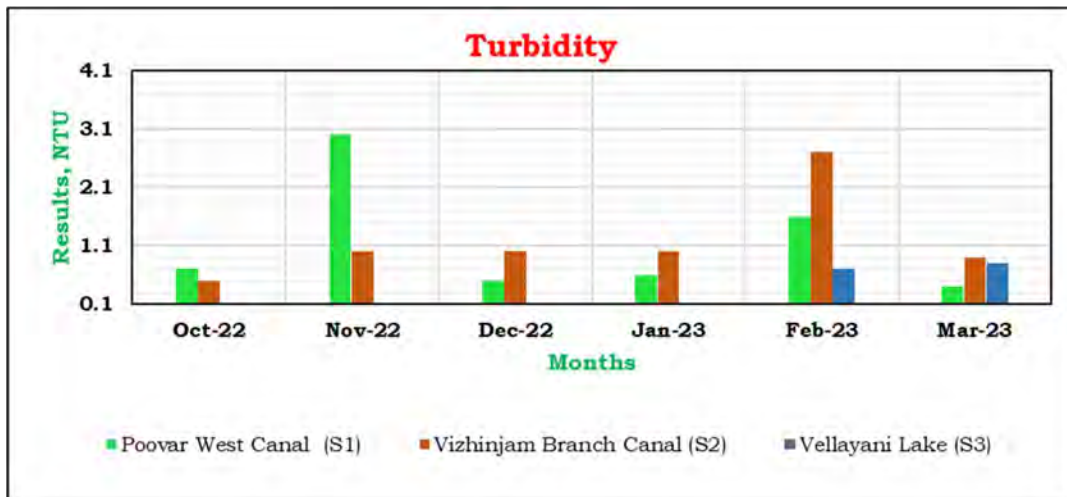


Figure 6.12: Surface Water Analysis for Electrical Conductivity @ 25 °C

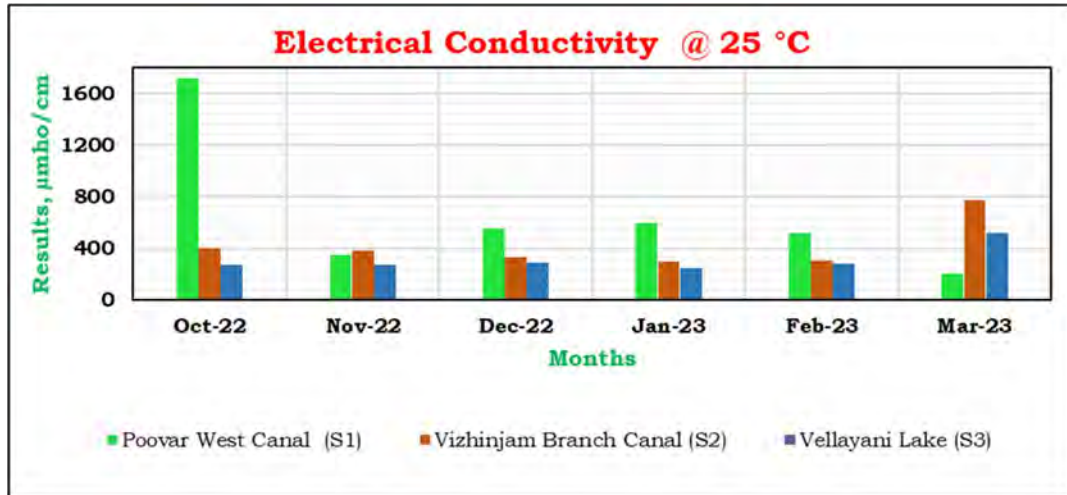


Figure 6.13: Surface Water Analysis for Total Dissolved Solids

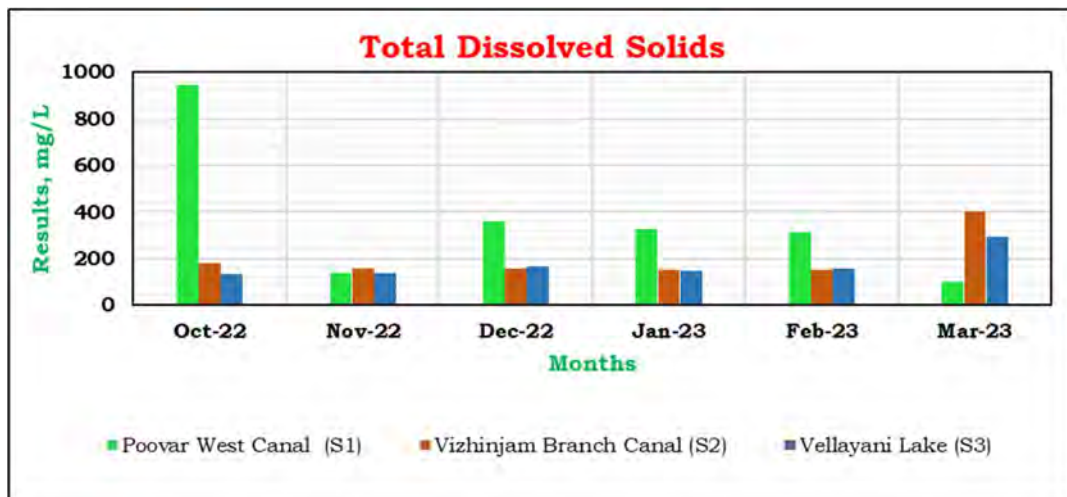


Figure 6.14: Surface Water Analysis for Dissolved Oxygen

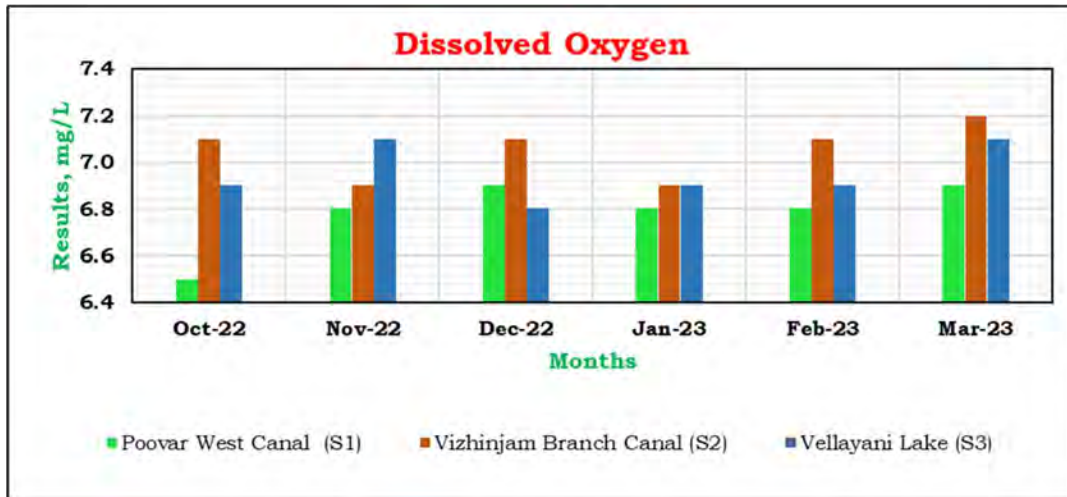


Figure 6.15: Surface Water Analysis for Chloride as Cl

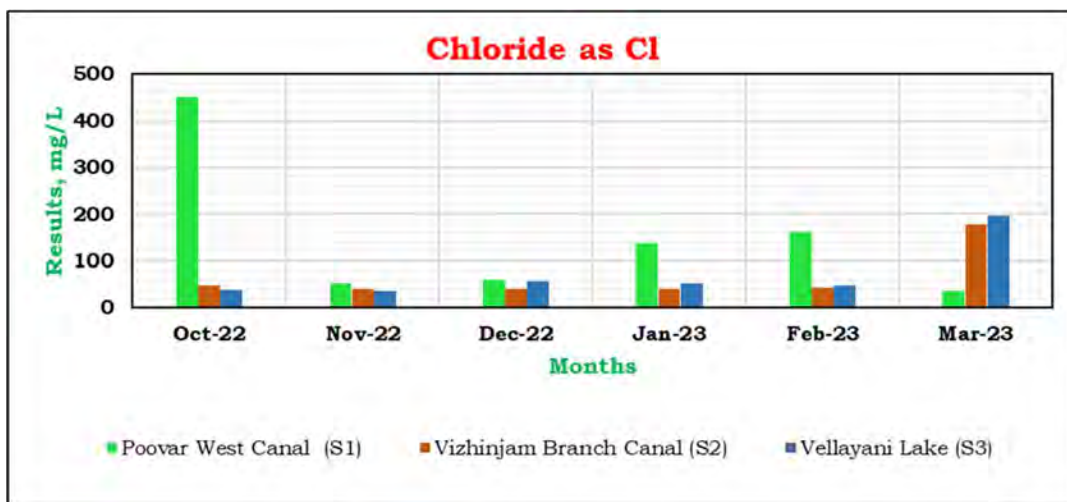


Figure 6.16: Surface Water Analysis for Sulphate as SO₄

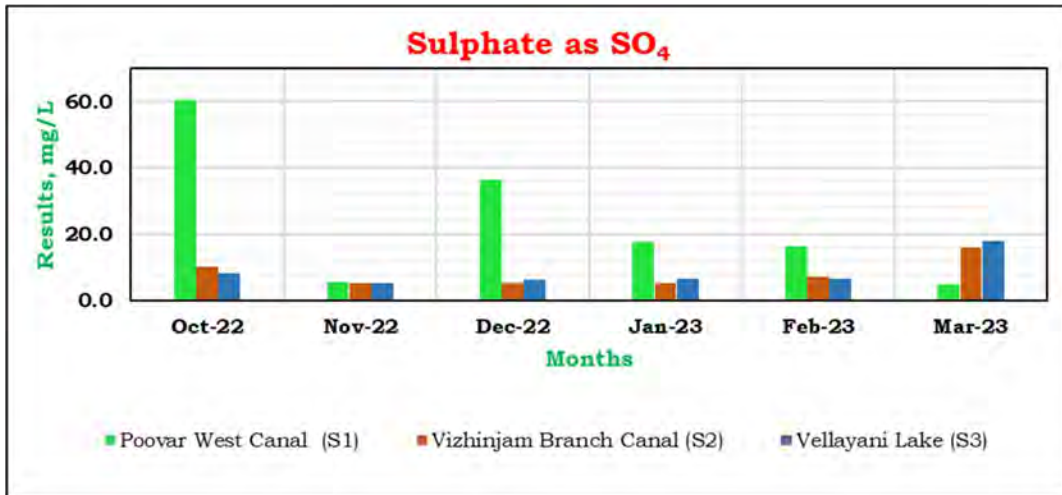


Figure 6.17: Surface Water Analysis for Calcium as Ca

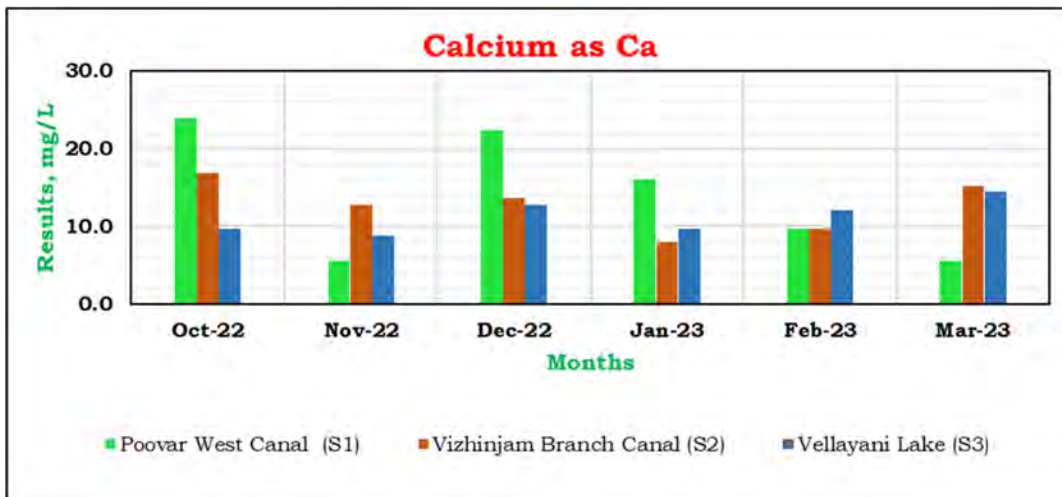


Figure 6.18: Surface Water Analysis for Magnesium as Mg

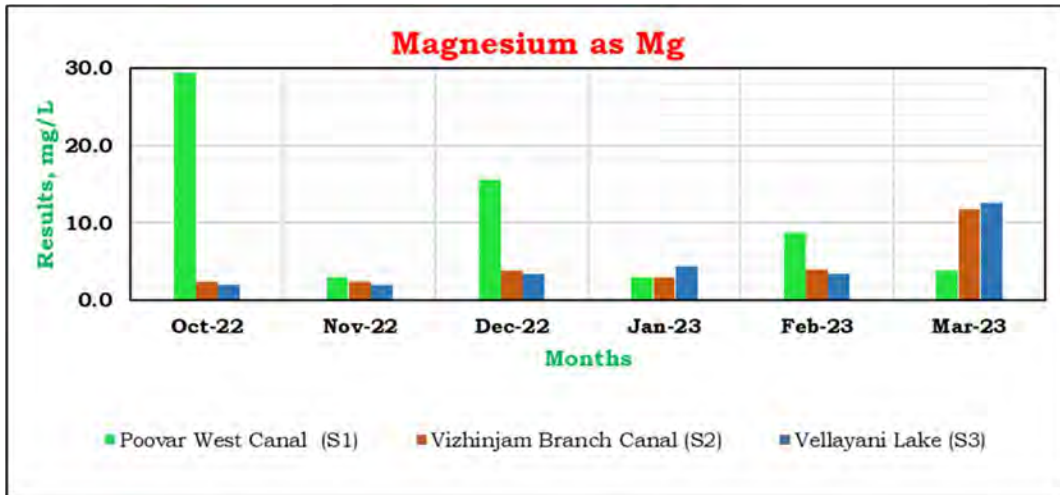


Figure 6.19: Surface Water Analysis for Iron as Fe

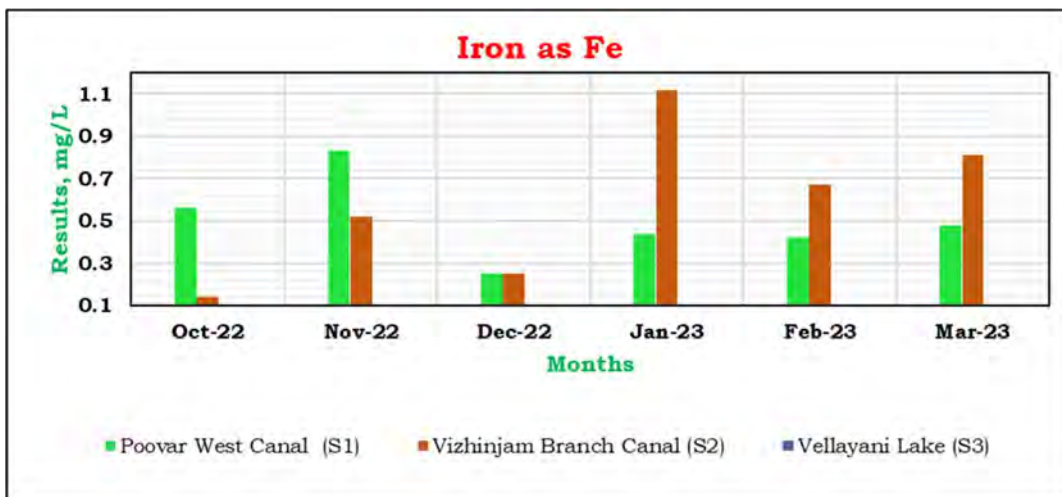


Figure 6.20: Surface Water Analysis for Zinc as Zn

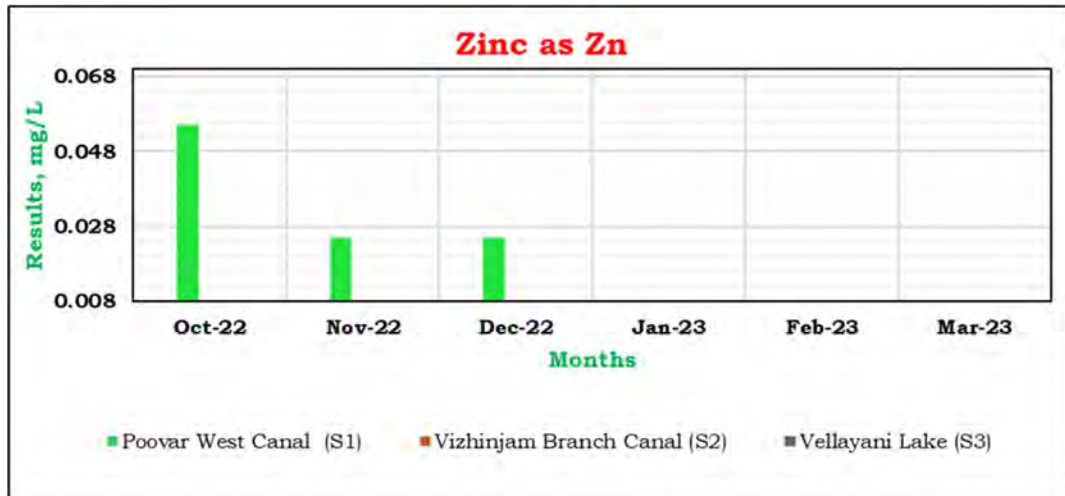


Figure 6.21: Surface Water Analysis for Total Alkalinity as CaCO₃

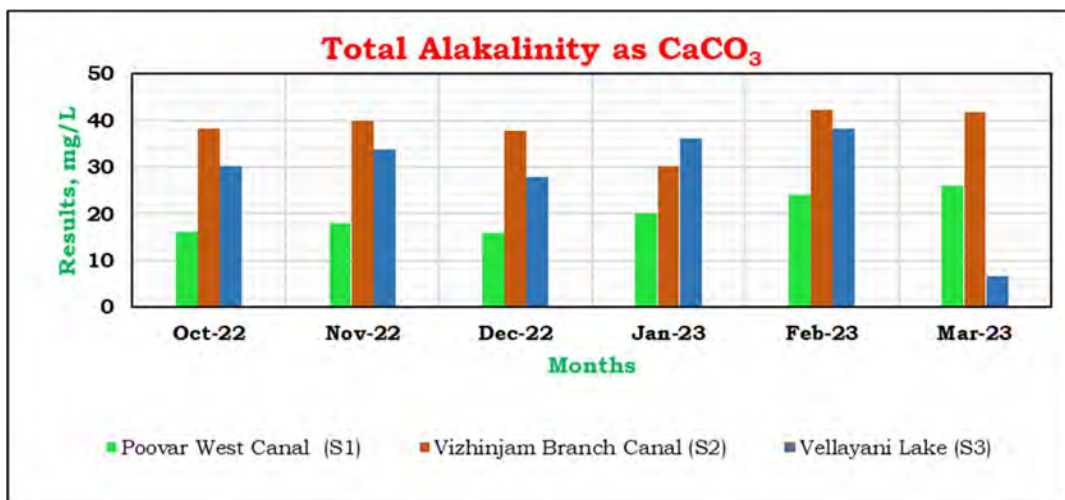


Figure 6.22: Surface Water Analysis for Total Hardness as CaCO₃

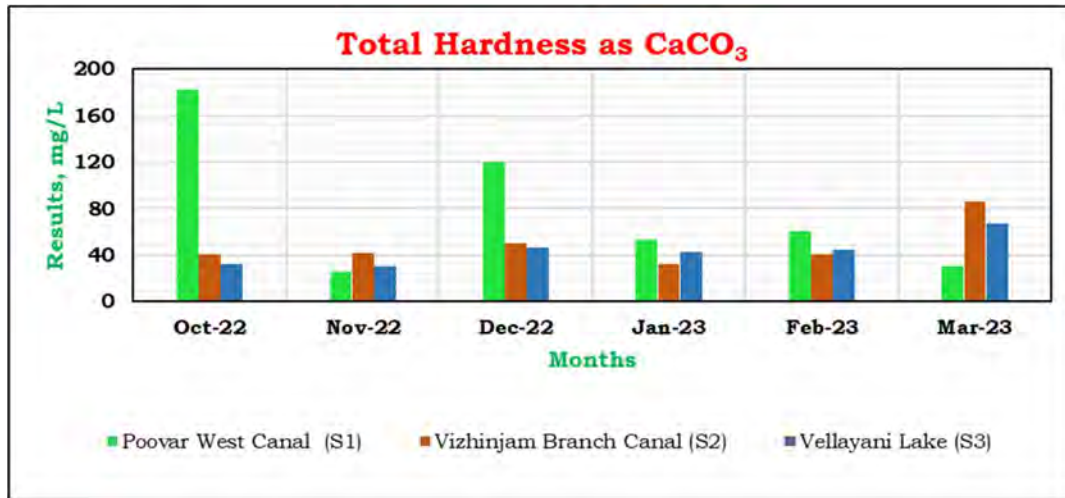


Figure 6.23: Surface Water Analysis for Calcium Hardness as CaCO₃

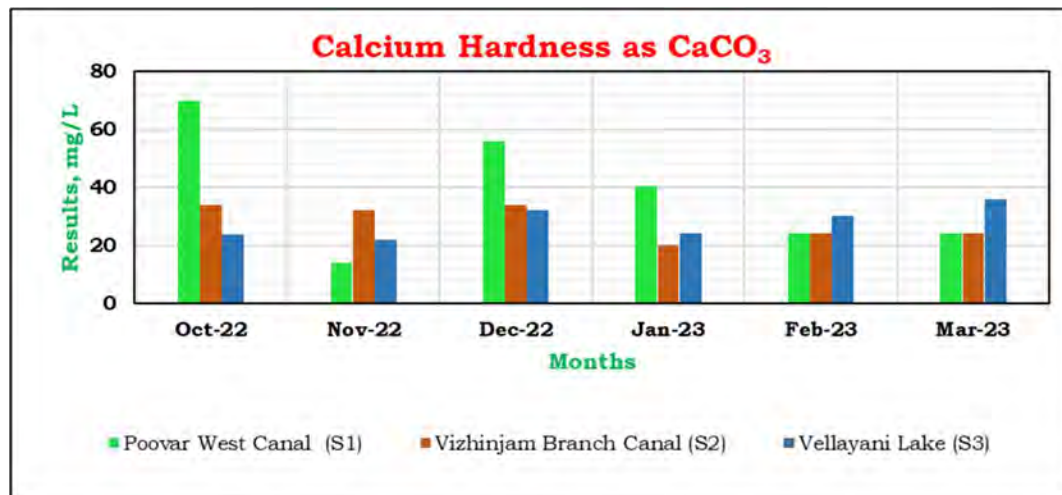


Figure 6.24: Surface Water Analysis for Sodium as Na

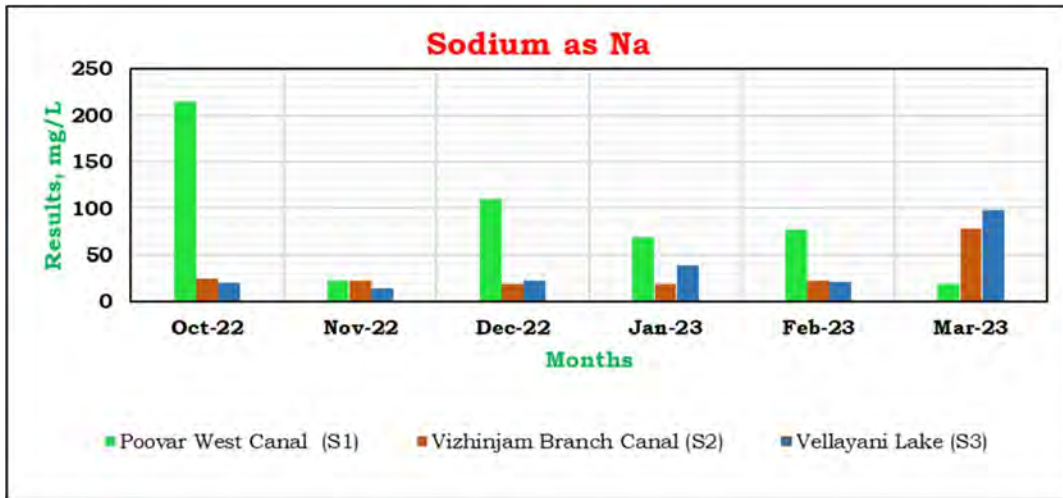


Figure 6.25: Surface Water Analysis for Potassium as K

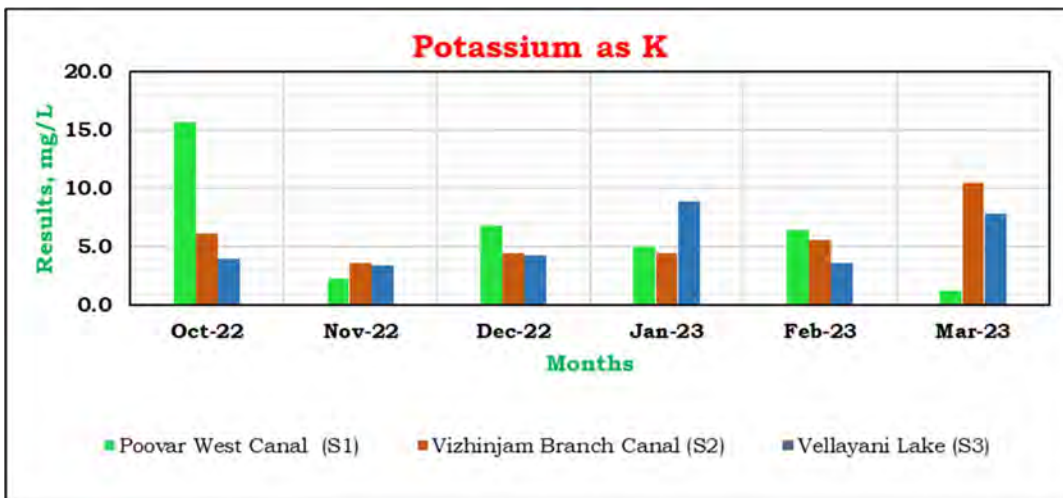
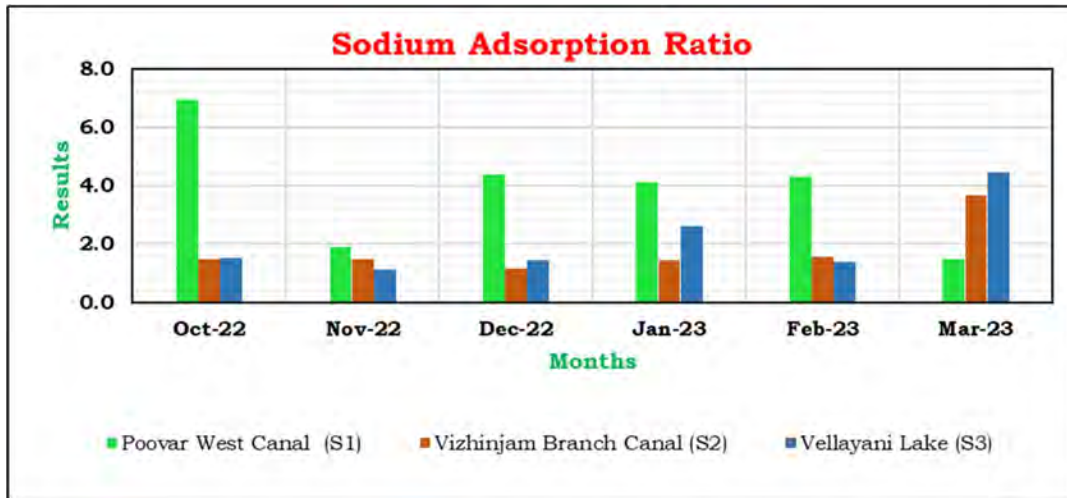


Figure 6.26: Surface Water Analysis for Sodium Adsorption Ratio



HYR-6.8. Summary of Surface water

During the period from October 2022 to March 2023, following is the summary of surface water analysis:

- a) At the location **Poovar West Canal**,
- Colour was observed 1 Hazen unit
 - Odour was agreeable
 - pH was observed in the range from 6.85 to 7.32
 - Turbidity was observed in the range from 0.4 to 3 N.T.U.
 - Total Dissolved Solids were observed in the range from 102 to 944 mg/L
 - Electrical Conductivity was observed in the range from 207 to 1716 $\mu\text{mho/cm}$
 - Dissolved Oxygen was observed in the range from 6.5 to 6.9 mg/L
 - Calcium (as Ca) was observed in the range from 5.6 to 24 mg/L
 - Chloride (as Cl) was observed in the range from 35.2 to 450 mg/L
 - Iron (as Fe) was observed in the range from 0.25 to 0.83 mg/L
 - Magnesium (as Mg) was observed in the range from 2.92 to 29.5 mg/L

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- Sulphate (as SO₄) was observed in the range from 4.99 to 60.4 mg/L
- Total Alkalinity (as CaCO₃) was observed in the range from 15.9 to 25.9 mg/L
- Total Hardness (as CaCO₃) was observed in the range from 26 to 182 mg/L
- Calcium Hardness (as CaCO₃) was observed in the range from 14 to 70 mg/L
- Sodium (as Na) was observed in the range from 18.5 to 215 mg/L
- Potassium (as K) was observed in the range from 1.24 to 15.64 mg/L
- Sodium Absorption Ratio was observed in the range from 1.467 to 6.941
- Zinc (as Zn) was observed in the range from 0.025 to 0.055 mg/L
- Free Ammonia, Fluoride, Manganese (as Mn), Nitrate (as NO₃), Total Phosphate (as PO₄), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Mineral Oil, Phenolic Compounds (as C₆H₅OH), Selenium (as Se), Silver (as Ag), 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 detectable limits
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected

b) At the location **Vizhinjam Branch Canal**,

- Colour was observed 1 Hazen unit
- Odour was agreeable
- pH was observed in the range from 7.05 to 7.63
- Turbidity was observed in the range from 0.5 to 2.7 N.T.U.
- Total Dissolved Solids were observed in the range from 150 to 402 mg/L
- Electrical Conductivity was observed in the range from 302 to 770 µmho/cm
- Dissolved Oxygen was observed in the range from 6.9 to 7.2 mg/L
- Calcium (as Ca) was observed in the range from 8.0 to 16.8 mg/L
- Chloride (as Cl) was observed in the range from 39.3 to 176 mg/L
- Iron (as Fe) was observed in the range from 0.14 to 1.12 mg/L
- Magnesium (as Mg) was observed in the range from 2.44 to 11.7 mg/L
- Sulphate (as SO₄) was observed in the range from 5.27 to 15.8 mg/L

- Total Alkalinity (as CaCO₃) was observed in the range from 30.2 to 42.2 mg/L
 - Total Hardness (as CaCO₃) was observed in the range from 32.3 to 86.0 mg/L
 - Calcium Hardness (as CaCO₃) was observed in the range from 20.2 to 34.0 mg/L
 - Sodium (as Na) was observed in the range from 18.9 to 78.0 mg/L
 - Potassium (as K) was observed in the range from 3.56 to 10.5 mg/L
 - Sodium Absorption Ratio was observed in the range from 1.166 to 3.654
 - Free Ammonia, Zinc (as Zn), Total Phosphate (as PO₄), Nitrate (as NO₃), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Manganese (as Mn), Mineral Oil, Phenolic Compounds (as C₆H₅OH), Selenium (as Se), Silver (as Ag), 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 detectable limits
 - Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected
- c) At the location **Vellayani Lake**,
- Colour was observed 1 Hazen unit
 - Odour was agreeable
 - pH was observed in the range from 7.11 to 7.47
 - Turbidity was observed in the range from 0.1 to 0.8 N.T.U.
 - Total Dissolved Solids were observed in the range from 135 to 294 mg/L
 - Electrical Conductivity was observed in the range from 250 to 523 µmho/cm
 - Dissolved Oxygen was observed in the range from 6.8 to 7.1 mg/L
 - Calcium (as Ca) was observed in the range from 8.8 to 14.4 mg/L
 - Chloride (as Cl) was observed in the range from 36.2 to 195 mg/L
 - Magnesium (as Mg) was observed in the range from 1.95 to 12.6 mg/L
 - Sulphate (as SO₄) was observed in the range from 5.16 to 17.8 mg/L
 - Total Alkalinity (as CaCO₃) was observed in the range from 6.65 to 38.2 mg/L
 - Total Hardness (as CaCO₃) was observed in the range from 30 to 67.3 mg/L

- Calcium Hardness (as CaCO₃) was observed in the range from 22 to 36 mg/L
- Sodium (as Na) was observed in the range from 14.38 to 96.6 mg/L
- Potassium (as K) was observed in the range from 3.38 to 8.9 mg/L
- Sodium Absorption Ratio was observed in the range from 1.141 to 4.455
- Free Ammonia, Zinc (as Zn), Total Phosphate (as PO₄), Nitrate (as NO₃), Manganese (as Mn), Iron (as Fe), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Mineral Oil, Phenolic Compounds (as C₆H₅OH), Selenium (as Se), Silver (as Ag), 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 detectable limits
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected

d) Summary – Comparison of Results of **All Locations**,

- Colour was observed 1 Hazen unit at all locations
- Odour was agreeable at all locations
- Maximum value of pH observed was 7.63 at Vizhinjam Branch Canal
- Maximum value of Turbidity observed was 3.0 N.T.U. at Poovar West Canal
- Maximum value of Total Dissolved Solids observed was 944 mg/L at Poovar West Canal
- Maximum value of Electrical Conductivity observed was 1716 µmho/cm at Poovar West Canal
- Maximum value of Dissolved Oxygen observed was 7.2 mg/L at Vizhinjam Branch Canal
- Maximum value of Calcium (as Ca) observed was 24 mg/L at Poovar West Canal
- Maximum value of Chloride (as Cl) observed was 450 mg/L at Poovar West Canal
- Maximum value of Iron (as Fe) observed was 1.12 mg/L at Vizhinjam Branch Canal
- Maximum value of Magnesium (as Mg) observed was 29.5 mg/L at Poovar West Canal

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- Maximum value of Sulphate (as SO₄) observed was 60.4 mg/L at Poovar West Canal
- Maximum value of Total Alkalinity (as CaCO₃) observed was 42.2 mg/L at Vizhinjam Branch Canal
- Maximum value of Total Hardness (as CaCO₃) observed was 182 mg/L at Poovar West Canal
- Maximum value of Calcium Hardness (as CaCO₃) observed was 70 mg/L at Poovar West Canal
- Maximum value of Sodium (as Na) observed was 215 mg/L at Poovar West Canal
- Maximum value of Potassium (as K) observed was 15.64 mg/L at Poovar West Canal
- Maximum value of Sodium Absorption Ratio observed was 6.941 at Poovar West Canal
- Maximum value of Zinc (as Zn) observed was 0.055 mg/L at Poovar West Canal
- Free Ammonia, Total Phosphate (as PO₄), Nitrate (as NO₃), Manganese (as Mn), Biochemical Oxygen Demand (3 days, 27°C), Oil & Grease, Anionic Detergents, Barium (as Ba), Boron (as B), Copper (as Cu), Fluoride (as F), Mineral Oil, Phenolic Compounds (as C₆H₅OH), Selenium (as Se), Silver (as Ag), 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 detectable limits at all locations
- Bacteriological parameters such as Total Coliforms and Faecal Coliforms were not detected at all locations.

HYR-7	Soil Analysis
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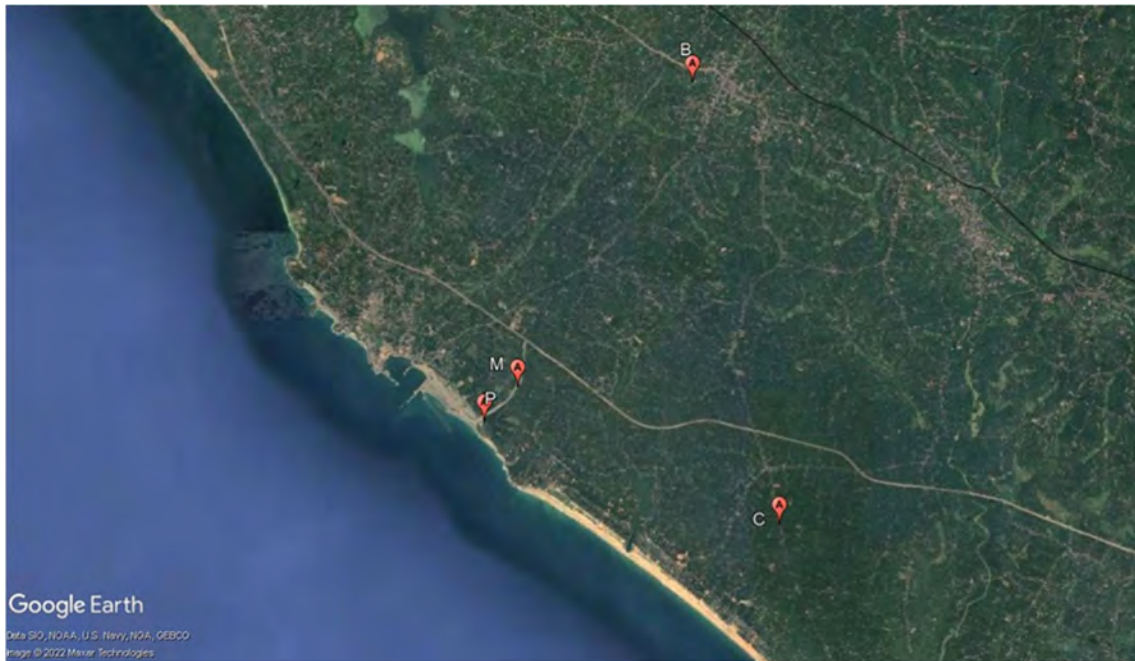
HYR-7.1. Soil Sampling Location Details:

This section describes the location and analysis results of Soil Sampling during January 2023. Soil sampling was carried out at four locations including Port Site, Proposed Port Estate Area, Along with road Network (Mulloor) and Along with Rail Network (Balarampuram).

Table 7.1: Coordinates of Soil Sampling Location

Location	Legend	Latitude	Longitude
Port Site	P	8°22'03.00"N	77°00'16.92"E
Proposed Port Estate Area	C	8°21'02.16"N	77°03'15.84"E
Along with road Network (Mulloor)	M	8°22'23.88"N	77°00'37.08"E
Along with Rail Network (Balarampuram)	B	8°25'28.92"N	77°02'23.64"E

Figure 7.1: Google earth views of Soil Sampling Locations



HYR-7.2. Methodology of Soil Sampling and Analysis

Table 7.2: Soil Sampling Methodology

Sr. No.	Parameter	Unit	Detection Limit	Method Reference
Soil Analysis				
1.	Texture	-	--	SEAAL/EN/SLS/SOP/14
2.	Particle Size Distribution	%	0.1	SEAAL/EN/SLS/SOP/14
3.	pH (1:5 Suspension)	-	1	IS 10158: 1982
4.	Electrical Conductivity (1:5 Suspension at 25°C)	µS/cm	1	IS 14767: 2000
5.	Porosity	%	5	SEAAL/EN/SLS/SOP/02
6.	Total Kjeldhal Nitrogen (as TKN)	mg/kg	50	IS 14684: 1999
7.	Available Phosphorus (as P)	mg/kg	1	SEAAL/EN/SLS/SOP/04
8.	Available Potassium (as K)	mg/kg	0.5	SEAAL/EN/SLS/SOP/03
9.	Total Organic Carbon	g/100g	0.1	IS 2720 Part 22:1972
10.	Organic Matter	g/100g	0.1	IS 2720 Part 22:1972
11.	Available Sodium	mg/kg	0.2	SEAAL/ENS/SLS/SOP/03
12.	Lead (as Pb)	mg/kg	5	EPA 7000B : 2007

HYR-7.3. Soil Analysis Results in the month of January 2023:

Table 7.3: Soil Analysis Results

Date of Sampling		12-01-2023			
Parameter	Unit	Results			
		Port Site (P)	Proposed Port Estate Area (C)	Along with road Network (Mulloor) (M)	Along with Rail Network (Balarampuram) (B)
Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Particle Size Distribution - Gravel	%	1.46	1.18	1.39	2.27

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Parameter	Unit	Results			
		Port Site (P)	Proposed Port Estate Area (C)	Along with road Network (Mulloor) (M)	Along with Rail Network (Balarampuram) (B)
Particle Size Distribution - Sand	%	73.88	61.73	70.25	56.39
Particle Size Distribution - Silt	%	12.69	23.26	17.23	23.74
Particle Size Distribution - Clay	%	11.97	13.83	11.13	17.60
pH (1:5 Suspension)	-	7.12	6.73	6.89	6.26
Electrical Conductivity (1:5 Suspension at 25 °C)	µS/cm	348	274	286	322
Porosity	%	19.6	28.9	26.4	46.1
Infiltration (Void Ratio)	-	6.64	5.31	6.26	5.26
Total Kjeldhal Nitrogen (as TKN)	mg/kg	2780	1265	1582	3574
Available Phosphorus (as P)	mg/kg	186	392	376	1037
Available Potassium (as K)	mg/kg	29.5	28.5	21.4	41.9
Total Organic Carbon	%	0.367	1.67	1.18	4.35
Organic Matter	%	0.635	2.89	2.04	7.53
Available Sodium	mg/kg	206	159	186	173
Lead (as Pb)	mg/kg	2.13	1.86	2.85	1.45

BDL: Below Detectable Limit

HYR-7.4. Graphical Representation of Results for Soil Analysis:
Figure 7.2: Soil Analysis for Particle Distribution

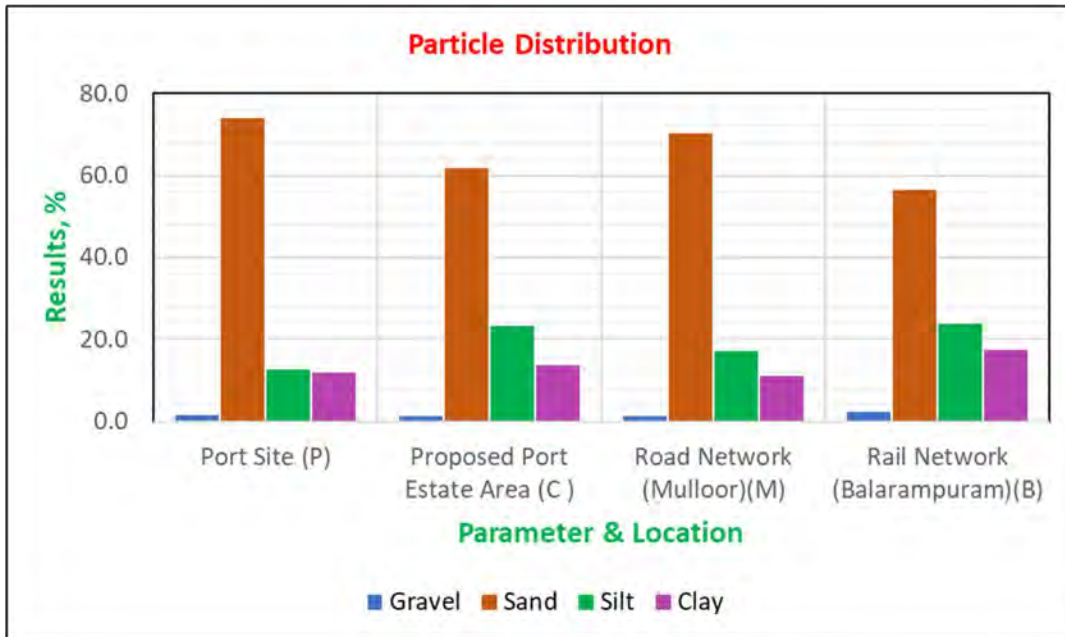


Figure 7.3: Soil Analysis for pH

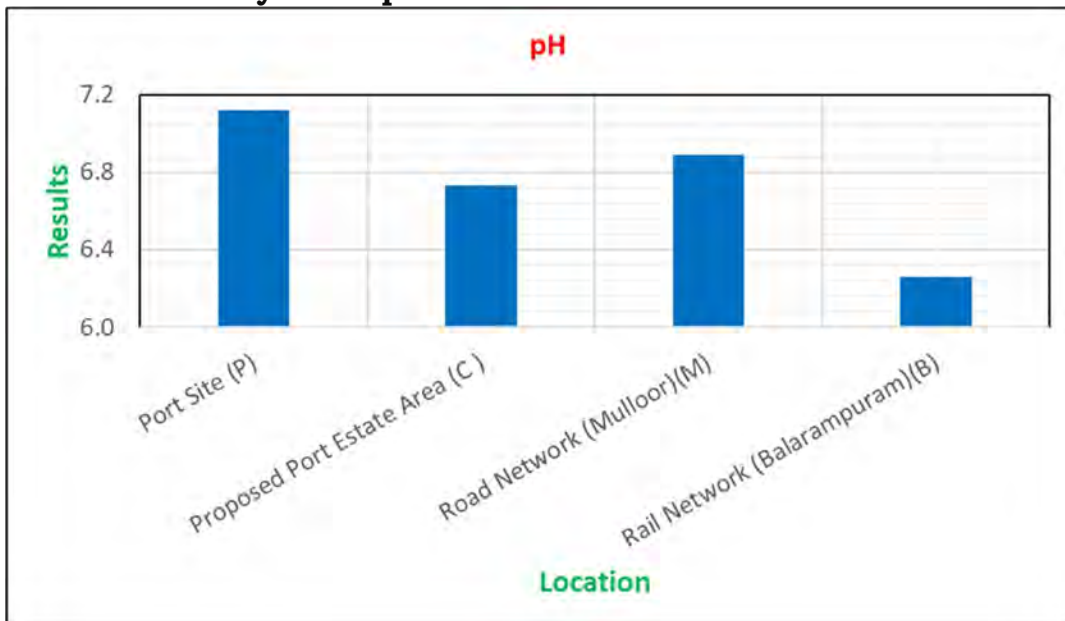


Figure 7.4: Soil Analysis for Electrical Conductivity

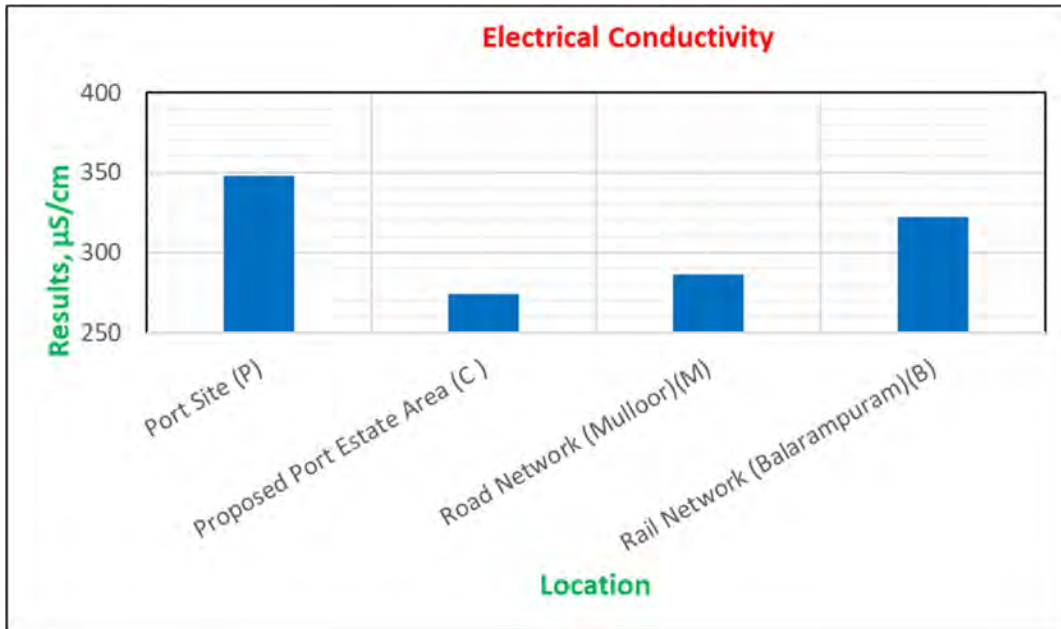


Figure 7.5: Soil Analysis for Porosity

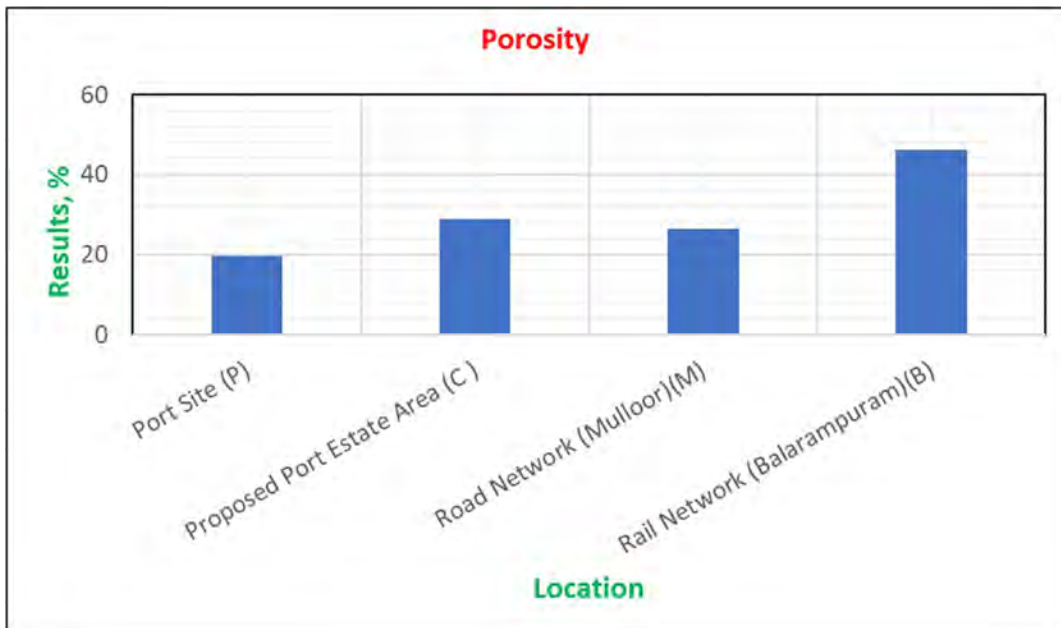


Figure 7.6: Soil Analysis for Infiltration Ratio

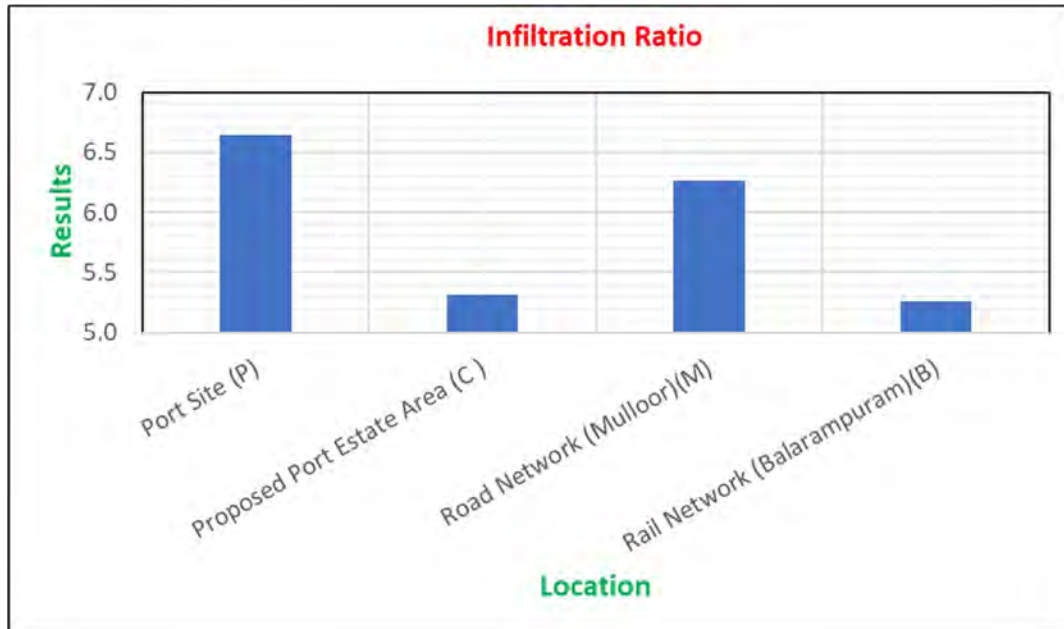


Figure 7.7: Soil Analysis for Total Kjeldhal Nitrogen

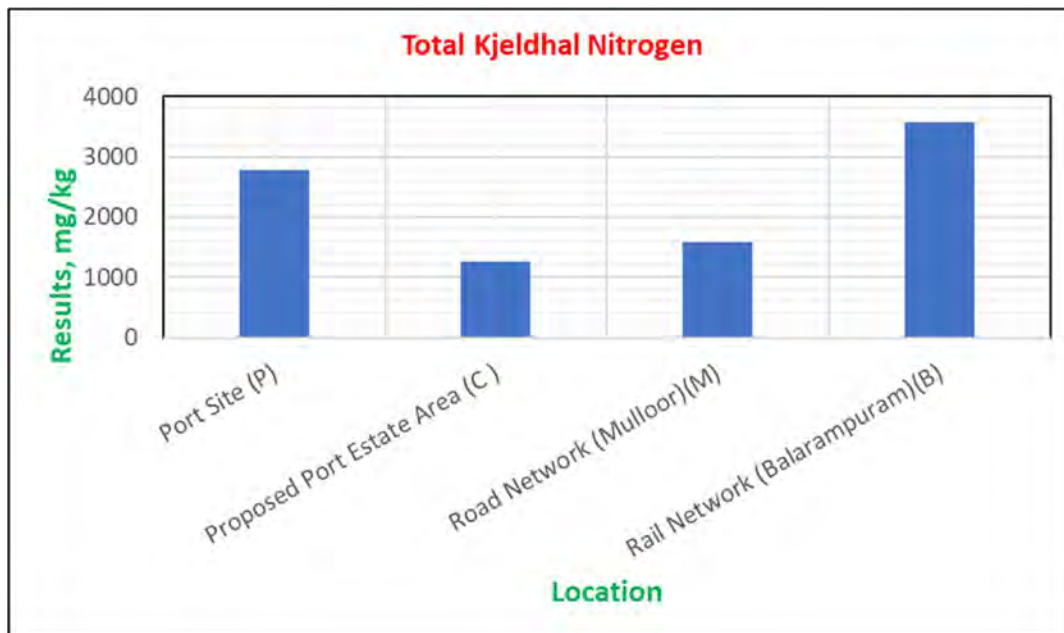


Figure 7.8: Soil Analysis for Available Phosphorous (as P)

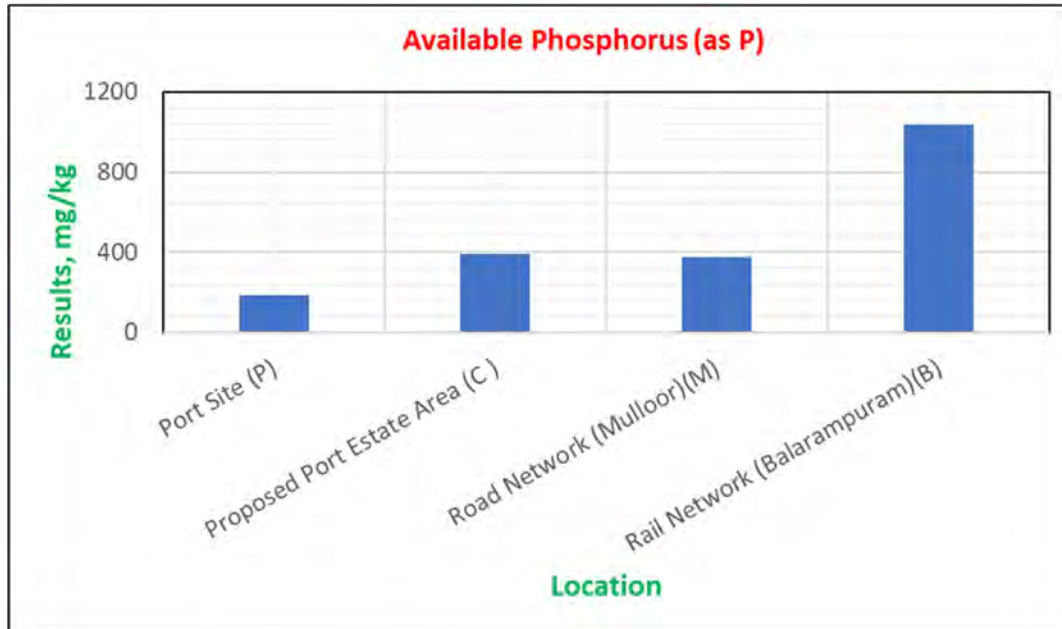


Figure 7.9: Soil Analysis for Available Potassium (as K)

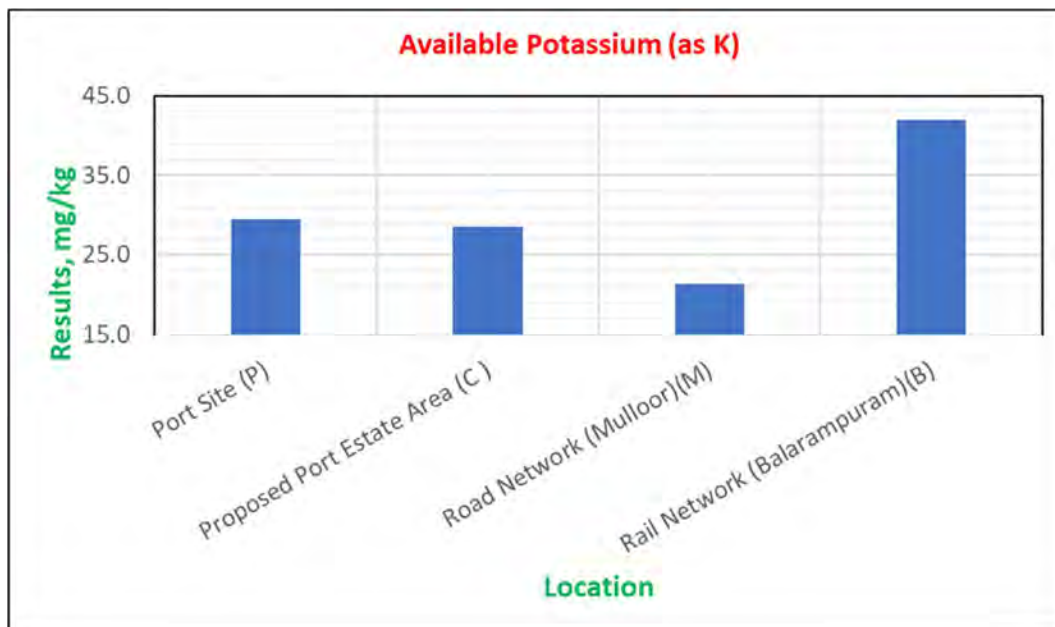


Figure 7.10: Soil Analysis for Total Organic Carbon

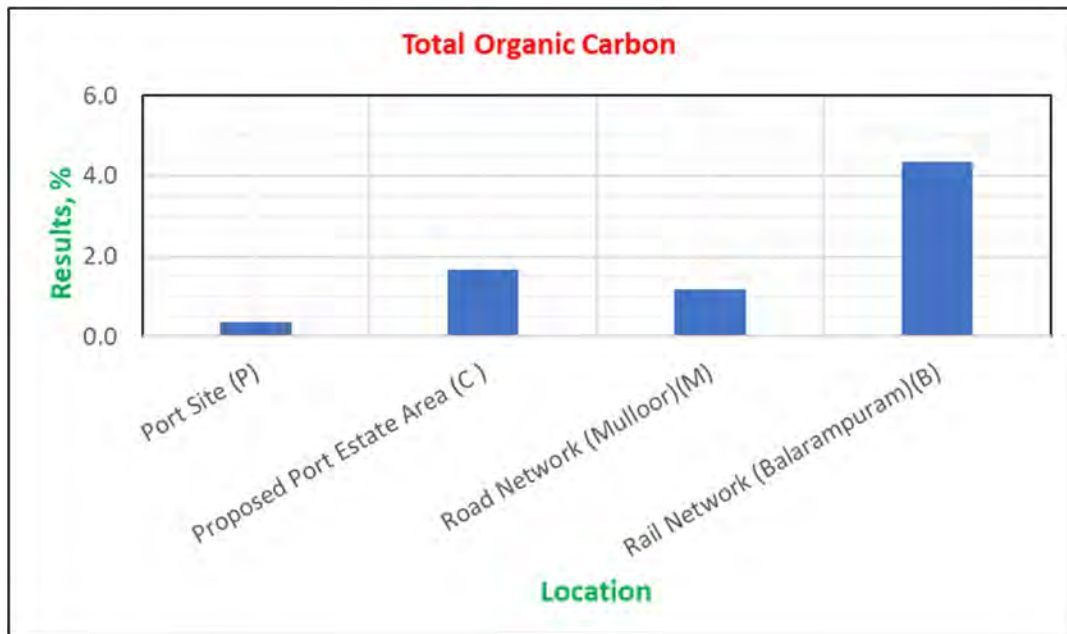


Figure 7.11: Soil Analysis for Organic Matter

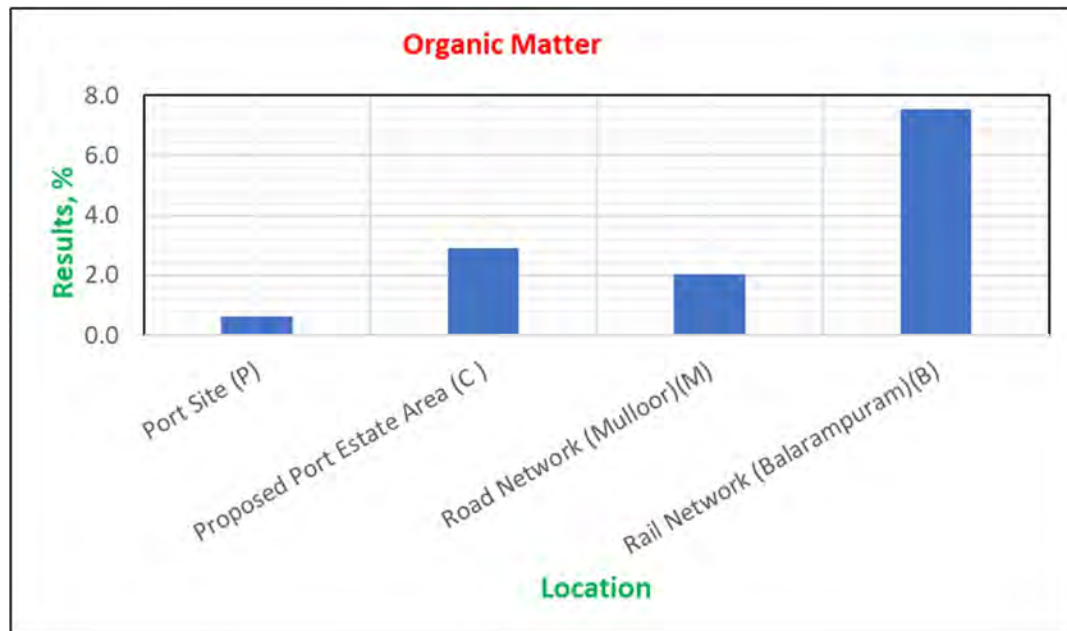


Figure 7.12: Soil Analysis for Available Sodium

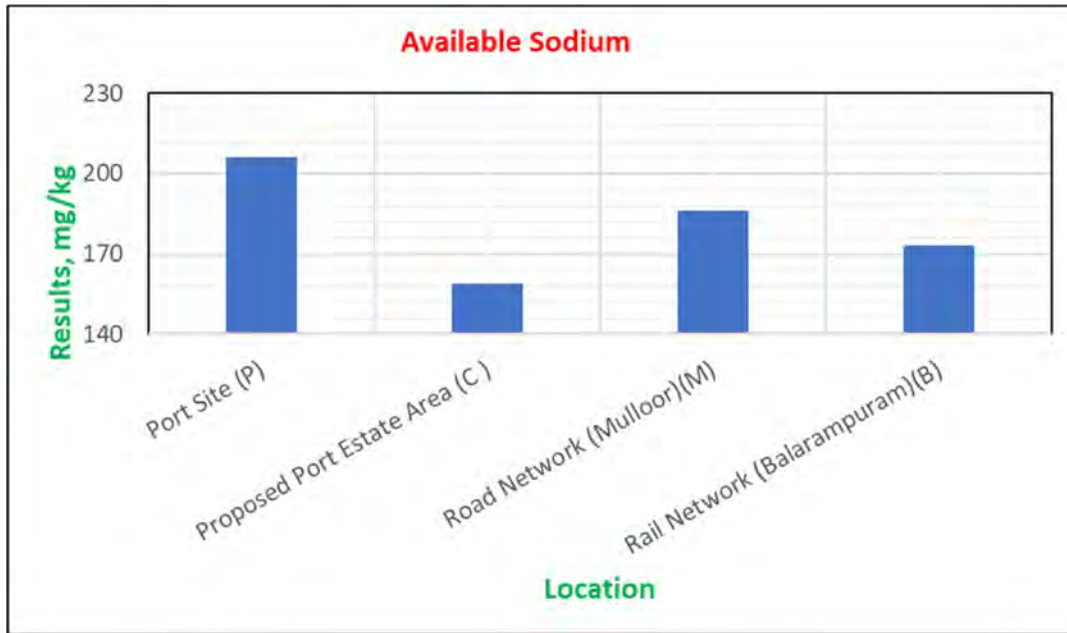
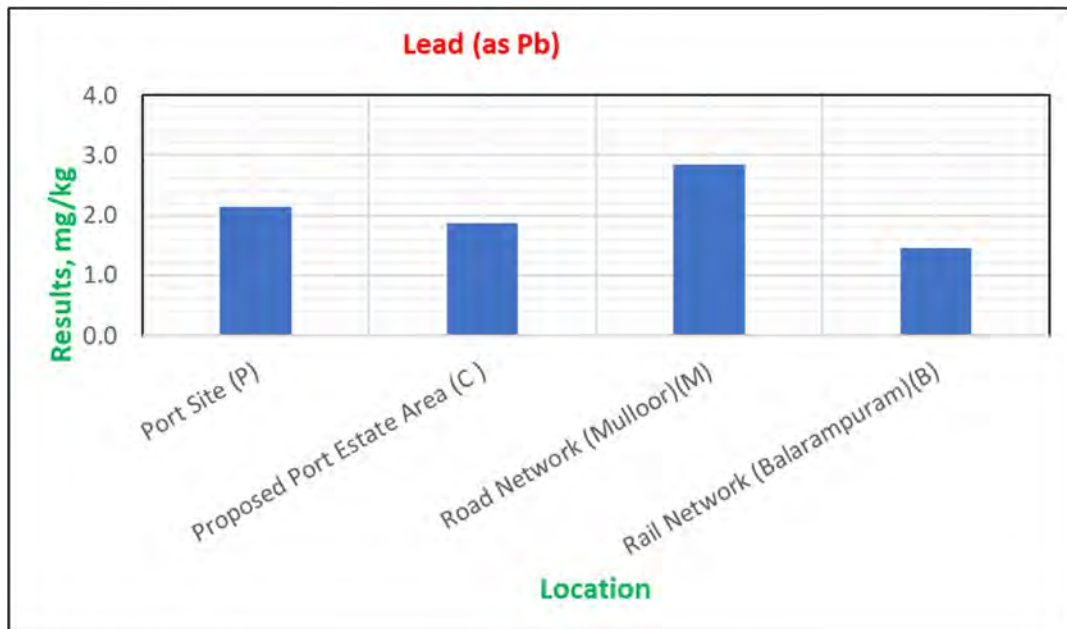


Figure 7.13: Soil Analysis for Lead (as Pb)



HYR-7.5. Summary of Soil Analysis:

- Texture was sandy loam at all locations
- Maximum value of Particle Size Distribution - Gravel observed was 2.27% at Along with Rail Network (Balarampuram)
- Maximum value of Particle Size Distribution - Sand observed was 73.88% at Port Site
- Maximum value of Particle Size Distribution - Silt observed was 23.74% at Along with Rail Network (Balarampuram)
- Maximum value of Particle Size Distribution - Clay observed was 17.60% at Along with Rail Network (Balarampuram)
- Maximum value of pH (1:5 Suspension) observed was 7.12 at Port Site
- Maximum value of Electrical Conductivity (1:5 Suspension at 25 °C) observed was 348 μ S/cm at Port Site
- Maximum value of Porosity observed was 46.1% at Along with Rail Network (Balarampuram)
- Maximum value of Infiltration (Void Ratio) observed was 6.64 at Port Site
- Maximum value of Total Kjeldhal Nitrogen (as TKN) observed was 3574 mg/kg at Along with Rail Network (Balarampuram)
- Maximum value of Available Phosphorus (as P) observed was 1037 mg/kg at Along with Rail Network (Balarampuram)
- Maximum value of Available Potassium (as K) observed was 41.9 mg/kg at Along with Rail Network (Balarampuram)
- Maximum value of Total Organic Carbon observed was 4.35% at Along with Rail Network (Balarampuram)
- Maximum value of Organic Matter observed was 7.53 % at Along with Rail Network (Balarampuram)
- Maximum value of Available Sodium observed was 206 mg/kg at Along with Port Site)
- Maximum value of Lead (as Pb) observed was 2.85 mg/kg at Along with Rail Network (Mulloor)

End of Report

Annexure III
CSR Activities by AVPPL
(October 2022 to March 2023)

CSR REPORT VIZHINJAM FOR THE PERIOD OCTOBER 2022 – MARCH 2023

Adani Foundation, the CSR arm of Adani Group is implementing the CSR activities of Adani Vizhinjam Port Pvt. Ltd since 2016 at Vizhinjam. Every month Adani Foundation touches more than ten thousand people through its various CSR activities. This report is covering the CSR activities for the period October 2022 to March 2023 in the following heads.

1. Education
2. Community Health
3. Sustainable Livelihood Development
4. Community Infrastructure Development
5. Others

1. Education

Following are the major and ongoing activities under Education.

1. Online Education Support Programme with Topper.Com learning platform
2. Intensive Exam preparation programme (Evening Class) at Kottappuram
3. Poets and Men of Literature Meet –
 - 3.1. Publication of the creatives of Literature participants
 - 3.2. Follow up of Venal Thumbi- 'Summer Butterflies' Camp – Cartoon & Bird watching group.
 - 3.3. Regular monthly meets
4. Distribution of Merit Scholarship
5. Enhancing the mathematical ability of students – 'Ganitham' – A pilot project
6. Professional Course support

1.1. Online Education Support Programme with Topper.Com learning platform

As part of the national initiative of Adani Foundation in Education vertical by collaborating with "toppr.com" to train and equip the unprivileged students for many state/national entrance/competitive examinations, 249 students (7th to 12th standards) have been selected from Vizhinjam, Kerala. Online coaching at free of cost in customized content for board curriculum, competitive, entrance and scholarship examinations - JEE, NEET, CLAT, NDA, NTSE, NSO, IMO, KVPY and so on is providing for the selected students as part of the programme. This advance

pack includes videos, concepts, exercises, questions search, dedicated mentors/councilors, unlimited practice sessions, test preparation and Ask Doubts 24x7. All the students have been using the application with the mentoring support of the in-charge teachers from the respective schools.

1.2. Intensive Exam preparation programme (Evening Class) at Kottappuram

AVPPL-AF under its CSR conducted Evening school for the students of fishing community at St. Mary's Higher Secondary School, Kottappuram, Vizhinjam for the last three years and it was a great success. This helped the fishing community students to stay-back in the schools and prepare for SSLC and Plus two exams in the presence of expert teachers, leading to better results.

As requested by church authorities and the PTA of St. Mary's Higher Secondary School, Vizhinjam Adani Foundation has been initiated "Evening School" programme this year also in two phases. The first phase was in continuation to the last year started from January 2022 prolonged to April 2022. The second phase was started from January 2023 till March 2023. This has been conducted by understanding their backwardness in education due to broken families, poor facilities in their house/huts, alcoholic parents, and other socio-economic backwardness. The programme was provided at 3 locations namely St. Mary's Higher Secondary School, Vizhinjam, St. Alphonsa Shrine, Thulavila and Ursuline Primary School, Kottappuram under the leadership of Vizhinjam Parish. Teachers Forum under the Education Ministry of Vizhinjam Parish, PTA Committee and Adani Foundation were monitored the programme. 5 special teachers for SSLC students and 3 for plus two students were deputed as mentor teachers from Teachers Forum. The classes had been conducted on every day 6 pm to 9 pm at three locations. Special classes were organized on difficult subjects like English, Maths, chemistry, and Physics.

In the first phase a total of 105 students including 74 SSLC and 31 Plus two and in the second phase a total of 250 students including 120 SSLC, 70 plus two and 60 plus one have been benefited the programme. Refreshments were also provided for the students as part of the programme. As a result of the programme in the first phase all the students except one passed the SSLC Examination and all the 31 Plus two students passed the examinations. For the second phase the results are awaiting



1.3. Poets and Men of Literature Meet

Publication of the Creatives – “Shalabhangal – Butterflies”

As part of the monthly poets and men of Literature meet a publication containing participating children’s creatives literature work was released in the name “Shalabhangal – Butterflies”. The releasing of the publication was done by Dr. Anil Balakrishnan, Southern CSR Head, Adani Foundation by handing over a copy to Mr. Shaiju Alex, a famous, award-winning young writer from Fishing community. This was released on 14-01-2023 in the presence of 10 poets and men of literature, 30 students, ten more parents, and Foundation team. The release was followed by a session on “Literature & Children with special reference to Poems”. Mr. Shaiju Alex handled the session. He talked about the need of reading books and role of life experience in writing poems and novels. The session was filled with a lot of information, fun, games, poems in various types and folk songs. All the students actively participated in the session. The meeting ended with a word of thanks & distribution of copies of “Shalabhangal” to all present.

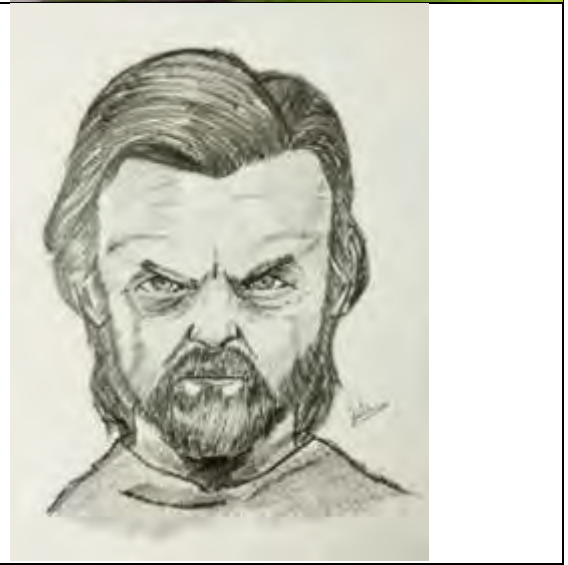




Follow up of Summer Camps - Venal Thumbi- Summer Butterflies – Training for Cartoon & Bird watching.

As the follow-up of the 'Venal Thumbi', summer camp, a cartoon group and a bird watching group have been formed for follow up trainings. The mentors have been evaluating students' creatives and providing guidance and suggestion for improvement. resource materials and other learning tools are also providing. Two designated WhatsApp groups have been formed for the purpose. Great response is getting from the part of the students.





Monthly Meets

In addition to that every month the poets and men of literature meeting has been conducting at CV Smaraka Grandhasala. Major theme for the meets was the poems of two famous Malayalam poets Shri. Kumaranasan with a follow up visit to his memorial & Shri. George Onakoor





In connection with ongoing literature meet an exposure visit was organized to Asan Smarakam located at Thonnakkal, a small village in the outskirts of Thiruvananthapuram, Asan Smarakam is built in commemoration of the eminent Malayalam poet, Kumaran Asan. The memorial holds a collection of the manuscripts of some of Asan's poems and his awards. Along with the monument, the home in which Asan was born is also protected here. The memorial hosts many cultural events. Spread over three acres of land is a beautiful garden containing rare medicinal plants maintained under the supervision of distinguished sculptor Kanayi Kunjiraman. The Freedom Gate and the four sculptures being created by Kanayi are the major attractions in the garden. A total number of 28 students was part of its program. The program is headed by Mr. George Zen and the poets and men of literature who are the part of literature meet. The program was intended to give an exposure towards the literary works of Famous Malayalam Poet Shri. Kumaransan. The grandhasala gives a total picture on the poetic works of Kumaransan in the form of books and photos.

This was followed by Visit to Sai Gram, a Global village, an NGO under Sri Sathya Sai Orphanage Trust, Kerala dedicated to the service of poor. The students were able to visit the kind of activities happening inside for mentally challenged, physically challenged and under privileged. This includes not only the recreational works for the aged, but also works related income generation. The visiting students also got exposure towards the ongoing farming including poultry animal husbandry etc.

The participants of the visit were asked to prepare a note on the themes/activities which are impressed in mind during their visit. They will submit the review in the coming meet scheduled on 14.01.2023.



1.4. Distribution of Merit Scholarship – Felicitation meetings for selected students, Ward wise

The merit Scholarship program is intended to support the students from weaker sections for meeting the requirement on higher education. Adani Foundation has awarded merit scholarship to students who passed SSLC in the year 2021 & 2022 to 141 students from the project area who were found eligible. The selected students will receive a scholarship amount of Rs.20,000 for a period of two years.

The felicitation and the distribution programmes were conducted ward wise. At Mulloor ward Councilor Mrs. Omana Amma Inaugurated the function of awarding Scholarship certificate and medal, here the program is attended by 24 students and their parents.

The second one was at Harbour Ward, Councilor Mr. Nisamudheen inaugurated the said function. This program was attended by 16 students and parents. At this function as a token of respect the ward councilor Mr.

Nisamudheen has adorned the CSR Head, Dr. Anil Balakrishnan with a Shawl of respect. CSR and ASDC team attended both the functions.



At Vizhinjam and Venganoor wards, Dr. Anil Balakrishnan, Head CSR Southern states Inaugurated the functions of awarding Scholarship certificate and medal. The programmes were attended by 19 students and their parents at Vizhinjam and 24 students and their parents at Venganoor. At Kottappuram, Rev. Fr. Aneesh, Asst. Vicar, Vizhinjam Parish was inaugurated the function. This program was attended by 58 students and parents. All the CSR & ASDC team attended both the functions.



1.5. Project Ganitham

To strengthen the mathematics skills of high school kids, a pilot project "Ganitham" was launched with support of an NGO "Insight for Innovation" at St. Pauls School, Uchchakkada, Vizhinjam. This programme was inaugurated by Adani Foundation officer Mr. George Zen on 16-01-2023 at St. Paul's School Uchakkada. The programme has been attending by 39 students from 7th to 9th standards. BTech students from Christ College Vizhinjam have been mentoring the programme.



The closing ceremony of the programme was conducted on 6th February 2023. All the participated students were happy with the programme and share their joy for enhancing their mathematical skills.



1.6. Professional Scholarship support

As part of the CSR activities a Professional scholarship support was provided to Kumari. Reshma M. Ashok belongs to a poor family from Mulloor for her higher

studies in Master of Science in Forensic, Risk Management & National Security at Rashtriya Raksha University, Gujarat



2. COMMUNITY HEALTH

Following are the major activities conducted under Community Health.

1. Service of Mobile Health Care Unit (MHCU)
2. SuPoshan
3. Kitchen Garden - Safe to Eat Vegetables for All Homes (SEVAH)
4. Farm School, Fruit Orchard & Landscape maintenance at Port site
5. Cancer Care, Medical Camps & referral Support
6. Patient care support programme
7. Cleaning Campaign
8. Community Awareness
9. Convergence of Govt. Schemes

2.1. Service of Mobile Health Care Unit (MHCU)

Summary for the period

- ❖ During the reporting period, the Vizhinjam MHU has visited 10 sites weekly and has provided 9718 treatments out of which 2382 were male and 7336 were female.
- ❖ Total 836 New registrations were received during the reporting period.
- ❖ 14 Regular health camps were done during the period.
- ❖ 17 awareness sessions on different subjects were also done for the period, participated 745 community people.

- ❖ The team had done 46 home visits for the period.
- ❖ 1219 Gluco check-ups and 201 HB tests were done during the period
- ❖ On 1/10/2022 Vizhinjam MHU along with Adani CSR team done a program at Viz Mart Vizhinjam for International day of older persons. The Main agenda of the program was to honor four elders who are well active in the society even now at their old age
- ❖ On World Diabetes Day done a Diabetes campaign through checking the Diabetes of the beneficiaries and given awareness at four sites

Detailed Report

Site wise patient break-up for the period from Oct – March 2023

Sl. No	Site/Halt Point	Oct		Nov		Dec		Jan		Feb		March		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
1	New Church	26	97	37	113	63	166	61	196	43	135	38	106	268	813
2	Kadaykkulam Resident's Association	16	54	25	59	26	86	33	103	26	92	22	79	148	473
3	Karayadivilla	38	169	48	180	37	173	53	211	37	167	19	106	232	1006
4	Kanjiramvilla	13	45	48	106	49	102	43	137	32	101	28	71	213	562
5	Nehru Memorial Library, Theruvu	53	142	57	149	52	150	39	98	34	113	49	148	284	800
6	SNDP Hall, Kovalam	39	140	30	119	36	118	33	101	35	146	35	114	208	738
7	Gateway Resident's Association Hall	30	75	36	93	52	142	49	120	30	80	36	116	233	626
8	Township Colony	14	62	16	93	38	130	46	106	27	125	14	104	155	620
9	Marian Nagar, Kottappuram	40	101	45	95	68	152	54	118	45	105	36	70	288	641
10	ICDS Harbour	16	64	8	43	41	136	17	89	20	61	20	70	122	463
11	Health Camp	17	87	12	45	37	175	140	172	18	91	7	24	231	594
Total		302	1036	362	1095	499	1530	568	1451	347	1216	304	1008	2382	7336
		1338		1457		2029		2019		1563		1312		9718	

Blood glucose test done for the period from Oct 2022- March 2023

Month	Total Tests			Total Positive cases of Blood Sugar		
	Male	Female	Total	Male	Female	Total
Oct	69	174	243	39	111	150
Nov	80	130	210	21	73	94
Dec	39	84	123	8	41	49
Jan	160	120	280	43	34	77
Feb	40	160	200	9	76	85

March	63	100	163	11	53	64
Total	451	768	1219	131	388	519

HB test done for the period from Oct 2022- March 2023

Month	Total Tests			Total Positive cases of HB Tests		
	Male	Female	Total	Male	Female	Total
Oct	12	26	38	2	9	11
Nov	2	10	12	0	3	3
Dec	2	24	26	0	3	3
Jan	12	50	62	1	29	30
Feb	9	41	50	2	8	10
March	1	12	13	0	3	3
Total	38	163	201	5	55	60

Details of awareness programmes during the period

SN	Topic	Venue	Date of the camp	Total
1	Lifestyle disease	Kottukal	15/10/2022	58
2	Lifestyle disease	Idathekkonam	29/10/2022	46
3	Hypertension	Mannothukonnam	5/11/2022	57
4	Diabetes	New church	14/11/2022	29
5	Diabetes	Kadaykullam	14/11/2022	37
6	Diabetes	Karayadivilla	15/11/2022	29
7	Diabetes	Mannali	15/11/2022	43
8	Road safety	Adani Port Vizhinjam	16/1/2023	78
9	Lifestyle disease	Adani port Vizhinjam	16/1/2023	78
10	Diabetes	Newchurch	23/1/2023	41
11	Diabetes	Manali	24/1/2023	33
12	Lifestyle disease	Piliyorkonam	4/2/2023	50
13	Lifestyle disease	MAnnamm nagar	4/2/2023	29
14	Lifestyle disease	Kairaly nagar	4/2/2023	29
15	Lifestyle disease	Chappath	18/3/2023	34
16	Covid Vaccinatio	New Church	24/3/2023	42
17	Covid Vaccination	Karayadivilla	25/3/2023	32



Case study – 1: PUSHPAROSE, AGE: 69
Female, Charathadi Puraidam Pulluvilla



Pushparose is a 69-year-old woman from Charathadi Pulluvilla village. She is having lifestyle diseases suffering from BP, Diabetes, and asthma. One of her cousins took her to their home at Adimalathura village, as she was left alone by her children.

Vizhinjam MHU involvement was very supportive in her life. The team met her at a medical camp at Ambalathumoola, Adimalathura. She was not having medicines and nobody to take her even to hospitals.

By understanding her problems, the team have checked her BP, sugar level and given medicines and inhaler for one month and arranged the ASHA worker and the community volunteer for further medicines to contact with us and we assured our services at her doorstep. She is so thankful to Adani Foundation in reaching her doorstep when all other options are closed.

Case study: 2. Suhaira Beevi, Age: 67, Leksham Veedu colony, Kovalam P.O, Vizhinjam



Suhaira is 67 years old, and she is residing at Leksham veedu colony, Kovalam along with her sister. She is having Diabetes and Blood pressure. Her husband passed away recently due to old age problems.

She is getting medical consultation and medicines through MHCU home visit. During lock down period, she didn't struggle for her daily medicines. Instead, she received all medicines along with an immunity kit from MHU Volunteers at her home. She was happy for that, and always shared about it to her neighbors. The MHU team further extended support for taking both COVID the vaccine, for which she has extended her thankfulness to MHU.

Case Story 3: Ummakolusu, Age: 69 Female, Township colony harbour Vizhinjam Trivandrum Kerala



Ummakolusu is a widow, and she is 69 years old residing with her daughter at Township colony vizhinjam. She was not aware that Adani Foundation is giving free medical camp near her house. She spends her welfare pension money for the treatment of thyroid, Hypertension, Diabetes Mellitus and DLP.

She always thought of a hospital near her house giving free treatment. It became true when a Mobile Care Unit serving near to her house giving free treatment and medicines. Now she is very much happy for all such good opportunities received.

2.2. SUPOSHAN (SDG No.2 and SDG No4)

SuPoshan is the health care initiative of Adani Foundation aiming to curb malnutrition and anemia among children below 5 years of age and women in reproductive age. After the wind-up process of SuPoshan activities in Vizhinjam for 3 years, it was decided to extend SuPoshan project to Kottukal Gram Panchayat as the second phase of Vizhinjam international seaport expansion is progressing to that area. The programme was launched at Kottukal Panchayath on February 25th, 2022 and started the activities from March 2022 onwards. Following are the major activities conducted under SuPoshan during the reporting period.

a) Community reach-out

Breakup of Community Engagement program

Sl. No	Programme	Oct	Nov	Dec	Jan	Feb	March	Total
1	Household visits	1192	1021	667	710	900	1253	5743
2	Family based counseling	154	28	65	169	116	119	651
3	Anganwadi Visits	102	136	76	63	45	86	508
4	Focus Group Discussions	90	72	46	45	15	17	285
5	Village Level Events	31	27	18	23	11	12	122
6	Anthropometric Measurements	42	372	242	296	85	123	1160
	Total	1611	1656	1114	1306	1172	1610	8469

During the period, SuPoshan activities reached to 8469 families in the nineteen wards of CSR intervention with focus on creating awareness on malnutrition and anemia.

Household Survey

The effective intervention of SuPoshan project needs basic and accurate data, for that the selected Sanginis have started the collection of household level data. The data will help to understand the living conditions, project area and socio-economic status of the people. The survey includes basic details of household and head of the family, details of children under 5 years of age, pregnant women, lactating women, and details of reproductive age group women such as adolescent girls and women under 45 years of age. During the period, Sanginis done household surveys in 5743 houses across 19 wards of Kottukal Panchayath.



Family Based Counselling

Family based counselling includes special attention and care of children identified as Severe Acute Malnourished, Moderate Acute Malnourished, Pregnant and Lactating mothers. Sanginis gives counselling not only to the beneficiaries but also to the family as they are the supporting factor in the overall development of the targeted people. During the period, sanginis gave 651 counselings which include pregnant women, lactating mothers, Parents of SAM, MAM, parents of underweight & overweight children.

Anganwadi visits

SuPoshan programme is completely targeted to the development of children under 5 years and women of reproductive age. In community, anganwadis play a vital role in the holistic development of these beneficiaries. As part of programme, Sanginis conducted 508 visits to 38 anganwadis in the project area.



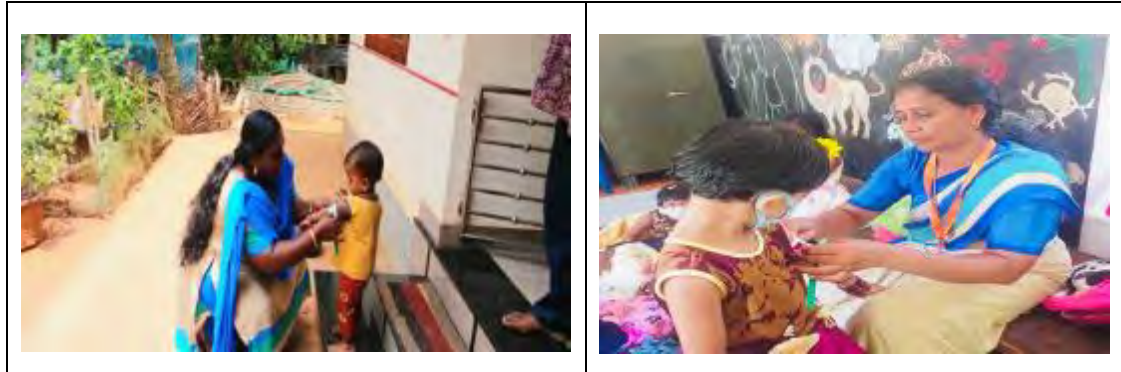
Anthropometric Measurements

During the period, SuPoshan Sanginis have done growth monitoring of 1160 children. Sanginies have identified 8 SAM, 12 MAM, 17 severe underweight and 8 moderate underweight children from the screening. Sanginis gave counselling and awareness to the parents on Healthy Eating Habits, using green leafy vegetables in children's food menu, Avoiding junk foods and proper growth monitoring.

Positive Shift During the Period

Sl.No	Category	Identified	Progressive Shift (Healthy)	Balance
1	SAM	8	4	4
2	MAM	12	7	5

3	Severe Underweight	17	7	10
4	Moderate underweight	8	6	2
Total		45	24	21



Focused Group Discussions

Focus group discussions are completely focused on the targeted populations such as adolescent girls, mothers, and pregnant & lactating mothers. During the period, Sanginis coordinated 285 Focus Group Discussions. Special training and awareness notes were given to Sanginis during Monthly Sangini Trainings for conducting FGDs.



Village Level Events

During the period Sanginis coordinated 122 Village events on recipe competition, awareness rally on breastfeeding, Oath taking ceremony by husbands and family members. This month aims to highlight the huge benefits that breastfeeding can bring to the health and welfare of babies and benefits to maternal health, focusing on good nutrition, poverty reduction, and food security. Village level meeting with Mothers, husbands, mothers-in-law, and other family members gave huge positive response in the field.



Observance of days of importance/ Special Events

World Handwashing Day

October 15 is Global Handwashing Day, a global advocacy day dedicated to increasing awareness and understanding about the importance of handwashing with soap as an effective and affordable way to prevent diseases and save lives. Global Handwashing Day is an opportunity to design, test and replicate creative ways to encourage people to wash their hands with soap at critical times. Vizhinjam site celebrated Global Handwashing Day by giving awareness to 78 participants in 11 handwashing demonstrations. Sanginis visited Anganwadis and Areas to spread awareness on Importance of Handwashing and Hygiene.





World Food Day

World Food Day is celebrated every year around the world on October 16. The day is celebrated to mark the anniversary of the founding of Food and Agriculture Organization (FAO) of the United Nations in 1945. Many other organizations concerned with food security such as the World Food Programme, International Fund for Agricultural Development also celebrate the day. The day is marked not only to celebrate the amazing food that we get to eat every day, but to also spread awareness about those who struggle to get even one meal in a day. Vizhinjam site observed World Food Day on October 16, 2022, with the aim of spreading awareness on importance of diet diversity, food preservation, food handling and right nutrition. in 3 events with 33 participants across Kottukal Panchayath.





Newborn Care Week

Newborn Care Week is celebrated every year in India from 15th to 21st November. The aim for celebrating the week is to raise awareness about the importance of the newborn care for child survival and development. Vizhinjam site celebrated Newborn Care Week as following:

Day	Planned Activity	Details of Activity	No. of Events	No. of Participants	No. of Wards Covered
Day 1	Focused Group Discussion with Pregnant Women	FGD with Pregnant women covered following points: 1. Registration of pregnancy 2. Antenatal check-up at AWC 3. IFA tablet consumption 4. Nutritious diet consumption 5. Institutional delivery 6. Sharing ideal weight of child at birth 7. Early initiation of breastfeeding within 1 hour of birth 8. Exclusive breastfeeding for 6 months 9. Things to be ready before delivery at hospital like vehicle, money, baby clothes and food items	4	24	3 wards
	Focused Group Discussion with Grand Parents	One FGD with Grandparents (especially grandmothers) on ensuring use of colostrum by daughter in law	2	14	2 wards
Day 2	FGD with Lactating Mothers	FGD with Lactating mothers covered following points: 1. Exclusive Breastfeeding 2. Breastfeeding position and attachments 3. IFA tablet consumption 4. Nutritious diet consumption 5. Postnatal check-up 6. Immunization of infant at AWC/PHC 7. Growth monitoring at AWC	8	45	5 wards

		8. Neonatal infections and its prevention			
	Family Counselling	Joint Home visit with ASHA to newly delivered women and counselling on early neonatal care practices and breastfeeding under Home based neonatal care (HBNC) module 1. Delayed Bathing by 24 hours 2. Wrapping of baby in warm clothes 3. Exclusive breastfeeding for 6 months 4. Timely immunization 5. Mothers diet during lactation	23	23	16 wards
Day 3	FGD with Pregnant and Lactating Mothers	Pregnant and lactating mothers's FGDs and briefed them on following, 1. What is Kangaroo Mother Care (KMC) 2. Importance of KMC and its benefits 3. Demonstration of KMC	4	29	4 wards
	Family Counselling	Newly delivered lactating mother on demonstration of KMC and HBNC, On importance of WASH for new-born babies, especially on disposal of faeces/stool of baby, breast cleaning, handwashing before feed	18	18	6 wards
Day 4	Cooking demonstration – 'dhatri mata ki paustik thali'	Cooking demonstration – 'dhatri mata ki paustik thali' promoting healthy food for lactating women	9	9	6 wards
Day 5	FGD with Men	FGD with men (father and father-in-law) on sensitization towards neonatal care and breastfeeding, pledge	5	31	5 wards
	Total		73	193	





Children's Day

Every Year November 14 is dedicated to Children and raise awareness and empower children about their rights, care, and education. Children's day was first observed on November 20 declared by Universal Children's Day by the United Nations but after the death of Jawahar Lal Nehru in the year 1964, the Indian parliament passed a resolution to mark the first Prime Minister's birth anniversary as Children's Day. Pandit Jawahar Lal Nehru was born on November 14, 1889, he considered children as the future of the nation and the citizen of tomorrow. "The children of today will make the India of tomorrow. The way we bring them up will determine the future of the country," Jawahar Lal Nehru had once said. Vizhinjam site celebrated Children's Day by spending quality time with children in Anganwadi Centre. Sanginis visited Anganwadi Centers and engaged in activities such as Storytelling and playing games. Sanginis also distributed Bananas to all Anganwadi Children as they are carb-rich food and a good source of fiber, vitamins, and minerals. They also contain antioxidants that fight free radicals. With good levels of vitamin C, they can also support immune function. A total of 430 Bananas were distributed in all 32 Aganwadi centres in 19 wards of Kottukal Panchayath.



Pravesanotsavam

Pravesanotsavam (reopening fest) held in all anganwadis in Kerala under the Integrated Child Development Services (ICDS) project on November 1, 2022. Pravesanotsavam will focus on the importance of education, nutritious food, and care of children till the age of six for their physical, mental, and cognitive development. Ahead of Pravesanotsavam, anganwadi workers took a survey to identify all children in the 3-6 age group who are to join anganwadis. The list will cover children who are permanent residents, children of migrant workers, and those who are temporary residents. SuPoshan Sanginis also joined with the Anganwadi workers in Pravesanotsavam event and celebration. All 10 sanginis involved in the ceremony in 32 Anganwadis of 19 wards of Kottukal Panchayath.



Anganwadi Festival

ICDS in association with Adani Foundation conducted two days Anganwadi Cultural Festival for Anganwadi Children. The main aim of the festival was to improve the mental health through facing the audience, helping them to get rid of stage fear. Mrs. Sindu, CDPO, Mrs. Divya, ICDS Supervisor, Vizhinjam 1 sector, Mr. Salim, Mrs. Sindu Vijayan, Mr. Nizamudeen, Mr. Paniyadima, Ward Counsellors, Mr. George Zen, Mr. Stephen Vinod, Mrs. Maya, Mrs. Radha, Mrs. Limna, Adani Foundation participated in the Inaugural function and Valedictory function. The program showcased talents of 300 students across the CSR project area.



De - Worming Day

Deworming has been a part of other programs, including the Weekly Iron and Folic Acid Supplementation Program (WIFS), deworming has occurred inconsistently and not all at-risk children are currently receiving treatment. Worm infections interfere with the health, nutrition, and education of children. Worms can cause anemia and malnourishment, which has negative effects on mental and physical development. Malnourished and anemic children are often underweight and have stunted growth. Children with heavy infections are often too sick or too tired to concentrate at school or attend school at all. A child regularly treated for worms will grow faster and is healthier, more resistant to other infections, learns better and is more active in school, attends school more regularly. In regard to this, On 17th January, 2023, all sanginis involved with Anagnwadi Workers for De- worming day in all anganwadis across Kottukal Panchayath.



Adolescent Club Formation

Adolescence is the phase of life between childhood and adulthood, from ages 10 to 19. It is a unique stage of human development and an important time for laying the foundations of good health. Adolescents experience rapid physical, cognitive and psychosocial growth. This affects how they feel, think, make decisions, and interact with the world around them. To grow and develop in good health, adolescents need information, including age-appropriate comprehensive sexuality education; opportunities to develop life skills; health services that are acceptable, equitable, appropriate, and effective; and safe and supportive environments. They also need opportunities to meaningfully participate in the design and delivery of interventions to improve and maintain their health. Expanding such opportunities is key to responding to adolescents' specific needs and rights. SuPoshan aim in the holistic development of Adolescent children especially girls and aims to form adolescent clubs in each anganwadi areas of Kottukal Panchayath. During the period in guidance of Mr. George Zen, Livelihood Coordinator, Adani Foundation Sanginies formed 7 adolescent club in the Panchayat.



Training Camp for Adolescent Children

Adani Foundation organized one day training for Adolescent Children of Kottukal Panchayath for establishing and strengthening the Adolescent Clubs in the Panchayath. 18 children from each Anganwadi attended the training. Training started with a prayer and icebreaking session by Mr. Johnny, Community Mobiliser, Adani Foundation. Next session was handled by Mr. Sebastian Britto, Project Manager, Adani Foundation on the topic "What is Adolescent Club: it's need and duties." The session was an interactive session where children threw light on their idea of establishing the clubs. Session ended with the decision of having first adolescent meeting on January 14th, 2023. Next session was handled by Mr. George Zen P T on the topic "Adolescent Children and Social Responsibilities". Mr. Johnny also took a session on Personality Development and final session was taken by Mrs. Meera Mariyam, Assistant SuPoshan Officer, Adani Foundation on SuPoshan Project. The session ended by collecting feedback form and planning of Adolescent Club Execution.



Sangini Weekly Meeting

Weekly meetings are the effective tool for evaluating the progress and to finalize the way forward. SuPoshan team has been conducting review meetings weekly to understand and evaluate the work sanginis do in field. Meeting discussed about the monthly sangini training, household survey, Growth Monitoring, Anganwadi visits, how to do smart work and effective planning, Data entry of household survey SuPoshan Web App and other SuPoshan related activities. Meeting also discussed the challenges and problems faced in the field.



Apart from that monthly trainings on various topics have also been given to Sanginies for the effective implementation of the project.



Kitchen Garden

Kitchen Garden at household's level is an important source for vegetables for families. It is also a way to enhance nutrition of family particularly pregnant and lactating women, adolescent girls, and children. Vegetables provide required mineral and vitamins for pregnant and lactating mothers and support them. By promoting Kitchen Garden (Vegetable Garden) in systemic way and with seeds support, demonstrate success for others adopt and cure nutrition issues of benefitting families. Adani Foundation provided Kitchen Garden training to Sanginis and beneficiaries on 10th October 2022. The session was handled by Mr. Rakesh, Senior Project Officer on the ways of cultivation, soil types, planting patterns, usage of fertilizers and tips of developing an effective Kitchen Garden. During the reporting month, started developing 300 kitchen Garden across Kottukal Panchayath. The preference will be given to women with early pregnancy, mothers of SAM children and lactating mothers. As developing easy availability of

spinach during pregnancy enhances iron intake of women and adolescent children. Kitchen Garden helps in Protects health, saves money, fights off food insecurity, reduces stress, Increased nutrients, Contributes to sustainable living. The Kit included seeds like Spinach, Bitter Guard, Bhindi, Cucumber, Long Beans and Chilli. SuPoshan distributed 300 seed kits to 32 anganwadi areas and to respective beneficiaries.

Sl. No	Wards	Sangini-in-charge	Anganwadi List (AWC No.)	Total Households
1	Chowara, Ambalathumoola	Treesa	69, 57, 58, 78	30
2	Adimalathura	Prabha	59, 60, 79	30
3	Pulivila, Manoottukonam	Prasanna	67, 48, 72	30
4	Avanakuzhy, Manakallu	Reshmi	71, 77, 64	30
5	Payattuvila, Pulliyoorkonam	Raji	49, 59, 73, 75	30
6	Thekkekonam, Punnakulam	Rejitha	71, 77, 64	30
7	Office Ward, Marathoorkonam	Deepa	51, 52, 68	30
8	Kuzhivilakonam, Sreenarayanapuram & Moolakara	Ajitha	61, 62, 63	30
9	Manakallu, Kollakonam	Jayakumari	65, 66, 70	30
10	Pulinkudi, Chapath, Thekkekonam	Rani	54, 55, 56	30
Total				300



2.3. Safe to Eat Vegetables for All Homes (SEVAH) - 1000 Household homestead vegetable garden.

The kitchen Garden initiative of AF progressing commendably with 1280 households during the period. Since the start of the programme from 2020-21, following were the number of beneficiaries covered.

Sl. no	year	No. of Beneficiaries covered
1	2020-21	280
2	2021-22	500
3	2022-23	500
Total		1280

500 kitchen gardens implemented during the year as follows.

Sl. no	Area	No of beneficiaries covered
1	Kottukal	200
2	Mulloor	80
3	Venganoor	80
4	Harbour	80
5	Vizhinjam	60
Total		500

Almost all the households are getting an average of 30-35 Kg of vegetable every month from kitchen garden. Household production for the period were as follows (Samples Collected 20 houses each from five wards)

Sl No	Item	Oct.	Nov.	Dec	Jan	Feb	March
		Quantity (Kg)					
1	Toamto	7	5	7.2	7.2	8	9
2	Chilli	4	4	3.5	3.5	4	4
3	Cauliflower					2	3
4	Cabbage					2	3
5	Bhindi	8	6	8	8	9	10
6	Brinjal (Round & Long)	5	8	8.2	8.2	8.5	9
7	Cluster Beans	3.5	3	4	4	5	6
8	Amaranthus	5 bundle				4 bundles	6 bundle
	Yard long Beans		5	6.4	6.4	7	7
	Salad Cucumber		4		2	2	3
Total		27.5	35.0	37.3	39.3	51.5	52



SEVAH Account Utilization

SEVAH account, which is a contribution of kitchen Garden Beneficiaries, has the total seed money of Rs. 47,000/- as on date after deducting all the payments spend for a purchase of kitchen garden inputs. There were cases of input supply from Govt sources like Krishi Bhavan and Trivandrum Corporation. The inputs are supplied through SEVAH in areas where govt assistance has not reached.



Kitchen Garden at Schools

In connection with Kitchen Garden Program following numbers of Inputs Kits were distributed to nearby schools around the project area and they are maintaining the garden commendably. The children from both the schools also visited farm school for learning the modalities of farming

SI No	Name of the Place	Name of the Coordinator	No of Kits distributed
1	St. Paul's Uchakkada	Mrs. Maya	2 kits
2	KVLPS Mukkola	Prasanna	2 kits

The input kit provided to schools comprises of

Sl. No	Item	Qty
1	Grow Bags	25
2	Organic Manure	2 kg
3	Vermi Compost	2 kg
4	Coir pit Compost	1 kg
5	Bevaria (Bio Pesticide)	200 gm
6	Verticillium	200 gm
7	Pseudomonas	200 gm
8	Vam	100 gm
9	Neem Oil	100 ml



2.4. Farm school

The Farm school activities are progressing commendably during the reporting period. The Farm School serves as a community school for agricultural learning. It is set in a majestic landscape with a bamboo house as training house and a lawn set in the shape of a leaf, symbolizing the solar energy receptor and plant food factory, thus ultimately the factory feeding humanity, and key oxygen producing organ for mother earth. Farm school has the functional specification of Horticultural Garden and honey production unit, Crop Museum (to house possible Crop Introduction for Vizhinjam), Vegetable and nutrition Garden, Vegetable nursery, Hi tech banana Farming.

The following activities were done at Farm school during the reporting period



Sales counter and ornamental garden at Farm School

The sales counter is operational with sales of organic vegetables fruits and ornamental plants produced at the farm school. On an average 150 kg of vegetables are producing from farm school monthly.



Miowaky- Crowd Forest

AF planted a model Mioway forest at Farm School during the period. A total no of 70 Planting materials of various medicinal and fruit plants were planted in an area of 3 cents. It is proposed that four plants occupied an area of 1 sqm. Thus, a total of 130 plants from 70 items are included in this total area of 3 cents. Of the total 250 plants planted in 3 cents 80 % recorded more than average growth and reached 6 to 7 feet.

Model Waste management units@ farm school - Biogas as green energy -model for homes

A model biogas unit of 1 m³ capacity is installed at farm school. Biogas will unit is a source of green energy to reduce the mitigation of methane gas which is a component of GHG escaping from cow dung pits, thus escaping to atmosphere. It is proposed to utilize canteen waste for biogas at farm school for biogas. Everyday maximum of 5 kg waste can be well added to unit.

Biogas is made when biomass, such as organic waste, manure, food waste, and agricultural residue, is fermented or put through anaerobic digestion. When put in an oxygen-free environment, waste is broken down and produces gas that is 50-75 per cent methane. The co₂ escaped from biogas is absorbed by plants.



Vermicompost unit -model for waste management for homes and for IGA.

Rectangular Tank type vermicompost unit of size 3.2x1.2x0.75 mts of 3 Nos and circular tank of 1 m dia is also installed at farm school. All vegetable waste from weeds and banana pseudostem will be the main source of compost. The worms used is exotic variety Eudrilids Eugenie obtained from Kerala Agricultural university. The compost will be ready in 60 days. This can be sold through Vanitha Karshika Karmasena outlets.



The harvested vermicompost were sieved for packing it to apply to various crops for the purpose a new sieve has been made which force the capacity of minimum 50 kgs at a time. It is decided to utilize part of vermin compost for farm purpose and remaining for the sales through the counter outside,



Model Kitchen Garden@ Farm school.

A model Kitchen Garden with 25 grow bags, in line with AF model kitchen garden for 600 sqft is established in farm school premises. This will help in imparting training to students and for interested community members.



Training for students on Farming & Sustainable Waste Management

As requested, A total number 373 school students visited farm school during the period. The details are as follows.

Sl No	Name of the School	Number of Students Attended
1	HSS For Girls Venganoor	98
2	Govt LPS School Kidarakuzhi	100
3	Govt LPS Muduppuranada School	75
4	PTM Maruthoorkonam	100
5	St. Paul's, Ucchakkada	53
6	KV LP School, Vizhinjam	80
	Total	506

Students of Various levels also participated in farm school training to learn different facets of agriculture and farming.

- The LP School students visited to have an exposure visit on flowers and vegetables and various farming practices. This will help them to get exposure to prepare various projects pertaining to agriculture.
- The High school students participated on the behalf of their ongoing courses of agriculture in their syllabus. They intended to have exposure on organic farming, vermi compost units and biogas.
- The students of VHSE Agriculture participated training programs in connection with their OJT programme. They want to learn more on various methods of vegetable farming process of Miyawaki forest making, Preparation of Aerobic Compost (Vermi Compost), Preparation of Anaerobic

Compost (Biogas). They were also taught about the process of vegetable nursery making and setting of a kitchen Garden.



Fruit orchard @ GIS –Substation

A Fruit orchard established at GIS –Substation covering 91 cents using 305 numbers of fruit plants ranging from Mango, Jackfruit, Rambutan, Sapota, Gemun,

Pomegranate, Ambla, Guava & Papaya. Almost all the plants are of 7 feet High started flowering and some started bearing fruits



Landscaping Maintenance @ Vizhinjam Port

The landscaping maintenance at port site is entrusted with Vanitha Karsheeka Karma Sena, one of the livelihood groups formed as part of CSR activities. The maintenance activities include, weeding operations, Application of fertilizers, Pruning of Grown-up plants, Application of plant protection chemicals. Landscaping at high mast circle was also initiated during the period, which is a part of phase 1 activity which covers a total area of 7000 sqft.



As part of the inauguration of substation inside the port area was directed to complete the landscaping work, and this was also initiated during the period. The details of accomplished work during the period are as follows

Sl no	Area	Type of work	New/Rejuvenation /balance	Total area proposed	Accomplished
1.	Substation premises	Landscaping-new work	New	0.16 hac	0.16 hac
2	Hi-mast circle –zero point	Landscaping with foliage plants and carpet grass	Balance 4000sqftarea of total 8000sqft	4000sqft	4000sqft
3	Median from poovar road end	Carpet grass filling and gap filling with foliage's in remaining area	Rejuvenation	0.42 hac	0.42 hac
4	RHS –slope	Gap filling –done in non-rocky terrain with spreading bougainvillea's	Rejuvenation	0.26 hac	0.20 hac



2.5. Cancer Care Support - providing nutritious Food supplements & Medicines, care materials and palliative service to the poor cancer patients, Medical Camps and Referral Support

AVPPL/AF has been continuing the Cancer care support programme during the year also. As part of the programme medicine, care materials like wheelchairs, walker and water beds have been providing to 150 cancer patients. Nutritious food kit including oats, ensure protein powder and milk powder have been providing to

30 bedridden/palliative care stage patients every month. This is in addition to regular house visits to the families of the suffering patients for consoling and for providing further mental strength.



Cancer Detection Camps

In addition to the care support, early detection camps have also been conducting in association with Regional Cancer Centre. During the period the following camps were conducted

Sl.No	Date	Venues	Partners	Screened	Referred
1	21.12.2022	Lions Club Office, Mulloor	Vizhinjam Chapter of Lions Club, Kidarakuzhy Residence Association, ADS Mullor	130	16
2	30.01.2023		Thekku Bhagayam Muslim Jamayath, Sirajul Islam Madarsa, Haritha Karmasena & Kudumbasree ADS of Harbour ward	102	10
3	15.03.2023	Parish Hall, Vizhinjam	Vizhinjam Parish, Abhayam Charitable Society, Trivandrum Social Service Society	102	17
Total				334	43

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After the camp the referral patients have been accompanied to Community Oncology Department, RCC for further checkups

World Cancer Awareness Day

ToT for community Volunteers

As part of the world Cancer awareness day observance, an awareness session was organized in association with RCC, Community Oncology Department, ASDC General Duty Students and Community Volunteers. The Same was Inaugurated by Mr. Sebastian Britto, Program Manager. He briefed about the purpose of cancer Awareness Program. The session was handled by Dr. Kalavathy, Head Community Oncology Department, RCC, Thiruvananthapuram. She spoke about length regarding the precaution needed to prevent Cancer disease. A total of 70 people were attended the ToT session.



Community level awareness

As the follow up of the Training of Trainers programme, the world cancer awareness day was observed on February 4th, 2023, raising the slogan “Close the care gap and the call to unite our voices and take action”. On the day Community Volunteers took 11 sessions in different locations of project area and distributed nutritious food to cancer patients.



Eye screening Camps

Four eye screening camps were organized under the CSR of AVPPL in association with Regional Institute of Ophthalmology -Govt Eye Hospital, Trivandrum during the period. The camps were conducted at four locations viz 1. Adani Skill Development Centre-Mukkola, 2. Nehru Smaraka Grandhasala -Vizinjam Theruv, 3. KV LP School Mukkola and 4. Sirajul Islam Madarasa. A total of 492 people from the port area screened in the camp. Among that 189 people recommended for spectacles and 22 people for cataract surgery. Follow up support for the cataract

surgery will be arranged free of cost at Govt. Ophthalmology hospital. The Specs were also provided to all referrals. The distribution of the spectacles were conducted at the same locations.

Details of Eye screenings

SI No	Dates	Camp venue	Number of Patients	Number of Patients Suggested Specs	Number of Patients suggested Cataract Surgery
1	04-01-2023	ASDC Centre Mukkola	138	62	5
2	13-01-2023	Nehru Smaraka Grandhaslal	134	61	7
3	20-01-2023	KVLPS Mukkola	145	32	7
4	21-01-2023	Sirajul Islam Madarasa	75	34	3
Total			492	189	22





2.6. Patient care support programme/Benevolent support programme

As part of the patient care support programme community volunteers have been visiting the houses of bedridden patients and providing nutritious food, medicine, and mental support to the patients. During the period volunteers and CSR team had conducted 144 visits



Waterbed to Mrs. Saraswathy Amma

Mrs. Saraswathy Amma, 82 years old from Pulioorkonam Mulloor, village, who is bedridden due to a sudden stroke since 2014 (Eight Years). She had two daughters. she is staying with her younger daughter & her granddaughter. The house she lives belongs to her granddaughter.

CSR Team conducted a house visit to this family in distress, realizing the need a Waterbed was provided to Saraswathyamma. She was also supported by our MHU Unit with medicines.

Walker to Mrs. Syamala

Mrs. Syamala, 52 years old from Mulloor near Port, is bedridden due to a sudden stroke which happens in 2016. she is staying at her own house along with her son, they have one daughter and a son. Even though she is bedridden she could walk a little bit if she has a walker. Understanding the real need, CSR team provided a walker to her. She is also supporting with medicines by MHU team.

Both the families expressed their gratitude towards Adani group.



2.7. Clean Campaign

The cleaning campaign promoted by AF is progressing commendably during the period. One of the livelihood groups, promoted under the CSR of AVPPL/AF-Karsheeka Karma Sena is coordinating the campaign. Most of the members who are actively participating in the cleaning campaign are from widow's category as part of the Widow's engagement programme. During the period, engaged 647 women-days for the campaign.



2.8. Community Awareness Programme

Adani Foundation has started the community awareness programme in the five wards of Vizhinjam. One of the volunteer's groups, promoted under the CSR of AVPPL/AF- Karsheeka Karma Sena is coordinating the programme. Most of the members who are actively participating in the community awareness are from Community Volunteers. It is important for all members of community to have awareness on Rainy season Diseases, Personal cleanliness, and cleanliness of the Surroundings and ensure proper community monitoring for its effectiveness. During the period 340 community awareness sessions were conducted in which 5703 people participated.



TOT on - REFRESHER TRAINING TO COMMUNITY RESOURCE PERSONS

As part of the community awareness program a one-day ToT was organized intended to equip Community Resource Persons to conduct citizen led campaign under CSR. This was conducted on 18th of December 2022 to equip the field level volunteers in disseminating knowledge regarding the following objectives.

- To inform regarding progress of vizhinjam Port and other related projects to the community
- kitchen garden –programme as a means for vegetable sustainability and nutrient supplement from each homestead
- Promotion of Sustainable Livelihood, Community Infrastructure development
- Awareness on employability skill courses conducted Adani Development Centre
- Need based interventions like immediate responses, organizing medical camps, taking patients to hospitals

The programme started with introductory speech from Shri. Sebastian Britto Program Manager regarding Vizhinjam port and relevance of CSR works. The programme was attended by 18 prospective volunteers belonging to 5 wards.



ADS & Community Volunteers Meeting

As part of the community awareness programme a community meeting was organized @ Mulloor ward attended by kudumbasree ADS Members & Community Volunteers. The meeting was intended to discuss community health issues and Health Care activities.



2.9. Convergence of Govt. Schemes

The convergence of Govt. Grant-in-aids schemes in CSR activities progressing well during the reporting period. Information regarding various schemes have been shared through the WhatsApp groups named "Phoenix – for Widows and divorced" and 'Shalabhangal- Butterflies for children below 18yrs old. Information regarding PM Kisan Project, Thiruvananthapuram Job drive, Impact Institute of Science - Intervention and mentoring for personality advancement & Career training, ESAF-Walk-In-Interview @ Vizhinjam Thiruvananthapuram, Transport Laws, Snehapoorvam Scholarship, photography exhibition of birds- "Colours @ Vellayani" Sport Admission For LPS Centre for Science & Technology, Scholarship For Medical related Courses-Backward Classes, Free Entrance Coaching For Backward Classes, Entrance Coaching Finance Support-SC-ST Students, Kerala Building and Other Construction Workers Welfare Board different Pension Details ,Fashion Design Course For Vivekananda Industrial Training School,Kendriya Vidayala School Admission Details, Norka-UK Career Fair, National Means Cum Merit Scholarship For School Students, Hiring drive-Multi State Co-operative Society, Career Fair For Norka, District Information Office Trivandrum- disability persons training, District Information Office Trivandrum-Livelihood, Trainig of Coconut Cultivation, District Information Office Trivandrum-Business Analytics Vacancy, Snehapoorvam

Project, Sri Ayyankali Talent Search Scholarship, Kerala State sport Council –Dr. A P J Abdual Kalam Scholarship, Motors Workers Welfare Board scholarship For Workers Children, Post Office Vacancies, Single Child Scholarship, Corporation Festivals, Swimming Coaching for Students, Finance support For Education, Trivandrum Model District Employment Exchange ACE Engineering College associated Job Fair, Quiz Competition for Student in Gandhi -Martyrs Day, Norka-Roots -SBI Loan. In Oman Wanted 50 English Teachers, SC-ST Students Skill Courses, International Books Festival, Field Workers for Primary Health Centre Thiruvallam, Pre-Metric Scholarship, Walk in Interview -Fisheries Department, Walk in selection to the post of Driver -Sree Chitra Thirunal Institute for Medical Sciences and s technology, Kudumbasree District Mission -DDUGKY Project -Job Fair, Free Drinking Water Onlie Application, Kerala PSC, Mees Thanal Project, National Haritha Sena-School Scientist. Walk in Interview, 20 days-Snehatheeram English Study Course, Online Registration for Agniveer Army, various vacancies for Trivandrum, Social Security Pension schemes were circulated during the period.

2. SUSTAINABLE LIVELIHOOD DEVELOPMENT (SLD)

SUSTAINABLE LIVELIHOOD DEVELOPMENT (SLD)

The projects under SLD includes

1. Competitive Exam Preparation
2. Digital Literacy – E learning
3. Skill Development Programme &
4. Livelihood Development Programme

3.1 "Coaching for success" – Competitive Exam Coaching Programme

Progressing the training sessions for the Competitive Exam Preparation candidates based on the notifications declared by the Central/State Government job openings under different departments. The training sessions are conducting at Farm School building near ASDC Centre. Subject wise classes for syllabus-based examinations are focusing with regular daily mock tests.



Learning Activities

In addition to the classes, other learning methods have also been progressing simultaneously as follows.

- Study materials like Rank file pages, easy study methods from You Tube and voice clips related to the daily test topics links has been sharing to groups on a regular basis.
- Different vacancy announcements from Central and State government have also been circulating through digital media.
- Daily mock test for a score of 30 has been conducting on a regular basis.
- After the successful completion of every day mock test the top scorers are announcing by the coordinator in the group.
- In addition to the daily mock test, a 100 marks mock test purely based on the previous question papers are being conducted in regular weekends and the results are announcing through the groups.

The training sessions are mainly focused on the following topics,

- i. General English.
- ii. Mathematics.
- iii. Indian Constitution.
- iv. Malayalam.
- v. General Knowledge.
- vi. History.

Notifications from the Government agencies were circulated on weekly basis through the social media groups.

Achievements

- Mrs. Gopika R Murali joined as Lower Division Clerk (Malappuram District), Govt. of Kerala on 28-11-2022
- Vishnu K Joined as Last Grade Servant (Idukki), Govt. of Kerala on 12-11-2022
- Mr. Jayasankar J C was awarded 8th Rank in the Police Constable (Special Recruitment- SC/ST) conducted by Kerala Public Service Commission
- 7 other candidates who were attended the physical assessment for Police Constable job under Kerala Police Department were passed.
- 100% of the candidates are applying and attending Central/State Govt. examinations.
- 80% of the candidates attended the plus-two level preliminary examination conducted by Kerala public Service Commission.

Details of the achievers are as follows,

Adani Skill Development Centre				
Coaching For Victory				
Achievers Details - 2022-23				
Sl. No	Name of the Candidate	Category Number	Selected Job Roles	Status
1	Vishnu K	548/19	Last Grade Servant (Idukki)	Joined on 12-11-2022
		609/21	Company Board Last Grade	Preliminary Exam passed. Selected for Main Exam
		368/21	Village Field Assistant (Kasaragod)	Preliminary Exam passed. Selected for Main Exam
		558/21	Bevco Lower Division Clerk	Preliminary Exam passed. Selected for Main Exam
		466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam
2	Vishnu S R	609/21	Company Board Last Grade	Preliminary Exam passed. Selected for Main Exam
		530/19	Civil Police Officer (Kasaragod)	Physical Exam Passed. Waiting for Rank List.
		368/21	Village Field Assistant (Idukki)	Preliminary Exam passed. Selected for Main Exam
		558/21	Bevco Lower Division Clerk	Preliminary Exam passed. Selected for Main Exam
		466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam

3	Jayasankar	609/21	Company Board Last Grade	Preliminary Exam passed. Selected for Main Exam
		530/19	Civil Police Officer (Trivandrum)	Physical Exam Passed. Waiting for Rank List.
		368/21	Village Field Assistant (Trivandrum)	Preliminary Exam passed. Selected for Main Exam
		558/21	Bevco Lower Division Clerk	Preliminary Exam passed. Selected for Main Exam
		466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam
4	Gopika R Murali	207/19	Lower Division Clerk (Malappuram District)	Joined on 28-11-2022
		94/20	Civil Police Officer (Women)	Physical Exam Passed. Waiting for Rank List.
		245/20	Firewomen	Selected for the Physical Examination.
		609/21	Company Board Last Grade	Preliminary Exam passed. Selected for Main Exam
		368/21	Village Field Assistant (Trivandrum)	Preliminary Exam passed. Selected for Main Exam
		558/21	Bevco Lower Division Clerk	Preliminary Exam passed. Selected for Main Exam
		089/19	Secretariate Office Assistant (Special Recruitment)	Preliminary Exam passed. Selected for Main Exam
5	Jobin J	466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam
		530/19	Civil Police Officer (Malappuram)	Physical Exam Passed. Waiting for Rank List.
6	Sreedevi G S	609/21	Company Board Last Grade	Preliminary Exam passed. Selected for Main Exam
7	Jishnu Vinayan	368/21	Village Field Assistant (Kozhikode)	Preliminary Exam passed. Selected for Main Exam
		530/19	Civil Police Officer (Thrissur)	Physical Exam Passed. Waiting for Rank List.
		466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam
8	Sreekanth S Nair	466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam
		530/19	Civil Police Officer (Thrissur)	Physical Exam Passed. Waiting for Rank List.
9	Anoop Mohan	466/21	India Reserve Battalion (Regular Wing)	Preliminary Exam passed. Selected for Main Exam

10	Reshma	558/21	Bevco Clerk	Lower Division	Preliminary Exam passed. Selected for Main Exam
		609/21	Company Grade	Board Last	Preliminary Exam passed. Selected for Main Exam
11	Rani	609/21	Company Grade	Board Last	Preliminary Exam passed. Selected for Main Exam

3.2 Digital Literacy E-Learning Programme

The Digital Literacy training has been progressing in community areas during the period and training were provided to 1496 people. The programme covers internet banking, social media, mobile banking, Digi locker, MS office, cyber security, barcode etc.... The programme helped in making the people to equip on online transactions, bill payments like KSEB, water bills, school fee payments and e-commerce activities without any others help.



The Digital Literacy Batch beneficiaries installed many useful mobile applications like BHIM App, SAKSHAM App and Digi-Locker.





E- Certificate

After the successful completion of 16 modules wise assessment the beneficiaries can easily download the E-Certificates from the LMS of ASDC. In addition to that physical certificate distribution programmes are also being conducted in the community.



Mobilization

Mobilization has been conducting at community levels with the help of community

volunteers, Elected Representatives and CSR team by Digital Literacy Resource persons for further batches.



3.3. SKILL DEVELOPMENT PROGRAMME

a. Entrepreneurial Skilling Programmes

As the result of entrepreneurial skilling programme two livelihood groups were formed and running the units at Viz Mart, Vizhinjam.

Home Nursing - SPANDHANAM – Patient Care Unit

The beneficiaries of Patient Care training programme formed a group with name “SPANDANAM Patient Care Unit” with 7 members. This group was registered as the Charitable Trust in Registration Department, Trivandrum.

They are conducting weekly meetings for discussing and validating the progress, reach of their group and finding out the new opportunities. 6 members are working in different home-based openings and earning money for their family.

Data Entry Operator (Batch 1) – SWAP DATA SERVICES – Livelihood Group

Data Entry Operator batch beneficiaries formed a group and started a livelihood programme named as SWAP DATA SERVICES at Viz Mart. SBI, Vizhinjam granted a Customer Service Point (CSP) to the group, and it will be functional from April 2023 onwards. They have also started working as a collection point of DTDC Courier services.

Employability Skilling Programmes

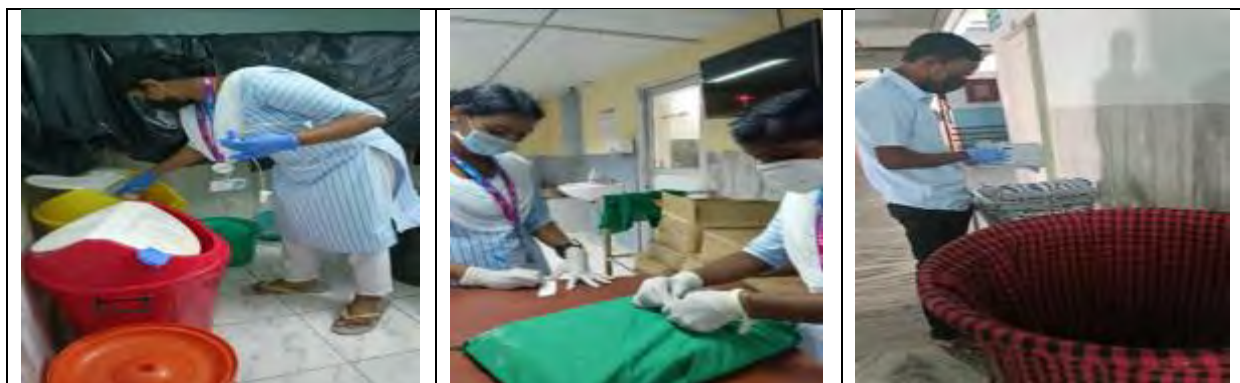
The following five different domain courses have been conducting at the transit campus during the period. All the batches were started only after successfully conducting the Induction Programme.

Sl. No.	Course Name	Eligibility	Duration	Certification	Venue of Classes	Trained	Placed/Livelihood
1	General Duty Assistant- GDA	10 th	420 hrs	ASDC & ASAP	ASDC Building, Mukkola	92	37
2	Beauty Therapist - BT	8 th	390 hrs	ASDC & ASAP	CSR Office, Mukkola	37	28
3	Data Entry Operator - DEO	10 th	440 hrs	ASDC & ASAP	ASDC Building, Mukkola	96	24
4	Retail Sales Associate – RSA	10 th	320 hrs	ASDC & ASAP	ASDC Building, Mukkola	13	9
5	Self Employed Tailor	10 th	340 hrs	ASDC & ASAP	VizMart, Vizhinjam	74	59
Total						312	157

During the period ASDC completed training for 312 candidates and placed 157

General Duty Assistant

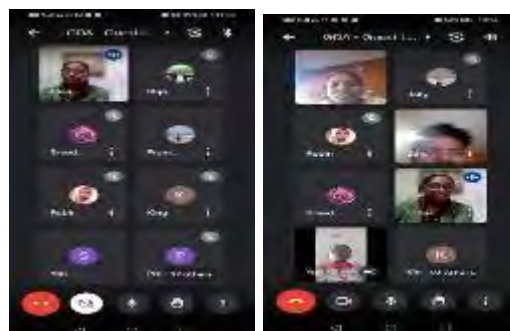
In this FY 2022-23, 92 candidates completed their training in General Duty Assistant course among them 37 were placed in hospitals and patient care centres.



Guest Sessions

a. How to Manage Personal Life and Professional Life

As part of training activity, a Guest Lecture session was arranged for the GDA trainees on 31st December 2022 at 10 am as online. The session was about "How to manage Personal Life and Professional Life" handled by Ms. Sherly Manoj Kumar



Pereira, teacher in Our Lady of Good Counsel School, Mumbai. It was conducted through Google Meet platform with a participation of 35 trainees.

Points discussed were,

- How to plan our personal and professional life activities.
- How to manage a time schedule for the completion of activities.
- How to prioritize and complete the tasks.
- How much we are flexible with our responsibilities.
- Sharing of working activities with the best ones.

b. Guest Lecture on Cancer Awareness

- Another Guest session was on Cancer as part of "World Cancer Day" in association with Regional Cancer Centre, Trivandrum at Transit Campus at 2 pm. The detail session was handled by Dr. Kalavathy, RCC, Trivandrum. Our 38 GDA trainees and 11 community volunteers as 49 participants in total attended the session.
- The session was about the cancer disease, how it can be identified, it's treatment methods and procedures, treatment facilities, grades of the disease, precautions etc....
- Dr. Kalavathy, experienced hand in Cancer treatment, explained all in detail and clear the queries of the participants.
- **Session Description**
- - Introduction about the Cancer.
- - What is Cancer.
- - How does cancer develop
- - Cancer most common in males is lung and mouth cancer
- - Cancer most common in female is breast and cervical cancer
- - Warning signs and symptoms of Cancer
- - Cancer treatments
- - Cancer prevention



Follow up Awareness in the Community

- As part of the World Cancer Day on 4th February 2023, ASDC Vizhinjam centre conducted community awareness sessions on Cancer Disease in Vizhinjam area with the help of community volunteers. In total, sessions were conducted in 12 different locations inside 5 corporation wards with a participation of 300 community people. Our GDA ongoing trainees handled the sessions and aware them about the Cancer Disease. The schedule list was as follows,

Adani Skill Development Centre, Vizhinjam					
World Cancer Day Awareness Programme Schedule					
Sl. No.	Time	Name of Community Volunteer	Place with Ward	Trainees Group	Monitored By
1	9:00 AM	Raji	Nellikunnu - Mulloor	Preethi M, Manju, Ancy, Sheeba, Aneesa & Sona	Kavitha T R
2	10:00 AM	Ancy & Raji	Nellikunnu - Mulloor	Preethi M, Manju, Ancy, Sheeba, Aneesa & Sona	Kavitha T R
3	10:00 AM	Prasanna	Mulloor	Preethi R, Stijo, Ashwini, Ajimsa, Stejina, Delisha & Sharanya S	Sheeja M
4	10:00 AM	Raji	Panavilacode - Mulloor	Reeja, Varsha, Aryananda, Preetha Francis,	Mini Jose

				Gayathri & Praveena	
5	11:00 AM	Suraja	Muduparavila - Venganoor	Jeni, Jyothi, Dayana, Vineetha, Rejina & Sujeena	Anurag M J
6	10:00 AM	Suraja	Karakkattukalluvila-Venganoor	Jeni, Jyothi, Dayana, Vineetha, Rejina & Sujeena	Anurag M J
7	09.30 AM	Carmel	Kanjiramvila - Kottapuram	Johnsara, Sharanya R, Rolin, Jini, Sharanya B, Princy & Ashika.	Neethu V Nath
8	11:00 AM	Jyothifa	Councillor office - Harbour	Prameela, Robin, Dolphy, Sreethika, Stejin & Seena	Sreejith S
9	12.30 PM	Jasmin Rose & Jyothifa	Nursery - Harbour	Prameela, Robin, Dolphy, Sreethika, Stejin & Seena	Sreejith S
10	11.30 PM	Anitha	Nursery - Vizhinjam	Reeja, Varsha, Aryananda, Preetha Francis, Gayathri & Praveena	Mini Jose

- **Session points were,**

- - Introduction of cancer disease.
- -Cancer and its prevention for all groups.
- -Two types of cancer for female group.
- -Breast cancer and its management.
- -Cervical cancer and its management.
- -Conclusion and preventive measures.
- Vizhinjam team members monitored the sessions in all the locations and guided them. We got very good response and feedback about the awareness session from the volunteers and from the community also.



Guest Session on First aid and Personal Hygiene

ASDC Vizhinjam Centre arranged a Guest Session for the GDA & BT trainees at Centre on 19th January 2023. The session was about "First Aid and Personal Hygiene" handled by Sr. Lucia, Rt. Nursing Superintendent, Medical College Hospital Trivandrum. She is having more than 30 years' experience and committed in the social activities in Vizhinjam. The session was attended by 53 trainees from GDA & BT batches. She was very happy to share her knowledge and experiences from her professional life. She motivated our trainees and conveyed the importance of patient care servicing of a nursing assistant career.

Points Discussed:

- Described what is First Aid and what are the importance of giving First Aid.
- First Aid management for a faint patient.
- How to perform a GDA in duty time.
- Explained about personal hygiene.
- Causes of urinary tract infection and its management.

The session was ended by 12:30 pm by sharing thanks to her for the time.



Guest Lecture on Industrial Safety

ASDC Vizhinjam centre conducted a Guest Lecture session on Industrial Safety on 30th March 2023 at centre. The session was handled by Mr. Shaji Joseph, Assistant Manager, Safety Department, Howe India Engineering Pvt. Ltd., Adani Vizhinjam Port. Our GDA & DDEO trainees participated in the session. The session started at 2 pm and ended by 3:30pm. He explained about all the safety measures, an employee must aware while working in an organization and, he detailed on the following contents.

Session Description

- Elements of fire are heat, fuel, and oxygen.
- Fire classes.
- Fire classification at Indian standard.
- Fire extinguisher colour code.
- Method of using a fire extinguisher.
- Fire signs.



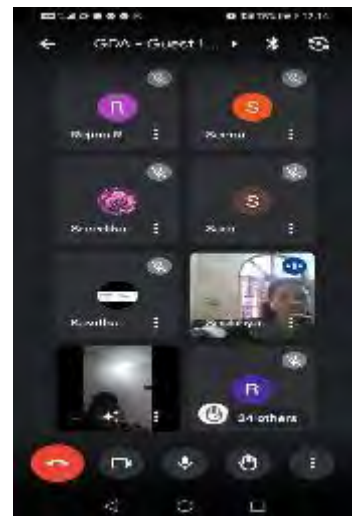
Guest Lecture on Vaccination Day

As part of National Vaccination Day, Vizhinjam Centre arranged a Guest Session as online for the ongoing 39 GDA trainees on 17th March 2023. The session was handled by Ms. Soubhya C, Nursing Officer SCTIMST (Sri Chithira Thirunaal Institute of Medical Science and Technology), Trivandrum. Topic was about the Communicable Diseases and its Preventive Measures.

Points Discussed:

- Definition of communicable disease.
- Classification depends on causative organism.
- Types of communicable diseases.
- Managements of communicable diseases.
- Prevention and Immunization.

All the trainees attended the session and lecturer cleared all the doubts raised by the trainees.



Beauty Therapist

The beauty therapist course was completed by 37 candidates among them 28 candidates placed in various centres. Some of them are started their own centre after training.



A Guest Lecture session was arranged for the Beauty Therapist trainees on 31st December 2022 at 10 am. The session was about “Natural Kizhi Facial” handled by Ms. Sajini, beautician with 10 years of experience. Session as online was attended by all the 17 trainees. The discussed points are as follows,

- Steps of facial
- Procedures
- Home remedies
- Benefits of homely available natural products
- Cleansing and scrubbing using natural products.

Data Entry Operator

96 candidates were successfully completed the course during the period and 24 of them placed in different institutions.



Guest Lecture for DDEO trainees

A Guest Lecture session was conducted for the Domestic Data Entry Operator batch trainees on 19th December 2022. The session was on “Motivation for a

Successful Life” handled by Mr. Johny Mariyadasan, a motivation speaker with 10 years above experience in the field. The session was conducted at centre with a participation of 49 trainees. Following were the areas discussed in the session,

- Things to do make life success.
- Things to do to motivate yourself and to others.
- Importance of education.
- Importance of personality development.
- Necessity of problem-solving skills.
- Conducted mind concentration game and mental ability game.
- Conducted physical strengthening class.



Guest Lecture – “Cyber Crimes & Cyber Laws”

Adani Skill Development Centre Vizhinjam conducted a Guest Lecture session about “Cyber Crimes & Cyber Laws” to the Domestic Data Entry Operator trainees and Digital Literacy Resource Persons on 13th February 2023 at Centre. The session was arranged based on the World Safer Internet Day – 2023 in association with Kerala Police Department. Mr. Sunil Kumar, ASI of Police, Cyber Police Station Pattom, Trivandrum handled the session on the same day.

Formally the session was inaugurated by Mr. Stephen Vinod, Project Officer, Adani Foundation in the presence of ASDC team members. In total, 51 members participated in the session.

Points Discussed were,

- ✓ How to use social medias safely.
- ✓ Privacy security settings in WhatsApp, E-Mail etc.
- ✓ Cyber-attacks and its complaint procedures.
- ✓ Cyber Laws and its penalties.
- ✓ Safe using of digital devices.

He interacted with the participants and team members were very excited to know about the frauds and misuse of Digital Medial in the day-to-day life.

The session was ended around 4:30pm. Ms. Anju Paul, Digital Literacy Resource Person, conveyed thanks to him in that occasion.



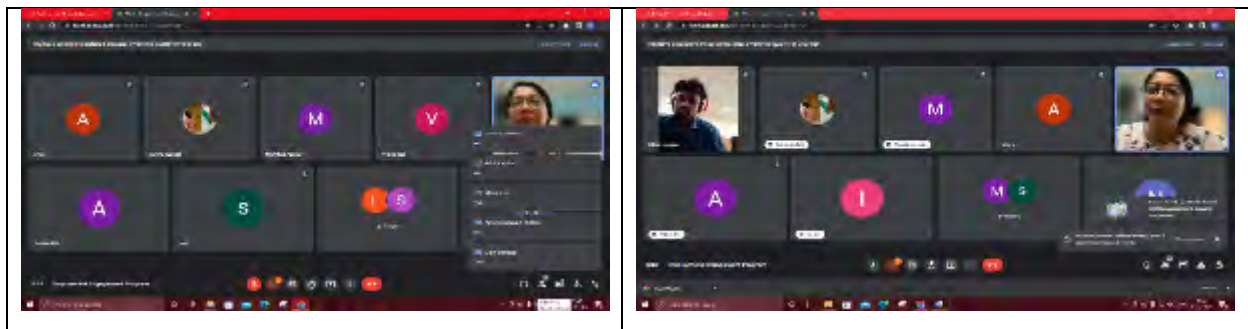
Employer engagement Programme

ASDC Vizhinjam centre conducted an Employer Engagement Programme for the Domestic Data Entry Operator batches as online on 15th December 2022. The session was handled by Ms. Neena K, H R Consultant, Larn Learning Solutions Pvt. Ltd. Calicut. 45 participants from the ongoing DDEO batches attended the session through online platform. She motivated our trainees on the job career, career development and gave ideas about to prepare for an interview as well as the placement strategies.

Topics discussed:

- Importance of Job.
- Motivation about Career development.

- About Career Growth.
- Steps to attend an interview.
- How to prepare Biodata.
- Tips to prepare for an interview.
- Discussion about self-introduction.
- Personality Development, Time management, Stress management, Problem Solving.
- Placement Strategies
- Rules and Regulations of the company
- Salary Package and promotion



Retail Sales Associate

13 trainees successfully completed the training in retail sales associate and 9 placed during the period



Self Employed Tailoring (SET)

Self Employed Tailoring course is conducting at Viz Mart, during the period 74 candidates successfully completed the training, out of that 59 started their own business to earn a living.

Language & Soft Skill Training

Soft Skill portions like Communication skills, Language skills are providing to the domain trainees as per the SOP. M. Kavitha is handling the soft skill portions for the ongoing domain batches.

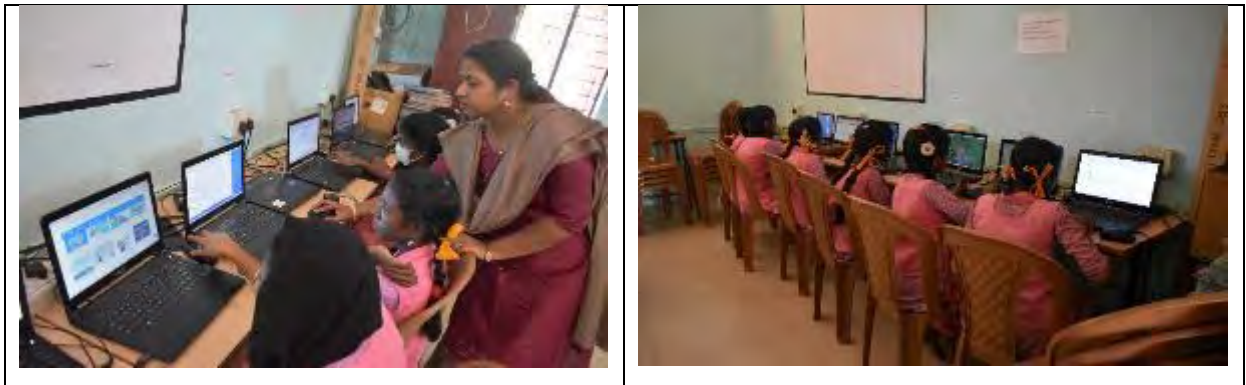


Basic Functional English

Basic Functional English course in four batches were conducted at GHSS, Venganoor School, Vizhinjam from 16th November 2022 to 10th March 2023. 142 students from 8th and 9th standard participated in the course. Ms. Kavitha T R, Language & Soft Skill trainer is handling the offline session at school with several assignments and other learning activities.



LMS assessment was also completed for all the 142 Basic Functional English trainees and the Lab facility was provided by the school management.



Certificate Distribution

Certificate distribution of Basic Functional English was arranged in the school auditorium of H.S.S. for Girls, Venganoor.

The manuscript magazine prepared by the participants named "BUDS" was released by Mr. Sebastian Britto, Adani Foundation and was handed over to MS. Uma, Headmistress of the school. Certificate were distributed to all the 142 students during the session.

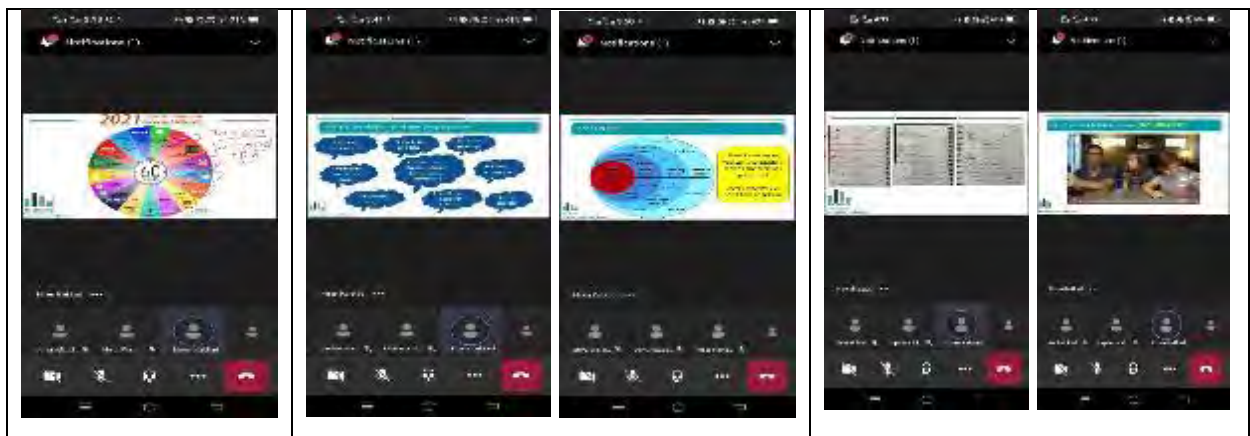


General Activities

As part of the Monthly Learning activity, ASDC conducted a session about "Motivate Yourself by Mastering Your Time" on 26th December 2022 at 3 pm. The session was handled by Mr. Hiren Kakkad, CEO & Founder of Stat Modeler. He is having more than 10 years of experience as Sr. Consultant Trainer and awarded by IQAC & ISTD for training quality of excellence. A very good interactive session was taken by him and all the team members from Vizhinjam centre participated in the same.

Discussed points were,

- How Data can be utilized?
- Why to learn new things?
- Reasons for not learning.
- How to approach continuous learning.
- Some practical exercises.



Kerala-Piravi Celebration

ASDC Vizhinjam centre celebrated the 66th Kerala Piravi day on 1st November 2022. Literally means the birth of Kerala. This day is observed to mark the date on which Malayalam speaking regions were united into one state. On 1st November 1956 the state of Kerala was created with the merge of 3 Malayalam speaking regions. On this special day, people in the state dress traditionally women wearing kasavu sarees and the men in Mundu (Dhotis).

In our Centre trainees participated in the programme very enthusiastically. Trainees and trainers were in traditional dress. Livelihood Project Officer of Vizhinjam CSR Mr George Zen P. T headed the programme with traditional songs and shared the concept of Kerala Piravi day. There was a rapport with the trainees. Trainees performed in songs, speeches, and quiz. It was a memorable event.



Christmas Celebrations at ASDC Vizhinjam

ASDC Vizhinjam centre conducted X'Mas celebrations for the domain and non-domain batch trainees at Vizhinjam along with ASDC team and AF team members on 22nd December 2022. Self-Employed Tailor batch trainees celebrated at Vizmart, Competitive Exam Preparation candidates at Farm School building and domain course trainees celebrated X'Mas at CSR office building with happy celebrating vibes.

Celebration at Competitive Exam Preparation batch



The celebration was inaugurated with a cake cutting ceremony by Mr. Sebastian Britto, Programme Manager AF Vizhinjam in the presence of Mr. George Zen P T, Project Officer AF, Mr. Stephen Vinod, Project Officer AF, Ms. Maya G, Project Officer AF, Ms. Meera Mariyam Skariah, Project Officer AF, Ms. Radha and Ms. Limna Glastin, Documentation Staff AVPPL. ASDC Vizhinjam team members, Mr. Anurag M J, Project Officer, Mr. Sreejith S S, Placement Manager, Ms. Sheeja M, GDA Trainer, Ms. Kavitha T R, Language Trainer, Ms. Neethu V Nath, DDEO Trainer and Ms. Mini Jose BT Trainer coordinated all the celebrations in every location and participated in the same.

Celebration at Self-Employed Tailoring & Digital Literacy batches



The celebrations with 162 participants were started with a prayer song and after that all the guest shared their wishes and blessings to the trainees. Guests were appreciated our trainees for the arrangements done as part of the celebrations. Cake pieces were distributed to all the participants by the volunteers. After cake cutting, trainees performed some programmes like Christmas songs, Karaoke songs, dances etc... All the participants enjoyed the programmes and shared their happiness to ASDC Vizhinjam team.

Celebrations of ASDC trainees



Industry Roundtable Discussion – ASAP Kerala

As we got an invitation to participate in the Industry Roundtable for the Healthcare and Life Sciences domain, Mr. Sreejith, Placement Manager from ASDC Vizhinjam centre attended the same on December 19, 2022, at Kochi. The Roundtable was hosted by ASAP Kerala, the EdTech PSU under the Department of Higher Education, in association with the Kerala Knowledge Economy Mission, for the identification of existing and emerging job roles, the skill gaps in the current workforce, the skill sets that are in demand by industries and the strategies that can help develop these skill sets to benefit students and employers. Industry experts and Human Resource team from healthcare industry attended the program.

Points Discussed are,

- Skill gap in healthcare industry.
- Most demandful job roles in healthcare industry.
- Discuss about current job openings.

Some of the participants were,

- Malabar Cancer Centre, Kannur

- Kottakal Aryavaidyashala, Malappuram
- NIMS Medicity, Trivandrum
- Believers Church medical college hospital, Thiruvalla
- Baby memorial hospital, Calicut
- Dentcare Dental Lab Pvt Ltd, Muvattupuzha



International Women's Day Celebration

Adani Skill Development Centre celebrated International Women's Day with trainees and team members on 8th March 2023 with various competitions. The theme of this year's Women's Day, according to the United Nations, is: DigitALL: Innovation and Technology for gender equality" and it aims to emphasise the importance of technology in bringing gender issues to light.

We conducted several competitions for the female trainees, trained under Vizhinjam centre in various domain and non-domain courses. 89 Trainees from the various batches participated in the 4 different competition items and performed very well. The competition details are as follows,

#	Competition Items	Activity / Theme	Winning Position	Winning Team / Individual Details
1	Case Study Video Streaming Competition	Based on the successful livelihood/individual women entrepreneur in Vizhinjam, capture a video of their activities, services and do a presentation on the same.	1 st Prize	(Heera & Team) Heera, Simi, Renjini, Mahima and Mini (BT Batch)
			2 nd Prize	(Rajeswari & Team) Rajeswari, Bindhu, Arya A, Arya P S, Raji (BT Batch)
2	Quiz Competition	Questionnaire based on the selected famous 10 women in India.	1 st Prize	(Surya & Team) Surya, Vrindha, Deepa (DDEO Batch)

			2 nd Prize	(Saranya & Team) Saranya, Preethi R & Dolphine (GDA Batch)
3	Speech Competition	Participants can select any one of the famous/ empowered women in the world.	1 st Prize	Saranya R (GDA Batch) & Preethi M (GDA Batch)
			2 nd Prize	Preethi R (GDA Batch)
4	Pencil Drawing Competition	Based on the International Women's Day theme, participants can do pencil drawing	1 st Prize	Rosy (BT Batch)
			2 nd Prize	Aryananda (GDA Batch) & Jeny (GDA Batch)

International Women's Day Celebration programme was conducted in the second half of 8th March 2023 at CSR Office. The celebration was formally inaugurated by Dr. Anil Balakrishnan, Regional Head CSR, Adani Foundation and Women's Day wishes were given by Mr. Vipin Sekuri, HR Manager, AVPPL, Mr. Valsalakumar, Officer AVPPL, Mr. Sebastian Britto, Program Manager, Adani Foundation Vizhinjam in the presence of all the other Foundation team members and ASDC team members. 102 members participated in the celebrations including Women Livelihood Group members, Digital Literacy Resource Persons, Community Volunteers, Trainees, and other supporting members.

Ms. Suraja, Convener, VizMart Livelihood Federation, shared her experience and growth happened with the support of Adani Foundation on that occasion. Our trainees from BT batch, Ms. Arya presented the success story of Ambika Pillai, Famous Cine Makeup Artist, Ms. Preethi presented the success story of Mother Theresa and Ms. Vrinda from DDEO batch presented the story of Kalpana Chawla.

The celebration was ended by 5:15 pm with a vote of thanks by Ms. Kavitha T R, Trainer, ASDC Vizhinjam





I. Training of Trainers – ASDC

Adani Skill Development Centre conducted Training of Trainers for all the trainers all over India on 20th & 21st March 2023. The online session was handled by Ms. Hiral Pandya, Senior Manager, Learning & Development, Adani Skill Development Centre. The sessions were based on the following details,

- ✓ Training and purpose
- ✓ Hard and soft skills
- ✓ Your role as a trainer
- ✓ Process of training
- ✓ Designing and developing training
- ✓ Delivering and facilitation
- ✓ The Saksham way of training



All the trainers including the voucher trainers from Vizhinjam centre also attended the ToT as per the schedule. For more clarifications and discussions, trainers met at centre on 23rd March and selected topics as well as got clear on the session plan format.

ToT Assessment

Based on the training provided for trainers, ASDC conducted assessment for all the trainers on 29th March 2023. As per the provided time schedules, participants attended the assessment by taking a 8 minute session on the selected topic. All the trainers from Vizhinjam centre developed a session plan on the same topic and

prepared a PPT for the presentation. They performed very well in the assessment and most of them achieved an A grade in the same.



Community Skill Park, Vizhinjam

Community Skill Park (CSP) building construction is 90% completed inside Vizhinjam Port area in association with Additional Skill Acquisition Programme (ASAP). The land handover by Vizhinjam International Sea Port Ltd. team to the ASAP team for construction having 3 storied building as Ground Floor for office space, Seminar Hall Training Rooms, G-1 Floor for IT lab & Other Training room facilities including Library, Meeting room, Faculty room. We planning to start High End Port related courses accordingly to the anticipated vacancies in abroad as well as in the top organizations. ASAP is planning to handover the building by the end of June once the building is commissioned.



From ASDC, course finalization process is in its final stage which will be happen after further discussions. High-end courses from the sectors like, Logistics, Health Care, Hospitality, IT-ITEs are preferred as per considering the placement market. The course finalization will be completed as earlier and will move forward with the infrastructure works. As of now the course are planning to have in 3 different levels as follows,

- 1) Post Graduate Diploma Courses.
- 2) Diploma Courses.
- 3) Certified Courses.

Highlights of CSP Infrastructure

- Sewage Treatment Plant - **STP 20 KLD MBBR** - Moving bed biofilm reactor (MBBR) is a biological technology used for wastewater treatment process suitable for municipal and industrial application. KLD - Volume of Collection / Equalization tank
- Water Treatment Plant - **WTP** for purifying the water from the Kerala Water Authority pipeline connection.
- Transformer of **250 KVA** with a **HT Outdoor Yard**. Planned provision for power back up placement.

- The **11 KV HT Power** electricity connection from KSEB. Separate HT supply lines in classroom and labs to cater high end electrical equipment used for training.
- **Heavy Machinery Lab** with one special entry gate, for ease of logistics. A **container** can get entered from the gate.
- **13 Passenger Lift** and Staircase with proper **Firefighting and Exit** plan.
- **Hostel** with capacity of 24 boys, 24 girls, 2 separate dining halls, 2 warden rooms, 1 sick room and visitor space.

Every window open-up towards greenery since the building is in **Green Valley** area. Highly ventilated and soothing environment for the purpose of education & training.

Area Details of Constructed Portion in CSP Campus

Area Details of Training Blocks		
Sl. No.	Location	Floor Area (Meter. Square)
1	Lower Ground Floor (G-1)	988.18
2	Ground Floor	988.18
3	Terrace Floor	27.44
Total Area		2002.80
Area Details of Hostel Blocks		
Sl. No.	Location	Floor Area (Meter. Square)
1	Ground Floor	254.72
2	First Floor	411.40
3	Second Floor	414.57
4	Third Floor	409.46
5	Terrace Floor	32.20
Total Area		1522.35
Area Details of Service Building		
Sl. No.	Location	Floor Area (Meter. Square)
1	Security Cabin	14.04
2	Pump Room	21.44
3	Electrical & DG Room	60.10
Total Area		95.58
Gross Area Constructed		3621.73

Discussion held with Mr. Jatin Trivedi, Chief Operating Officer, Adani Skill Development Centre, Dr. Anil Balakrishnan, CSR Head Southern Region and Dr. T M George, Technical Advisor and Designing team as online regarding the infrastructure designing of the CSP building.

Other Facilities		
Sl. No.	Facility	Demarcated for
1	Car Parking	28 Vehicles
2	Two-Wheeler Parking	35 Vehicles
3	Open Area for Lawn in front of building	Sufficient
4	Open Area for Students Outdoor Activities	Sufficient

3.4. Sport Support

Adani Foundation has been supporting Kovalam FC, a professional football club in Vizhinjam since 2018.

3.5. LIVELIHOOD UPDATES

Status of existing livelihood groups

SI No	Group	Type of Business/ Status up to March 2020	Business Status during the Period
1	Clean 4 U (5 Members)	<ul style="list-style-type: none"> Hi Tech Cleaning for Flats, Hospitals, Offices, water tank, Vehicle and Public Institutions Hosted a new web site www.clean4u.info for the customer registration. The turnover during the year was Rs.4,10,000/- 	<ul style="list-style-type: none"> The clients included offices, hospitals, flats... The turnover during the period was Rs. 608382/- Supplied contract cleaning cum housekeeping staff to CSR, ASDC, POB, Driver's toilet block and ITD office at port
2	Anaswara Poultry Unit (7Members)	<ul style="list-style-type: none"> Hi-tech poultry with 14 cages of 630 chicken for 7 members The total revenue for the group for the financial year is Rs. 4,00,000/- 	<ul style="list-style-type: none"> Ongoing Average monthly earning per family is Rs. 4,200/- The turnover during the period was Rs. 71151/-
3	Thriпти Poultry Unit (7 Members)	<ul style="list-style-type: none"> Hi-tech poultry with 14 cages capacity of 630 chicken for 7-member group The total revenue for the group for the financial year is Rs. 4,41,000/- 	<ul style="list-style-type: none"> Ongoing Average monthly earning per family Rs. 4,350/-. The turnover during the period was Rs 74177/-

4	Harbour Canteen Unit (5 Members)	<p>Canteen unit specially for traditional seafood's</p> <p>The total revenue for the group for the financial year is Rs. 20,19,600/-</p>	<ul style="list-style-type: none"> • Daily turnover of Rs. 4,500/- to Rs. 5,000/- and gets an average profit of Rs.490 /-per day • Canteen runs in the building of Harbour Engineering Department • The turnover during the period was Rs. 440886/-
5	Sreebhadra Big Shopper Unit (3 Members)	<p>Big shopper / Cloth Bag / Nonwoven Bag Unit</p> <p>The group has made a turnover of Rs.1,44,000/-for the current financial year</p>	<ul style="list-style-type: none"> • Supplying cloth bags face mask etc. • The turnover during the period was Rs. 122900/-
6	Eco Shop unit (3 members)	<p>Selling of fresh vegetables at Viz Mart</p> <ul style="list-style-type: none"> • The turnover of the group for the last six months was Rs. 8,80,000/- 	<ul style="list-style-type: none"> • Procuring vegetables from the local farmers, Farm School and selling at Viz Mart. • The turnover during the period was Rs.195930/-
7	Vizhinjam Karshika Karmasena (4 Members)	<p>Clearing of vegetation and other Agri works</p> <p>Turn over for the last three months was 90,000/-</p>	<ul style="list-style-type: none"> • The clean Campaign including community cleaning and the cleaning of public places are coordinating by the Group. • Vegetation cleaning and the plastic collection at port site is entrusted with this group • Selling fertilizer, growbags, etc. also progressing. • The turnover during the period was Rs. 488300/-
8	Prime Events (5 Members)	<ul style="list-style-type: none"> • Power Laundry Unit and Steam Pressing • Consultancy partner for Viz Mart – Livelihood market 	<ul style="list-style-type: none"> • Steam pressing and hi-tech power laundry progressing • The turnover during the period was Rs.103310/- • The shifting of laundry unit is progressing
9	Data Plus (3 Members)	<ul style="list-style-type: none"> • Data entry Photostat, projects, designing and online jobs • The group has made a turnover of Rs.7,40,000 for the financial year 	<ul style="list-style-type: none"> • Digital Literacy programme and competitive Exam coaching programme have been successfully supported by the group • The merit scholarship for meritorious students routed through the group

			<ul style="list-style-type: none"> The turnover during the period was Rs. 134095/-
10	Thattukkada Unit (3 members)	<ul style="list-style-type: none"> Shop for preparation & selling of steam-based snacks The shop has made a turnover of 3,60,000/- for the financial year 	<ul style="list-style-type: none"> The unit provide only the breakfast. Daily turnover reached to Rs. 2300- 2500/- The turnover during the period was Rs. 86394/-
11	You Me & Tea Café (3 members)	<ul style="list-style-type: none"> Canteen unit, traditional Kerala Foods. Made a turnover of Rs. 7,50,000/-in 7 months 	<ul style="list-style-type: none"> Concentrated in parcel service and port related orders Progressing the monthly turnover averages daily turnover reached to 2,700- 3,500. The turnover during the period was Rs. 397906/- Worker's canteen is entrusted with the group
12	SRM Stitching & Garments unit (3 Members)	<ul style="list-style-type: none"> Spot stitching and garments The group has made a turnover of Rs. 2,14,000/- in six-month time 	<ul style="list-style-type: none"> Express stitching and selling of lady's garments are the services The turnover during the period was Rs. 82096/- One of the group members selected as the Voucher based trainer for Self Employed Trainer conducting by ASDC
13	Turn to fresh - organic shop (3 members)	<ul style="list-style-type: none"> Virgin coconut oil, natural pickles, and other provisional items The group has made a turnover of Rs. 1,00,000/- in 3 months. 	<ul style="list-style-type: none"> Wholesale dealer for provisions tie up with Paul Raj & Company The Nestle Products and mineral water is also progressing as a separate counter Established new tie up with Kunnil Supermarket The turnover during the period was Rs.3,70,685/-
14	SWAP Data Services (3 Members)	<ul style="list-style-type: none"> Providing online services like PAN card, notice printing and designing, art works, Photostat, Money Transfer etc.... 	<ul style="list-style-type: none"> Providing data services and Photostat The turnover during the period was Rs. 1,06,654/-
15	SPANDHAN AM Patient Care Unit (5 Members)	<ul style="list-style-type: none"> Providing patient care services for bedridden patients in houses as well as in nearby hospitals. 	<ul style="list-style-type: none"> Office is functioning at Viz Mart Four members got placed in home-based patient care.

			<ul style="list-style-type: none"> The turnover during the period was Rs.385300/-
16	Samudra Activity Group	<ul style="list-style-type: none"> Making of fresh fish pickles and other pickle items. 	<ul style="list-style-type: none"> Registration activities are under process.
17	Port Canteen	<ul style="list-style-type: none"> Canteen unit, traditional Kerala Foods 	<ul style="list-style-type: none"> The turnover during the period was Rs.589612/-
18	Milk and Milk products – Milma Parlor	<ul style="list-style-type: none"> Selling of Milk and Milk products 	<ul style="list-style-type: none"> Progressing the preparation of shop for starting a milk and milk product selling counter at Viz Mart The turnover during the period was Rs.3,27,415/-

VIZMART

Viz Mart, the consortium of livelihood groups and the selling counter progressing well during the period. Another Push cart shop is also functional at prot site



Collection of Waste Cloths from schools for Mat Production

As a training cum production unit for cloth mat has been functioning at Farm School premises, started the collection of waste cloths from Schools. This is in continuation of swachhagraha project to inculcate the behaviors of cleanliness and waste management among students. This in turn will help the livelihood unit to earn an income as wealth from waste. As a beginning the collection of waste cloth was started from HSS For Venganoor. The first lot of waste was collected on 26th November. This was initiated at school under the leadership of Students Police Cadet unit. More waste cloths will be collected from more schools in coming months for the product of cloth mat.



Food Offering for Pilgrims @ Sre Narayana guru -Kunnumpara Temple

Adani Vizhinjam Port Private Ltd has extended its support as part of CSR activities through an offering for Pilgrims of Sree Narayana Guru @ Kunnumpara temple a unit of Sivagiri Math, Varkala. This offering was in the form of provision item(grocery) worth Rs @50000.



Livelihood Training Programme for new groups

As part of the livelihood programme, Adani Foundation conducted basic management trainings as follows to create new livelihood groups.

SI No	Date	Venue	Topic	Participants
1	02-02-2023	Mukkola-CSR Office	Introduction of CSR Projects & Vizmart	34
2	03-02-2023	Mukkola-CSR Office	Basic Livelihood management training	

3	08-02-2023	Mukkola-CSR Office	Cash & Debts Management	
4	13-02-2023	Harbour Councillor Office	Introduction of CSR Projects & Vizmart	66
5	14-02-2023	Harbour Councillor Office	Basic Livelihood management training	22
5	21-02-2023	Harbour Councillor Office	Cash & Debts Management	
Total				122



Individual- micro-Enterprise Initiatives

AF has been supporting group enterprise since 2017 onwards, last year a new initiative of individual enterprise support programme started, under this programme the following enterprises were progressing during the reporting period.

SI No	Name	Type of Business	Income for the period
1	Sulekha	Street Shop (Food Counter)	195843
2	Peter	Cobbler	44200
3	Baby	Petty Shop (Grocery & Snacks Items)	26000
4	Sheeja Suresh	Grocery Shop	262600
5	Sindhu	Tailoring Shop	74620
6	Nirmala	Fish Vending	73900
7	Jepsi	Fish Vending	278400
8	Gulastic Amma	Fish Vending	344200

4. COMMUNITY INFRASTRUCUTRE DEVELOPMENT

4.1. Pilot project on clean drinking water for Vizhinjam

Availability of clean drinking water in Vizhinjam persists even after it was made into Corporation in 2010. Provide pure drinking water AVPPL/AF was decided to install five clean drinking water plants in the nearby five divisions of Vizhinjam having 2000L/hour capacity each on a pilot basis. The total cost of the project is Rs. 52.5 lakhs of which the equipment cost of Rs. 30 lakhs from the CSR of Tata Chemicals whereas the infra and installation cost of Rs. 22.5 lakhs are from CSR of AVPPL/AF. The future maintenance will be the responsibility of community beneficiaries. The infra work and the installation for the water kiosk completed at 3 locations. Work order was given to M/s. Rudrasha Constructions for remaining two locations.

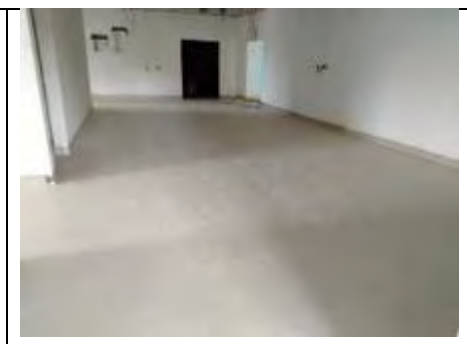
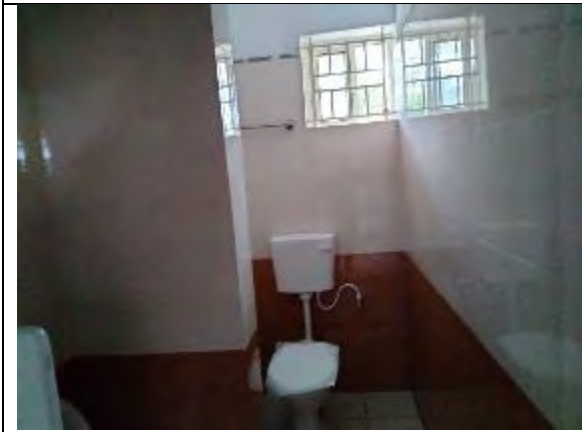


4.2. Community Health Centre, Vizhinjam

The construction work of Community Health Center at Vizhinjam has been resumed after the COVID restrictions. The project cost is Rs. 7.79 cr where the Government component of Rs.482 lakhs and CSR component of 297 lakhs from Adani Foundation. Adani Foundation handed over the first installment of Rs.1.18 crores to the Harbour Engineering Department on 03.10.2018. Initiated the process to transfer the second installment of Rs. 1.18 crores to HED. Most electrical works, plumbing works and cement mortar plastering for terrace area are completed. The works that are presently being carried out/done are as follows:

- The setting up of framework for the false ceiling is progressing.
- The tiling work for 5 toilets completed.
- The tiles for the floor area are transported and stacked at site.

- Level difference of nearly 6cm measured in various parts of floor area. Hence Plain cement concrete was laid on the floor to achieve uniform thickness.
- Water pipes and required number of fire detectors and water sprinklers being set up in the roof area and over walls by the Fire and Safety Department.
- The work of various workstations as per the hospital norms is also progressing



4.3. Gangayar Canal

The proposed maintenance to ensure proper water flow and desilting of Gangayar had been entrusted Minor Irrigation Department under the supervision of Harbour Engineering Department. The initial project cost was Rs.89 lakhs, in equal share of AVPPL and VISL. AVPPL transferred Rs. 60 lakhs as half share through VISL to Minor Irrigation Department. The work includes

- Desilting of waste up to 1 km from the mouth of the canal
- Core wall (Break water) to block sand iteration at the southern side of the exiting Fishing Harbour
- Installation of three Silt breakers at 500 m & a footbridges
- Fencing of both sides

The status of the work during the period is as followings

- Completed the desilting of waste up to 1 km from the mouth of the canal
- Progressing the Rock mining work to construct the Core wall (Break water) to block sand iteration at the southern side of the exiting Fishing Harbour
- Progressing the preliminary works to Install Silt breakers
- The construction of footbridge completed.
- The construction of 1 silt trap completed. The second sit trap work is in progress.
- The sidewall construction is progressing.
- The silt removal completed for a depth of 1 m. There is significant increase in the flow of water.



4.4. Harbour School

The new two-storied school building constructed facing issue of leakage, it is recommended to carry out repair works and bituminous water proofing treatment for terrace area. All the work has been completed and handed over the building during the reporting period.



4.5. Kottukal School

The construction of second floor of Kottukal School has been carried out in Kottukal Panchayat as part of CSR activities. The plinth area of the existing Reinforced concrete building is nearly 2135.sq feet. Presently 3 new classrooms are added to the school infrastructure. Each classroom is built using solid cement concrete blocks. Dimensions (length of 6.30 m and 6.30 m width.) The roof of the school building is entirely steel truss work and supported on reinforced cement concrete columns. The concrete mix used is M25 grade. Chettinad Super grade cement of 53 grade is used for construction purposes. The construction works are done without affecting the school activities.

The ongoing construction works include:

- The RCC columns 16 nos are casted up to a height of 2.70m.
- The casting reinforced cement concrete beams completed.
- The block masonry work for the classrooms completed.
- The installation of doors and windows completed.

The plastering work of block masonry progressing,



4.6. GRANDHASALA UCHAKKADA

The Uchakkada library is entirely a new construction in 3 cents of land. The building is two storeyed with open terrace area. The ground floor is designed to function as a library and first floor to be allocated for conducting CSR activities in future. The plinth area of the building is 1183.76 sq. Feet. The foundation was already constructed and finished with DR Masonry at the time of site visit. Plain cement concrete was laid all around the existing plinth area to obtain a levelled surface over which reinforced cement concreting was carried out. The earth excavation for constructing septic tank was performed. Then bed concreting and block masonry works for septic tank followed. Finally centering and shuttering was set up for slab concrete work. Reinforcements were laid properly followed by concreting.

The following activities for Ground floor were done as mentioned below:

- The construction of septic tank completed.

- The Installation of doors and windows for the ground floor completed.
- The block masonry work for the ground floor completed.
- The staircase leading to first floor is built in reinforced cement.

The first floor of the building is under construction. The staircase and the roof slab of ground floor were concreted simultaneously. The reinforcement bars for the staircase were mainly 10 mm and 8 mm diameter. For the ground floor, roof slab was designed as two ways. Main reinforcements and distribution reinforcements were both provided in both directions. Extra top bars were also given wherever necessary. The centering and shuttering work for the mentioned parts were carried out in two days. Proper supervision was done during centering and shuttering, setting up of reinforcements and during curing stages.

Presently, the following items of work are being completed/under progress.

- The roof slab construction by reinforced cement concrete completed.
- The curing of roof slab construction done.
- Centering and Shuttering works for the ground floor removed completely.
- The installation of windows completed.
- The block masonry work for the first floor progressing.





4.7. Harbour Sub Centre

Harbour Subcentre is an urban primary health Centre developed by Trivandrum Corporation to help fishing community. It lacked facilities like seating arrangement, token system, drinking water system and provisions to preserve medicines. As per the request from medical officer and the ward counsellor following consumer durables were handed over to Harbour Subcentre.

- Token dispenser-1
- Panasonic LED TV-1
- Water Purifier-1
- LOYD AC and stabiliser-1
- 3 seater chair-5 sets

The consumer durables are handed over to Dr. Asha Vijan, DPM, National Health Mission and Mr. Nazamudheen, Ward Counsellor, Harbour ward by Dr. Anil Balakrishnan in a public function organised in the training hall of Urban PHC. Community volunteers, Kudumbhasree members and health workers were participated the programme



4.8. De-Weeding Drive of Water Hyacinth @ Vellayani Lake

mechanical removal of - Water hyacinth Mat from Vellayani lake

The water hyacinth mat and reduced inflow into Vellayani lake from canals has hit the health of the second largest freshwater lake of Kerala the seepage of waste, including septic waste has been fueling the growth of hyacinths at areas close to land and shallower parts of the lake. Apart from this is the thick growth of lotus

plants. There are around 67 streams that feed Vellayani Lake but the larger ones, such as Pallichal canal accelerate the pollution of the water body.

The serious ecological situation was addressed many times by Adani Foundation, local panchayats, local NGOs (Neerthadaka Samithi) and residents - by manually removing Hyacinth weed mat. However, the replenishment of the mat was so quick that its necessities the need for a mechanical means which can remove 100 times more mat area compared to manual weed removal by 10 men.

Adani Foundation organized to bring a weed harvest machine from Irrigation Department which could remove 1ton weed mat in 1 hour time. This was considered as a novel initiative for the cause. An inaugural session was organized on 29/11/2022 by Adani Foundation with the support of Neerthadakam Samithi and Local panchayath. The programme was inaugurated by Panchayath president Mr. Sreekumar, and facilitated by District panchayath member Bhagath Rufus, Dr Anil Balakrishnan -National Livelihood head and CSR head south India. The programme was attended by officials of Adani foundation and officials of Neerthadaka Samithi. The program ended with a signature campaign raising the slogan of "Water is Precious". The removal process will continue for a period of one month to remove all the water hyacinth.





Conversion of hyacinth water weed to compost.

As requested by us Dean, Agriculture Faculty, college of Agriculture Vellayani send two expert professors 1. Dr Aparna prof and head Department of organic Agriculture, Dr Soumya Department of Agricultural microbiology, visited the

Vellayani kayal cleaning site at Venganoor panchayath along with CSR officials of Adani Foundation.

Inferences and suggestions of expert team.

- Hyacinth weed collected can be converted to compost at institute location using Biodigester and cow dung in 1:7 ratio with temporary roofing.
- It can be made into an activity for group selected for the purpose.
- Kerala Agri -university will provide training in this regard.
- Possible studies will follow this for students of agriculture.



4.9. Other major projects under progress

SI N	Project	
1	Model Anaganwadi, Vizhinjam (Nr. Police Station)	<ul style="list-style-type: none"> • 1500 Sqft Montessori model Anganwadi at Govt. Vizhinjam LP School compound. • The plan and the location approved by social welfare department. • Land permission received from Social Welfare department. • As the area is notified for road widening, suggested for location shift
2	MRF	<ul style="list-style-type: none"> • As per the request received from Trivandrum Municipal Corporation it is decided to construct an MRF at harbor ward. Land for the same will be allotted by Harbour Engineering Department.

		<p>The operation of the unit will be done by Trivandrum Municipal Corporation under the technical support of Suchithwa Mission and Clean Kerala Company. A Haritha Karma Sena will be formed for the daily collection of waste after the commissioning of the proposed unit. The MRF will include</p> <ul style="list-style-type: none"> • 3500 sqft building • Shredding Machine • Baling Machine • Dust remover and • Conveyor belt • Compound wall • Internal roads • Estimate, BOQ and plans are ready • A MoU is under preparation to demystify the role of all the stakeholders • NFA approved and transferred Rs. 44.77 lakhs to VISL as half share
4	Playground	<ul style="list-style-type: none"> • AS per the request of Kottappuram community a playground has been agreed to develop at Vizhinjam • Harbour Engineering Department provided an acre of land for the purpose • Sports Kerala Foundation has submitted a project at an estimated cost of Rs. 1.75 crore to establish the playground • As got the NFA approval, instruction given to TCD for transferring the half share of amount Rs. 87.5 lakhs to VISL

5. OTHERS

5.1. Celebration of Special Days

Women's Day Celebration

Women's Day was celebrated with active participation of all the staff and skill development students of ASDC. The program started with presentation from ASDC students on various women personalities of the country who had made

a mark during their period of life. It Includes 1. Kalpana Chawla 2. Mother Thresa 3. Ambika Pillai. This was followed by the video presentations prepared on various women enterprise group supported by Adani foundation. This includes 1. Vanitha Karshika Karmasena 2. Laundry business 3. Vizmart 4.SRM Stitching 5. You me & Tea Cafe 6. Clean 4 U. The video on Vizmart was judged as the best film made. The second prize was awarded to Clean 4 This was followed by cultural programmes like Folk songs and Light Music. The program was presided over by Adani foundation Southern Regional CSR Head Dr. Anil Balakrishnan, attended by officials of CSR Vizhinjam & AVPPL.



5.2. Community grievances

Reporting the progress of Vizhinjam Port to community stakeholder

As per the environmental audit compliance, the progress of Port activities has been circulated to the community groups during the period to 4479 people through various community groups like Competitive Exam Coaching students, Open House students, Literature Group students, Digital Literacy Resource Persons, Digital Literacy Community Group, Phoenix – Widows Group, Children’s Group, SuPoshan Group, Swachhagraha group, Community Volunteers, Livelihood Group Kottukal Panchayat, Community Awareness.

5.3. Grow 100 million trees by 2030.

As the Adani Group has pledged to 'grow 100 million trees by 2030, a plan has been prepared and submitted to AVPPL and AF. As per the plan it was proposed to grow 50000 plants by 2030.

5.4. NGT visit

The NGT expert committee has made a visit to Vizhinjam CSR site on 5th Jan 2023. The committee first visited Community Skill Park site and interacted with CSP team regarding the proposed courses. Thereafter the team visited Community Resource Centre and interacted with the leaders of women livelihood groups on their business turnover, daily income, support received from Adani Foundation, and the support further needed. The livelihood members expressed their wholehearted happiness in the overall support, training and guidance received from Adani Foundation to start, strengthen, and streamline the enterprises. The team further interacted with Mobile Health care unit members and noted more than 85000 checkups happened so far through MHCU.

The team then visited Adani Skill Training Centre and interacted with the students of General Duty Assistant, Beauty Therapy and Data Entry Operator. The team got a very good response from students in terms of quality of training and placement support of over 70% extended. The team then visited farm school and interacted with competitive exam coaching students, school students and community volunteers. Appreciated the efforts in farm school for promoting kitchen garden, plant nursery and fruit orchard. It has been recommended to plan for starting some of agri processing units under farm school to benefit multifold.

The team visited VIZMART, the marketing platform of livelihood units and impressed by the meaningful interaction with group members. Finally, the group visited Mulloor UP school and appreciated the efforts to provide a two storied building under CSR. Following are some of the recommendations of the Expert committee members.

1. Include courses on Net mending and boat repairing in skilling along with CIFNET or other institutions having expertise.
2. Expand CSR activities beyond 2k.m. radius on both sides of the Port Project.

3. Include a module on "Importance of Vizhinjam Port" in all CSR programmes and activities.





Press Converge

ആഗോള കൈകഴുകൽ ദിനം

കോവളം : ആഗോള കൈകഴുകൽ ദിനത്തോടനുബന്ധിച്ച് അദാനി ഗ്രൂപ്പിന്റെ സാമൂഹ്യ പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷൻ ദേശീയ തലത്തിൽ നടപ്പിലാക്കി വരുന്ന സുപോഷൺ പദ്ധതിയുടെ ഭാഗമായി കോട്ടകാൽ ഗ്രാമ പഞ്ചായത്തിലെ വിവിധ അങ്കണവാടികളിലും പരിസര പ്രദേശത്തും ബോധവൽക്കരണ ക്ലാസും കൈകഴുകൽ ഡെമോയും സംഘടിപ്പിച്ചു. 5 വയസി

നു താഴെയുള്ള കുട്ടികൾ, കൗമാര പെൺകുട്ടികൾ, മുലയൂട്ടുന്ന അമ്മമാർ, 5 വയസിനു താഴെയുള്ള കുട്ടികളുടെ അമ്മമാർ എന്നിവർ പങ്കെടുത്തു. അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ, സീനിയർ പ്രോജക്ട് ഓഫീസർ രാകേഷ്, പ്രോജക്ട് ഓഫീസർ ജോർജ്ജ് സെൻ പി. ടി, സ്റ്റീഫൻ വിനോദ്, അനുരാഗ്, മായ, മീര, ലിംന, രാധ എന്നിവർ നേതൃത്വം നൽകി.

പോഷണ മാസാചരണം

കോവളം : പോഷണ മാസാചരണത്തോടനുബന്ധിച്ച് അദാനി ഗ്രൂപ്പിന്റെ സാമൂഹ്യ പ്രതിബദ്ധതയുടെ ഭാഗമായി അദാനി ഫൗണ്ടേഷൻ ദേശീയതലത്തിൽ നടപ്പിലാക്കിവരുന്ന 'സുപോഷൺ' പദ്ധതിക്ക് തുടക്കമായി. പദ്ധതിയോടനുബന്ധിച്ച് കോട്ടുകാൽ ഗ്രാമപഞ്ചായത്തിൽ 4 ആഴ്ച നീണ്ടുനിന്ന പരിപാടികളിൽ കൗമാര പെൺകുട്ടികൾ, മുലയൂട്ടുന്ന അമ്മമാർ, 5 വയസിനു താഴെയുള്ള കുട്ടികളുടെ അമ്മമാർ എന്നിവർ പങ്കെടുത്ത വിളംബര റാലി, ബോധവൽക്കരണ ക്ലാസുകൾ, പോഷകാഹാര പ്രദർശനം, പാചക മത്സരം, ഫാമിലി കൗൺസലിംഗ്, കൈകഴുകലിന്റെ പ്രാധാന്യം, കക്കിംഗ് ഡെമോ എന്നിവയുൾപ്പെടെ, അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ, സീനിയർ പ്രോജക്ട് ഓഫീസർ രാകേഷ്, പ്രോജക്ട് ഓഫീസർ ജോർജ്ജ് സെൻ. പി. ടി. സ്റ്റീഫൻ വിനോദ്, അനുരാഗ്, മായ, കമാരിമീര, ലിന, രാധ എന്നിവർ നേതൃത്വം നൽകി.

ഗാന്ധിജയന്തി

കോവളം: അദാനി വിഴിഞ്ഞം തുറമുഖത്തിന്റെ സാമൂഹിക പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷനും നൈപുണ്യ വികസന വിഭാഗമായ അദാനി സ്റ്റീൽ ഡവലപ്മെന്റ് സെന്ററും സംയുക്തമായി ഗാന്ധിജയന്തി ദിനാഘോഷം സംഘടിപ്പിച്ചു. അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ ദിനാഘോഷം ഉദ്ഘാടനം ചെയ്തു. അദാനി ഫൗണ്ടേഷൻ പ്രോജക്ട് ഓഫീസർ ജോർജ്ജ് സെൻ മുഖ്യ പ്രഭാഷണം നടത്തി.

എക്സൈസ് പ്രിവന്റീവ് ഓഫീസർ പദ്മകുമാർ ലഹരി വിരുദ്ധ ബോധവൽക്കരണ ക്ലാസ്സായി. അദാനി ഫൗണ്ടേഷൻ സീനിയർ പ്രോജക്ട് ഓഫീസർ രാകേഷ്, സ്കിൽ ഡവലപ്മെന്റ് സെന്റർ ഹെഡ് അനുരാഗ് എന്നിവർ സംസാരിച്ചു.

തുറമുഖ പദ്ധതി പ്രതിസന്ധിയിൽ, എന്നിട്ടും കൈയയച്ച് സഹായം

■ സി.എസ്.ആർ ഫണ്ടായി അദാനി ചെലവഴിച്ചത് 59.5 കോടി

■ സായ്കൃഷ്ണ ആർ.പി

തിരുവനന്തപുരം: ആറ് വർഷത്തിനുള്ള കോർപ്പറേറ്റ് സെറ്റ് പോണിസിവിറ്റിറ്റിഫിക്കേഷൻ (സി.എസ്.ആർ) നിന്നുമാണ് വിഴിഞ്ഞം പൊർട്ട് പ്രൈവറ്റ് ലിമിറ്റഡ് വിനിയോഗിച്ചത് 59.5 കോടി രൂപ.

പ്രളയകാലത്ത് നടത്തിയ പ്രവർത്തനങ്ങൾക്ക് (2.5 കോടി), ഹബ്ബി പ്രബലതയ്ക്ക് വാർഷികങ്ങളിലെ അടിസ്ഥാന സൗകര്യ വികസനത്തിന് (10.92 കോടി) എന്നിവയാണ് ഏറ്റവും അധികം തുക ചെലവഴിച്ചത്.

വിദ്യാഭ്യാസ പ്രവർത്തനങ്ങൾ (1.64 കോടി), സാമൂഹിക ആരോഗ്യം (3.57 കോടി), നൈപുണ്യ വികസനം, ഉപജീവനം, കാർഷികം (4.6 കോടി), സ്പെഷ്യൽ പ്രോജക്ട്സ് (6.34 കോടി), മാധ്യമ സഹായം (2.5 കോടി), കൊവിഡ് സഹായം (5 കോടി) എന്നിങ്ങനെയാണ് 37 പ്രവർത്തനങ്ങൾക്കായി വിനിയോഗിച്ച തുകയുടെ കണക്ക്.

വിഴിഞ്ഞം തുറമുഖത്തിനായി 4000 കോടിയിലേറെ രൂപയുടെ നിക്ഷേപമാണ് അദാനി ഗ്രൂപ്പ് ഇതുവരെ നടത്തിയത്. ഇറക്കുമതി വിജ്ഞാപന നിർദ്ദേശിച്ചതോടെ 100 കോടിയിലേറെ രൂപയാണ് പ്രാഥമിക കണക്ക് പ്രകാരമുള്ള നിക്ഷേപത്തിനായിട്ടും ഏറ്റെടുത്ത സി. എസ്. ആർ പ്രവർത്തനങ്ങളായി മൂന്നോടു ചേർന്നാണ് അദാനി വിഴിഞ്ഞം പൊർട്ട് പ്രൈവറ്റ് ലിമിറ്റഡിന്റെ നിരീക്ഷണം. കൊവി



നൈപുണ്യ വികസനത്തിന് കത്തുണിറ്റി സീകിൽ പാർക്ക്

ആരോഗ്യം

- 151 കാൻസർ രോഗികൾക്ക് ചികിത്സാനുസഹായം
- ജോലിയിൽ ഹെൽത്ത് കെയർ യൂണിറ്റ്
- വിഴിഞ്ഞം സാമൂഹിക ആരോഗ്യ കേന്ദ്രത്തിന് കെട്ടിവെച്ചു നൂറ് കിടക്കകളും

നൈപുണ്യ വികസനവും ഉപജീവനവും

- 7415 പേർക്ക് ഡിജിറ്റൽ സാക്ഷരത ക്ലാസ്സ്
- ലൊജിസ്റ്റിക് സെന്റർ, ആശുപത്രികൾ, സൂപ്പർ മാർക്കറ്റുകൾ എന്നിവിടങ്ങളിൽ 1047 പേർക്ക് റിക്രൂട്ട്മെന്റ്
- ഫാം സ്കൂൾ ആരംഭിച്ച് 400 തദ്ദേശവാസികൾക്ക് പരിശീലനം
- 760 വീടുകളിൽ ജൈവപച്ചക്കറി കൃഷി
- 610 വിദ്യാർത്ഥികൾക്ക് മത്സരപ്പരീക്ഷകളിൽ പരിശീലനം ഫുട്ബോൾ പരിശീലനം



വിഴിഞ്ഞം തുറമുഖ നിർമ്മാണത്തിൽ ജോലി നൽകിയത് **435** പ്രദേശവാസികൾക്ക്

വിദ്യാഭ്യാസം

- 282 വിദ്യാർത്ഥികൾക്ക് 20000 രൂപ
- സി.കോളർഷിപ്പ് 249 വിദ്യാർത്ഥികൾക്ക് മൂന്നുവർഷവിദ്യാഭ്യാസ രേഖയിൽ സഹായം
- 645 വിദ്യാർത്ഥികൾക്ക് സാധാരണ ക്ലാസ്സ്
- 500 വിദ്യാർത്ഥികൾക്ക് ഇംഗ്ലീഷ് ക്ലാസ്സ്
- 14 സ്കൂളുകൾക്ക് സർക്കാർ ക്ലാസ്സ് റൂം
- 49 അക്ഷണവാക്യങ്ങൾ വാട്ടർ പ്യൂരിഫയർ

അടിസ്ഥാനസൗകര്യം

- ഫാർമൽ ഏരിയ എൽ.പി സ്കൂളിനും മറ്റുമ്പോൾ യു.പി സ്കൂളിനും പുതിയ കെട്ടിടങ്ങൾ
- കോട്ടപ്പുറം വിഴിഞ്ഞം ഫാർമൽ എന്നിവിടങ്ങളിൽ പൊതു ടോയ്ലറ്റ്
- കോട്ടപ്പുറം സ്കൂളിൽ പ്ലേഗ് റൗണ്ട്
- വിഴിഞ്ഞം ആസാഫ് സ്മാർക ലൈബ്രറി നവീകരണം
- മാവേലി നിർമ്മാണത്തിന് വിവിധ വാർഡുകളിൽ ഗാർബേജ് ബിന്നുകൾ
- ഗഹയാർ റോഡ് ശുചീകരണം

ഡ് കാലത്ത് 1012 മാർഗ്ഗങ്ങൾ നിർമ്മിക്കുകയും മൂന്ന് ലാൻഡിംഗ് നിലകളെയും മൂന്നു നിർമ്മാണത്തിനാവുമുള്ള കെട്ടിടങ്ങൾ നിർമ്മാണ സെന്ററിന് 50 ലക്ഷം രൂപയാണ് അടുത്തിടെ അദാനി ഗ്രൂപ്പ് സർക്കാരിൽ നിന്നു കൈമാറിയത്.

വിഴിഞ്ഞം: കോട്ടുകാലിൽ ശിശു ദിനാഘോഷം സംഘടിപ്പിച്ചു

വിഴിഞ്ഞം ശിശുദിനത്തോടനുബന്ധിച്ചു അദാനി ഗ്രൂപ്പിന്റെ സാമൂഹ്യ പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷൻ രാശീയ തലത്തിൽ അദാനി വിൽമാറിന്റെ സഹായത്തോടെ നടപ്പിലാക്കി വരുന്ന 'സുപോഷൺ' പദ്ധതിയുടെ ഭാഗമായി നവംബർ 14 ന് കോട്ടുകാൽ ഗ്രാമപഞ്ചായത്തിലെ 32 അംഗൻവാടികളിൽ ശിശു ദിനാഘോഷ പരിപാടികൾ സംഘടിപ്പിച്ചു. അഞ്ചു വയസ്സിൽ താഴെയുള്ള കുട്ടികളിലെ പോഷകശോഷണവും സ്ത്രീകളിലെയും കൗമാരക്കാരായ പെൺകുട്ടികളിലെയും വിളർച്ചയും ഇല്ലാതെ ചെയ്യുന്നതിനായി നടത്തി വരുന്ന പദ്ധതിയാണ് സുപോഷൺ.



ശിശു ദിനത്തോനുബന്ധിച്ചു അംഗൻവാടികളിൽ നടന്ന രാമി, വിവിധ ആഘോഷ പരിപാടികൾ എന്നിവ സുപോഷൻ കമ്മ്യൂണിറ്റി ഹെൽത്ത് വോളന്റിയറുമായ സംഗീണിമാരും അംഗൻവാടി പ്രവർത്തകരും ചേർ

ന്നു സംഘടിപ്പിച്ചു. ശിശു ദിനത്തോനുബന്ധിച്ചു സുപോഷൺ പദ്ധതിയുടെ ഭാഗമായി എല്ലാ അംഗൻവാടികൾക്കും നേത്രപഠനം വിതരണം ചെയ്തു.

അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ ശ്രീ. സെബാസ്റ്റ്യൻ ശ്രീമദ്ദോ, സീനിയർ പ്രോജക്ട് ഓഫീസർ ശ്രീ. രാമേഷ്, പ്രോജക്ട് ഓഫീസർ ശ്രീ. ജോർജ്ജ്

നെൽ പി കി, ശ്രീ. സ്റ്റീഫൻ വിനോദ്, ശ്രീ.അനൂരാഗ്, ശ്രീമതി.മായ, ശ്രീമതി. മീര, ശ്രീമതി.വിംന, ശ്രീമതി.രായ എന്നിവർ പരിപാടികൾ നേതൃത്വം നൽകി.

യന്ത്ര സഹായത്തോടെയുള്ള വെള്ളായണി കായൽ ശുചീകരണ പ്രവർത്തനങ്ങൾക്ക് തുടക്കമായി

വെങ്ങാനൂർ, തിരുവനന്തപുരം : അദാനി വിഴിഞ്ഞം തുറമുഖത്തിന്റെ സാമൂഹ്യപ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി അദാനി ഫൗണ്ടേഷൻ, വെങ്ങാനൂർ ഗ്രാമപഞ്ചായത്ത്, നിർമ്മാണകോം പരിസ്ഥിതി സംഘടന, വിവിധ സാമൂഹ്യ സംഘടനകൾ എന്നിവരുടെ നേതൃത്വത്തിൽ യന്ത്ര സഹായത്തോടെയുള്ള വെള്ളായണി കായൽ ശുചീകരണ പ്രവർത്തനങ്ങൾക്ക് തുടക്കം കുറിച്ചു.

മാൻ ശ്രീമതി അലീത ഇ. ഗ്രാമ പഞ്ചായത്ത് അംഗം ശ്രീ. അഷ്ടപാലൻ, നിർമ്മാണകോം പ്രസിഡന്റ് ശ്രീ.കിരൺ, സെക്രട്ടറി ശ്രീ. ജയകുമാർ, അദാനി തുറമുഖ കമ്പനി എച്ച്.ആർ വിഭാഗം മേധാവി ശ്രീ. വിപിൻ ശേക്കറി, എന്നിവർ ശുചീകരണ യജമാനരാണ് നേതൃത്വം നൽകി. അദാനി കമ്പനി പ്രതിനിധികൾ, ഫൗണ്ടേഷൻ പ്രവർത്തകർ എന്നിവരും യജമാനരായി പങ്കാളികളായി.

മലം അലുവ്യയാണ് അതി ശുചിയായി സൂക്ഷിക്കുവാൻ നമുക്ക് കടമയുണ്ട് എന്ന മുദ്രാവചകൃത്യത്തിൽ ഒരു ഒപ്പ് ശേഖരണ ക്യാമ്പയിനും സംഘടിപ്പിച്ചു. വരുന്ന മേ ദിവസം കൊണ്ട് വെങ്ങാനൂർ ഗ്രാമ പഞ്ചായത്തിന്റെയും വിവിധ സംഘടനകളുടെയും സഹകരണത്തോടെ സമ്പൂർണ്ണ കായൽ ശുചീകരണം പൂർത്തിയാക്കുമെന്ന് അദാനി ഫൗണ്ടേഷൻ പ്ര

തിനിധികൾ അറിയിച്ചു. കൂടാതെ തീക്കര ചെയ്യുന്ന കുളവാഴകളിൽ കുറച്ചെണ്ണയും വെള്ളായണി കാർഷിക കോളേജിന്റെ സാങ്കേതിക സഹകരണത്തോടെ മൈവെലുമാക്കി മാറ്റുന്നതിനുള്ള പദ്ധതിയും കുളവാഴകളിൽ നിന്ന് ബയോഗ്യാസ് നിർമ്മിക്കുന്നതിനാവശ്യമായ ഒരു മാതൃകാ പദ്ധതിയും ഇതിന്റെ ഭാഗമായി നടപ്പിലാക്കുമെന്നും അദാനി ഫൗണ്ടേഷൻ പ്രതിനിധികൾ അറിയിച്ചു.

യമസേവന വകുപ്പിന്റെ റീഡ് റിമൂവർ ഉപയോഗിച്ചാണ് കുളവാഴകൾ നീക്കം ചെയ്യുന്നത്. ശുചീകരണ യജമാനം വെങ്ങാനൂർ ഗ്രാമപഞ്ചായത്ത് പ്രസിഡൻ്റ് ശ്രീ. ശ്രീകുമാർ, അദാനി ഫൗണ്ടേഷൻ സുസ്ഥിര ഉപജീവന വിഭാഗം മേധാവിയ മേധാവി ഡോ. അനിൽ ബാവകൃഷ്ണൻ എന്നിവർ ചേർന്ന് ഉദ്ഘാടനം ചെയ്തു. ഇല്ലാ പഞ്ചായത്ത് അംഗം ശ്രീ. ഗോത് വഹാസ്, വെങ്ങാനൂർ ഗ്രാമ പഞ്ചായത്ത് വൈസ് പ്രസിഡന്റ് ശ്രീമതി, റാണി വൽസൻ, കേരളകാര്യ സ്റ്റാൻഡിംഗ് കമ്മിറ്റി ചെയർ





आपके शहर की हर अपडेट के लिए

डाउनलोड करें

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തിരുവനന്തപുരം: അദാനി ഫൗണ്ടേഷൻ വിഴിഞ്ഞം പ്രദേശത്ത് നടത്തിവന്ന പ്രമേഹ ബോധവൽക്കരണ വാരാചരണത്തിന്റെ സമാപനം മുക്കോലയിലെ CSR ആഫീസിൽ നടന്നു

1.4k views | Thiruvananthapuram, Thiruvananthapuram | Nov 20, 2022

കാൻസർ രോഗ നിർണ്ണയ ക്യാമ്പ്

കോവളം: അദാനി വിഴിഞ്ഞം തുറമുഖം കമ്പനിയുടെ സാമൂഹ്യ പ്രതിബദ്ധത പദ്ധതിയുടെ ഭാഗമായി തിരുവനന്തപുരം റീജിയണൽ കാൻസർ സെന്ററിന്റെയും വിഴിഞ്ഞം ലയൺസ് ക്ലബ്ബ് ഇന്റർനാഷണൽ, കിടാരക്കുഴി സിഡന്റ്സ് അസോസിയേഷൻ എന്നിവയുടെ സംയുക്താഭിമുഖ്യത്തിൽ സംഘടിപ്പിച്ച കാൻസർ രോഗനിർണ്ണയ ക്യാമ്പ് നഗരസഭ മുല്ലൂർ വാർഡ് കൗൺസിലർ ഓമന നിർവഹിച്ചു.

കിടാരക്കുഴി ലയൺസ് ക്ലബ്ബ് ഓഫീസിൽ നടന്ന ചടങ്ങിൽ വിഴിഞ്ഞം ലയൺസ് ക്ലബ്ബ് പ്രസിഡന്റ് മണ്ണിൽ മനോഹരൻ അധ്യക്ഷത വഹിച്ചു. അദാനി ഫൗണ്ടേഷൻ ലൈവി ഹുഡ് കോ ഓർഡിനേറ്റർ ജോർജ്ജ് സെൻ.പി.ടി, അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം മാനേജർ സെബാസ്റ്റ്യൻ ബ്രിട്ടോ, ആർ.സി.സി കമ്മ്യൂണിറ്റി ഓങ്കോളജി വിഭാഗം മേധാവികളായ ഡോ.ജയകൃഷ്ണൻ, ഡോ. കലാവതി തുടങ്ങിയവർ ക്യാമ്പിന് നേതൃത്വം നൽകി.

കാൻസർ രോഗനിർണ്ണയ ക്യാമ്പ് നടത്തി

വിഴിഞ്ഞം • അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനി സാമൂഹ്യപ്രതിബദ്ധത പദ്ധതി ഭാഗമായി റീജനൽ കാൻസർ സെന്റർ, വിഴിഞ്ഞം ലയൺസ് ഇൻറർനാഷനൽ, കിടാരക്കുഴി റസി. അസോസിയേഷൻ എന്നിവയുടെ നേതൃത്വത്തിൽ കാൻസർ രോഗനിർണ്ണയ ക്യാമ്പ് നടത്തി. വാർഡ് കൗൺസിലർ സി.ഓമന ഉദ്ഘാടനം ചെയ്തു. മണ്ണിൽ മനോഹരൻ, പി.ടി.ജോർജ്ജ്, സെബാസ്റ്റ്യൻ ബ്രിട്ടോ ഡോ. ജയകൃഷ്ണൻ, ഡോ.കലാവതി, സി.പുഷ്കരൻ, വിനോദ് എന്നിവർ പ്രസംഗിച്ചു.

ജെൻറോബോട്ടിക്സ് സ്ഥാപകർക്ക് അദാനി ഗ്രൂപ്പ് ഫെല്ലോഷിപ്പ്

തിരുവനന്തപുരം: റോബോട്ടിക് സാങ്കേതികവിദ്യയിലൂടെ സാമൂഹിക പ്രശ്നങ്ങൾക്ക് പരിഹാരം കാണുന്ന സംരംഭമായ ജെൻറോബോട്ടിക്സ് സ്ഥാപകരെ അദാനി ഗ്രൂപ്പ് ഫെല്ലോഷിപ്പിനായി തിരഞ്ഞെടുത്തു. സൃഷ്ടിച്ച സംരംഭവും അതിൻ്റെ സാമൂഹിക സ്വാധീനവും കണക്കിലെടുത്താണ് ഇത്തരമൊരു അംഗീകാരം അവരെ തേടിയെത്തിയത്.

ജെൻറോബോട്ടിക്സിൻ്റെ സ്ഥാപകരായ വിമൽ ഗോവിന്ദ് എം.കെ, അരുൺ ജോർജ്, റഷീദ് കെ, നിഖിൽ എൻ.പി എന്നിവർ രാജ്യത്തെ നിരവധി സാമൂഹിക പ്രശ്നങ്ങൾ പരിഹരിക്കാൻ സഹായിക്കുന്ന ഉൽപ്പന്നങ്ങൾ വികസിപ്പിച്ചെടുത്തി

ട്ടുണ്ട്. മനുഷ്യർ മാധ്യമം കോരുന്നതിൽ അവസാനിപ്പിക്കുന്നതിനുള്ള ദൗത്യം തിരിച്ചെടുക്കുന്നതിന് ജെൻറോബോട്ടിക്സിനെ ഈ ഫെല്ലോഷിപ്പ് സഹായിക്കുന്നു. ഇതിൽ അദാനി ഗ്രൂപ്പ് ഭാഗമാകുമെന്നും ഫൗണ്ടേഷൻ്റെ അധ്യക്ഷ പ്രീതി അദാനി അഭിപ്രായപ്പെട്ടു.

മേധാക്കത്തിലെ ആദ്യത്തെ റോബോട്ടിക് സ്കാലബറായ ബെൻഡിക്ട് പോമറ്റുള്ള ജെൻറോബോട്ടിക്സിൻ്റെ ഉൽപ്പന്നങ്ങൾ അദാനി ഗ്രൂപ്പിൻ്റെ കീഴിലുള്ള തുറമുഖങ്ങളിലും വിമാനത്താവളങ്ങളിലും മറ്റ് ടൗൺഷിപ്പുകളിലും സ്ഥാപിക്കുമെന്നും അവർ കൂട്ടിച്ചേർത്തു. ഫെല്ലോഷിപ്പിലൂടെ, കൂടുതൽ സാമൂഹിക മേഖലക

ളിലേക്ക് ഈ സംരംഭം വ്യാപിപ്പിക്കാനും കൂടുതൽ സാമൂഹിക പ്രശ്നങ്ങൾ പരിഹരിക്കുന്നതിനുള്ള ഉൽപ്പന്നങ്ങൾ വികസിപ്പിക്കാനും ജെൻറോബോട്ടിക്സിന് സാധിക്കും.

രാജ്യത്ത് ആയിരക്കണക്കിന് ശുചീകരണ യോജിപ്പാളികളുടെ ജീവൻ രക്ഷിക്കാൻ സഹായിച്ച ബെൻഡിക്ട് പോമറ്റുള്ള ഫലപ്രദമായ കണ്ടുപിടുത്തങ്ങൾ ജെൻറോബോട്ടിക്സിൻ്റെ നൂതന സംരംഭം സൃഷ്ടിച്ചു. നിമിഷം ഇന്ത്യയിലെ 11 സംസ്ഥാനങ്ങളിലും മൂന്ന് കേന്ദ്ര ഭരണ പ്രദേശങ്ങളിലും ബെൻഡിക്ട് പ്രവർത്തിക്കുന്നുണ്ട്.

ശുചീകരണത്തോഴിമാളികളുടെ സുരക്ഷയും അ

ന്തസ്സും മെച്ചപ്പെടുത്തുന്നതിനൊപ്പം അവർക്ക് സമൂഹത്തിൽ നല്ല മാറ്റങ്ങൾ കൊണ്ടുവരികയും ചെയ്യുക എന്ന ലക്ഷ്യത്തോടെയാണ് ഞങ്ങൾ ഈ സാങ്കേതികവിദ്യ വികസിപ്പിച്ചെടുത്തതെന്ന് കമ്പനി സഹസ്ഥാപകൻ വിമൽ ഗോവിന്ദ് പറഞ്ഞു. ശുചീകരണ മേഖലയിൽ കൂടുതൽ നവീകരണങ്ങൾക്കായി പ്രവർത്തിക്കുന്നതിന് ഈ ഫെല്ലോഷിപ്പ് സഹായിക്കുമെന്നും വിമൽ ഗോവിന്ദ് കൂട്ടിച്ചേർത്തു.

അടുത്തിടെ ജെൻറോബോട്ടിക്സ് അവരുടെ മെഡിക്കൽ ഉൽപ്പന്നമായ ജി ഗെന്റർ റോബോട്ട് പുറത്തിറക്കി. പരമ്പരാഗത ഫിസിതോതെറാപ്പി ചികിത്സയെക്കാൾ ജി ഗെന്റർ വിജി മേഖലയിൽ രോഗികൾക്ക് സൗജ്യം നൽകാനാകുമെന്നാണ് അധികൃതർ പറയുന്നത്.

ജി ഗെന്റർ ന്റെ നിർമ്മിത ബുദ്ധി ഉപയോഗിച്ചുള്ള നാച്യുറൽ ഹൃദയൻ ഗെന്റർ പാറ്റേൺ മികച്ച കാര്യക്ഷമതയും, രോഗിയുടെ നടത്ത പരിശീലന വേഗങ്ങളുടെ ചലനാത്മകതയും, സ്ഥിരതയും, ഗുണ നിമിശ്വാപരവും വർദ്ധിപ്പിക്കുന്നു. ഓരോ രോഗിയുടെയും പ്രത്യേക ആവശ്യങ്ങൾക്കനുസരിച്ച് പ്രകൃതമായ കമാൻഡ് തെറാപ്പി സംവിധാനം തയ്യാറാക്കാനും ജി ഗെന്റർ സഹായിക്കും. മാത്രമല്ല മെഡിക്കൽ പ്രൊഫഷണലുകളുടെ സമയവും മാർഗ്ഗം നാകും.



അദാനി ഗ്രൂപ്പ് ചേർത്തതായ ഗൗരവം അദാനിക്കൊപ്പം ജെൻറോബോട്ടിക്സ് സ്ഥാപകരായ നിഖിൽ എൻ പി, റഷീദ് കെ, വിമൽ ഗോവിന്ദ് എം.കെ, അരുൺ ജോർജ് എന്നിവർ.



Adani Foundation ✓



7 Dec 2022

Mishaps can occur at any time, and it is the underprivileged who suffers the most. Suresh.G and Sheeja Suresh are living in #Kidarakuzhi village in the Thiruvananthapuram district of Kerala. Things took an ugly turn when Suresh fell from second storey of a building and damaged his spinal cord. He was forced to go out of job leading the family of five to slip into abject penury. #AdaniFoundation extended help of ₹10,000, and a grocery store was set up near his home when approached by Sheeja, his wife. Through the shop they earn moderate profits that is now supporting the family.

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കാൻസർ രോഗനിർണയ ക്യാമ്പ്

വിഴിഞ്ഞം, അറാബിൻ റിവിയർ ഏരിയയിലെ കരവനാശ്ശിയിൽ നടന്നുവന്നുവരുന്ന കാൻസർ രോഗനിർണയ ക്യാമ്പിൽ ഹൃദയം ക്യാമ്പിൽ പങ്കെടുത്തു. ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

കാൻസർ രോഗനിർണയ ക്യാമ്പ് നടത്തി

വിഴിഞ്ഞം അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

വിഴിഞ്ഞം അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

വിഴിഞ്ഞം അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

'ശലഭങ്ങൾ' പുസ്തകം പ്രകാശനം ചെയ്തു



വിഴിഞ്ഞം അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

കാൻസർ രോഗനിർണയ ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്. അറാബിൻ റിവിയർ ഏരിയയിൽ പങ്കെടുത്തവർക്ക് പരിശോധനകൾ നൽകിയിട്ടുണ്ട്.

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16 January 2023, 08:12 AM IST

തൂറമുഖം വരുന്നതിനു മുന്നേയും വലിയതൂറു, ശംഖുംമുഖം, പുനത്തൂറ്റ് മേഖലകളിൽ തീരശോഷണമുണ്ടായതായി പഠനങ്ങളിൽനിന്നു വ്യക്തമാണ്



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Winner - Stories of Change - Competition!!!

Hiral Pandya 5:07 PM to ASDC_Team, Amitkum...

Dear Team,
The winners of the competition are as below:
1. Best Story East - Placed: **Dhamra** (Candidate Name: Debdatta Biswal - Ass. Electrician)
2. Best Story East - Self-Employed: **Dhamra** (Candidate Name: Sasmita Rani Das - SET)
3. Best Story South - Placed: **Vizhinjam** (Candidate Name: Ludhiya & Samson Francis - GDA)
4. Best Story South - Self-Employed: **Kattur** (Candidate Name: Nandhini S. - Beauty Therapist)

Congratulations to the winning team!!!

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'ശലഭങ്ങൾ' പുസ്തകം പ്രകാശനം ചെയ്തു

വിഴിഞ്ഞം അദാനി വിഴിഞ്ഞം തുറമുഖത്തിന്റെ സാമൂഹിക പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷൻ 2018 മുതൽ നടത്തി വരുന്ന അറിവരങ്ങ് സാഹിത്യ അഭിരുചി ക്യാമ്പിലെ കുട്ടികൾ എഴുതിയ കഥ, കവിത, ആസവാദനക്കുറിപ്പുകൾ എന്നിവയുടെ സമാഹാരമായ ശലഭങ്ങൾ എന്ന പുസ്തകം പ്രകാശനം ചെയ്തു. തിരുവനന്തപുരം സി.വി. സ്മാരക ഗ്രന്ഥശാലയിൽ വെച്ച് നടന്ന പടങ്ങിൽ അദാനി ഫൗണ്ടേഷൻ നാഷണൽ സെന്റർ സി എസ് ആർ ഹെഡ് ഡോ. അനീൽ ബാലകൃഷ്ണൻ അധ്യക്ഷകനും, മിമിക്രി ആർട്ടിസ്റ്റും ആയ ഷൈജു അലക്സിന് പുസ്തകം നൽകി പ്രകാശനം കർമ്മം നിർവ്വഹിച്ചു. സാഹിത്യ അഭിരുചി ക്യാമ്പിലെ അധ്യാപകരായ രത്നാകരൻ, വിജയകൃഷ്ണൻ, റിപ്പബ്ലിക് ഹെർബാലിസ്റ്റ്, സുബ്രഹ്മണ്യൻ, സുബ്രഹ്മണ്യൻ, സുബ്രഹ്മണ്യൻ



●ശലഭങ്ങൾ എന്ന പുസ്തകം ഡോ. അനീൽ ബാലകൃഷ്ണൻ അധ്യക്ഷകനും മിമിക്രി ആർട്ടിസ്റ്റുമായ ഷൈജു അലക്സിന് നൽകി പ്രകാശനം ചെയ്തു. അദാനി ഫൗണ്ടേഷൻ പ്രോഗ്രാം ട്രോ, സാഹിത്യ അഭിരുചി ക്യാമ്പ് സെൻ പീട്രി, വിനോദ്, രാമേഷ്, രാമേഷ് സെബാസ്റ്റ്യൻ ശ്രീ ന് കോഡിനേറ്റർ ജോർജ്ജ് ഫി, മിര എന്നിവർ പങ്കെടുത്തു.

സുപ്രഭാതം

പരിശീലന പരിപാടി സംഘടിപ്പിച്ചു

വിഴിഞ്ഞം • ലോക കാൻസർ ദിനാചരണത്തിന്റെ ഭാഗമായി അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷൻ കമ്മ്യൂണിറ്റി വളണ്ടിയർമാർക്കായി കാൻസർ അവബോധ പരിശീലന പരിപാടികൾ സംഘടിപ്പിച്ചു. വിഴിഞ്ഞം തുറമുഖ പദ്ധതി പ്രദേശം ഉൽ

പ്പെടുന്ന നഗരസഭയുടെ വിഴിഞ്ഞം, മുല്ലൂർ, കാട്ടേപ്പുറം, വെങ്ങാനൂർ, ഹാർബർ വാർഡുകളിലാണ് ബോധവൽക്കരണ പരിശീലന ക്ലാസുകൾ സംഘടിപ്പിച്ചത്. പരിശീലന പരിപാടിക്ക് റിജിയണൽ കാൻസർ സെന്റർ, കമ്മ്യൂണിറ്റി ഓങ്കോളജി വിഭാഗത്തിലെ പ്രൊഫ. ഡോ. കലാവതി നേതൃത്വം നൽകി.

കാൻസർ അവബോധ പരിശീലനം
 വിശിഷ്ടം - കാൻസർ പിന്മുറക്കെ നുണമ്പിച്ച് അടാണി പരാമൺഷൻ കമ്മ്യൂണിറ്റി വൊളന്റിയർമാർ മൊതി കാൻസർ അവബോധ പരിശീലന പരിപാടിയും രണ്ടാം വർഷത്തെ ക്ലോസ്കൂട്ടും നടത്തി വീടിലൂടെ കാൻസർ സെന്റിൻ കമ്മ്യൂണിറ്റി ഓരോരുത്തി വിഭാഗം പ്രസി. ഡോ. കലാവതി നയിച്ചു.

സംഗ്രഹം
പരിശീലന പരിപാടി സംഘടിപ്പിച്ചു
 വിശിഷ്ടം - രണ്ടാം കാൻസർ പിന്മുറക്കെ നുണമ്പിച്ച് അടാണി പരാമൺഷൻ കമ്മ്യൂണിറ്റി വൊളന്റിയർമാർ മൊതി കാൻസർ അവബോധ പരിശീലന പരിപാടിയും രണ്ടാം വർഷത്തെ ക്ലോസ്കൂട്ടും നടത്തി വീടിലൂടെ കാൻസർ സെന്റിൻ കമ്മ്യൂണിറ്റി ഓരോരുത്തി വിഭാഗം പ്രസി. ഡോ. കലാവതി നയിച്ചു.

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ശിശുവനന്തപുരം: ഘോഷ കാൻസർദിനം അടാണി പരാമൺഷൻ കമ്മ്യൂണിറ്റി വൊളന്റിയർമാർക്ക് വിശിഷ്ടം അടാണി 5 വാർഡുകളിൽ പരിശീലന പരിപാടി സംഘടിപ്പിച്ചു.

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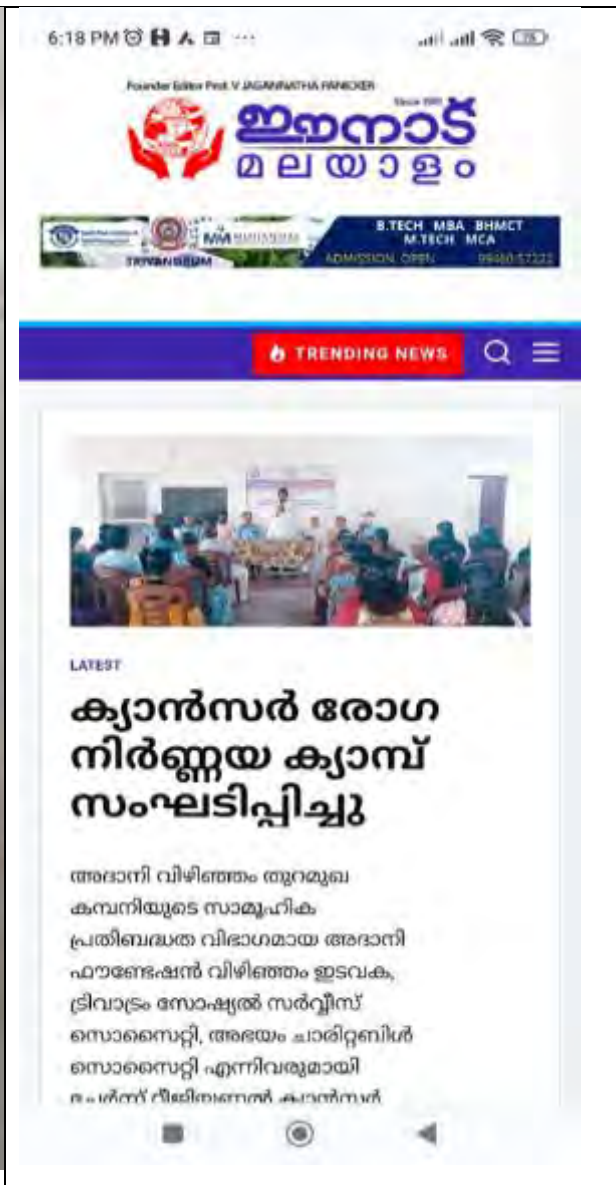
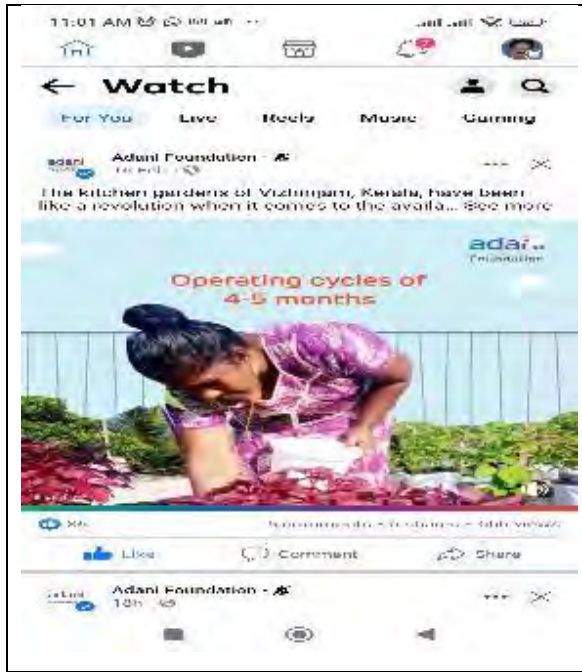
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ക്യാൻസർ രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു

തിരുവനന്തപുരം: അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പരിഷ്കരണ പദ്ധതിയുടെ ഭാഗമായി പന്ത്രണ്ടുപേർ വിഴിഞ്ഞം ഇടവകയിലെ മിസോസിയം സെന്ററിൽ നടത്തിയ സൗജന്യമായി നടന്ന ക്യാമ്പിൽ ക്യാൻസർ രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു. ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.

ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു. ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.

ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു. ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.

സിപിഎം ജാഥക്ക് ഇന്ന് നെടുമങ്ങാട് സ്വീകരണം

നെടുമങ്ങാട്: സിപിഎം ജാഥയ്ക്ക് ഇന്ന് നെടുമങ്ങാട് സ്വീകരണം. ഇടവകയിൽ നടന്ന ചടങ്ങിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.



ക്യാമ്പിൽ പങ്കെടുത്തവർക്ക് ക്യാൻസർ രോഗനിർണയം വേഗം തിരിച്ചറിയുന്നതിനും ചികിത്സിക്കുന്നതിനും സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.

ക്യാൻസർ രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു



16.03.2023

തിരുവനന്തപുരം: അദാനി വിഴിഞ്ഞം തുറമുഖ കമ്പനിയുടെ സാമൂഹിക പ്രതിബദ്ധത വിഭാഗമായ അദാനി ഫൗണ്ടേഷൻ വിഴിഞ്ഞം ഇടവക, ട്രിവാണ്ട്രം സോഷ്യൽ സർവ്വീസ് സൊസൈറ്റി, അഭയം ചാരിറ്റബിൾ സൊസൈറ്റി എന്നിവരുമായി ചേർന്ന് രീജിയണൽ ക്യാൻസർ സെന്ററിലെ കമ്മ്യൂണിറ്റി ഓങ്കോളജി ഡിപ്പാർട്ട്മെന്റിന്റെ സഹായത്തോടെ ക്യാൻസർ രോഗനിർണയ ക്യാമ്പ് സംഘടിപ്പിച്ചു. വിഴിഞ്ഞം ഇടവക പാരിഷ് ഹാളിൽ നടന്ന ക്യാമ്പ് ഇടവക സഹ വികാരി റവ.ഫാദർ മനീഷ് പീറ്റർ ഉദ്ഘാടനം ചെയ്തു. കമ്മ്യൂണിറ്റി ഓങ്കോളജി വിഭാഗം സഹായം നൽകുന്നതിനും ക്യാമ്പ് സംഘടിപ്പിച്ചു.

ചന്ദ്രിക വിഴിഞ്ഞത്തും ലോകവനിതാ ദിനാഘോഷം

വിഴിഞ്ഞം: അദാനി വിഴിഞ്ഞം തുറമുഖത്തിന്റെ സാമൂഹ്യ പ്രതിബദ്ധത പദ്ധതികളുടെ ഭാഗമായി വനിതാ ദിനാഘോഷം സംഘടിപ്പിച്ചു. വനിതാ സ്വയം തൊഴിൽ സംരംഭങ്ങളുടെ ഫെഡറേഷനായ വിസ് മാർട്ട് കൺവീനർ സുരജ ടി.കെ അദ്ധ്യക്ഷത വഹിച്ച ചടങ്ങ് അദാനി ഫൗണ്ടേഷൻ റീജിയണൽ ഹെഡ് ഡോ. അനിൽ ബാലകൃഷ്ണൻ ഉദ്ഘാടനം ചെയ്തു. തുറമുഖ കമ്പനി എച്ച്.ആർ. ഹെഡ് വിപിൻ ശെക്കുറി, ലോജിസ്റ്റിക് വിഭാഗം പ്രതിനിധി വത്സലകുമാർ, വനിതാ കാർഷിക കർമ്മസേന പ്രസിഡന്റ് ശശികല എന്നിവർ സന്ദേശങ്ങൾ നൽകി. മത്സരങ്ങളിൽ വിജയിച്ചവർക്കുള്ള സമ്മാനങ്ങളും ചടങ്ങിൽ വിതരണം ചെയ്തു.

രവധി സ്ഥലങ്ങളിൽ ഭൂചലനം.ഡൽഹി

വിഴിഞ്ഞം തുറമുഖ കമ്പനി ലോക വനിതാ ദിനാഘോഷം സംഘടിപ്പിച്ചു.



08-03-2023

വിഴിഞ്ഞം:അദാനി വിഴിഞ്ഞം തുറമുഖത്തിന്റെ സാമൂഹ്യ പ്രതിബദ്ധതാ പദ്ധതികളുടെ ഭാഗമായി വനിതാ ദിനാഘോഷം സംഘടിപ്പിച്ചു.വനിതാ സ്വയം തൊഴിൽ സംരംഭങ്ങളുടെ ഫെഡറേഷനായ വിസ്മാർട്ട് കൺവീനർ

Annexure IV
Compliance to Conditions of KCZMA
Recommendation

	Adani Vizhinjam Port Private Ltd	From: October 2022 To: March 2023
Vizhinjam International Deepwater Multipurpose Seaport Compliance of Conditions of KCZMA recommendation for Environmental/CRZ Clearance		

Annexure IV

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendation for Environment and CRZ Clearance (EC) for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
(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.	<p>Complied</p> <p>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 construction activities as mentioned hereunder:</p> <ul style="list-style-type: none"> • Consent to Establish (CTE) No. PCB/HO/TVM/ICE/08/2015 dated 15.09.2015 valid up to 31.07.2018 was renewed from State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE-R/02/2018, dated 19.07.2018 valid up to 31.07.2023. • Airport Authority of India NOC vide NOC no AAI/SR/NOC/RHQ dated 7.12.2015. • CTE for consumer pump inside the Vizhinjam port premises was obtained on 07.03.2021 (Consent No.: PCB/TVM-DO/NTA/PTP/15/2021) for the period of 5 years valid up to 28.02.2026. • Consent to Operate (CTO) for Explosives Storage at Chappath area was obtained on 20.07.2021 (Consent No.: PCB/TVM-DO/ICO/NTA/HCS/49/2021) valid up to 31.12.2024. • As per the exemption granted by GoK G.O. No. 310/2015/LSGD dated 01/10/2015, AVPPL is not required to obtain any further building permits/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.	<p>Complied</p> <p>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. Organizational Structure for Environment, Health, and Safety (EHS) & CSR for construction phase is enclosed as Annexure VIII. All work plans are</p>

	Adani Vizhinjam Port Private Ltd	From: October 2022 To: March 2023
Vizhinjam International Deepwater Multipurpose Seaport Compliance of Conditions of KCZMA recommendation for Environmental/CRZ Clearance		

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendation for Environment and CRZ Clearance (EC) for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
		executed after assessing the defined EHS 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 CTE has been obtained from Kerala State Pollution Control Board vide Consent No. PCB/HO/TVM/ICE/08/2015, dated 15.09.2015 valid up to 31.07.2018. Subsequently, the CTE was renewed vide Consent No. PCB/HO/TVM/ICE-R/02/2018 dated 19.07.2018 valid up to 31.07.2023.
(iv)	The construction should be undertaken, if any with least damages to the existing mangroves. A buffer zone of 50m shall be provided for mangroves present in the area.	Not Applicable There are no mangroves in the vicinity of the 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 No solid waste is being disposed in the CRZ area. Bio-degradable waste is being treated in an Organic Waste Converter (OWC) installed at site and output is being used as manure in greenbelt development. Currently no effluent is generated. Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner is being planned and will be implemented in line with CRZ Notification along with the commissioning of the project.
(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.	Noted All necessary support will be extended to officials of KCZMA during inspection of the project/site visit; at any time.
(vii)	The KCZMA may be duly	Being Complied

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of Conditions of KCZMA recommendation for Environmental/CRZ Clearance**

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendation for Environment and CRZ Clearance (EC) for the Period October 2022 to March 2023

S. No.	Conditions	Compliance Status as on 31.03.2023
	<p>informed of any construction/developmental works/major activities undertaken in the CRZ area of the project</p>	<ul style="list-style-type: none"> • Member Secretary KCZMA is also the member secretary of NGT appointed committee; the committee meets every six months to review the compliance of Environmental & CRZ Clearance. • Regular meetings are held with officials of KCZMA to appraise them on various project related activities. • HYCRs are being furnished to KCZMA including the details of the development works. <p>Following construction activities have taken place till March 2023:</p> <ul style="list-style-type: none"> • During the compliance period, 0.41 Mm³ material has been dredged and the total dredged material amounting to 3.31 Mm³ has been utilized for reclamation. • Berth Construction: Piling (617 nos.) and casting of pile muffs (617 nos.) have been completed. • Breakwater construction and yard development are in progress. • Boundary wall construction and port approach road work along available front has been completed at various locations; remaining construction work is on hold owing to several local disputes as well as R&R issues. • Excavation for levelling in the backup area considering present and future port development activities. • Following buildings construction work are completed: Gas Insulated Substation (GIS) substation, Substation building (Inside port), Port Operations Building (POB), Port Canteen, Toilet Block-2, Training Room and Custom Check Building, RMU Room & Wharf Office, Workshop and Stores Building, Gate Complex, Security Building, Electrical DG shed, Training Room & Custom check point. • Following construction work is in progress: Other toilet blocks, Quay workers and Driver Amenities

	Adani Vizhinjam Port Private Ltd	From: October 2022 To: March 2023
Vizhinjam International Deepwater Multipurpose Seaport Compliance of Conditions of KCZMA recommendation for Environmental/CRZ Clearance		

Half Yearly Compliance of Conditions Stipulated in KCZMA Recommendation for Environment and CRZ Clearance (EC) for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on 31.03.2023
		<p>(Rest Room), Firefighting Water Tank & Pump House, Fuel Station, Port User Building (PUB) Building, Parking Shed for ambulance/fire tenders, Fuel Bowser parking shed, Storm Water Drain, etc.</p> <p>During the compliance period, for the months of October, November and December 2022 works were stalled due to the ongoing protests and strike by the Latin Archdiocese and others. The agitation was withdrawn at the Port site on 08.12.2022 and the contractors resumed their work thereafter.</p>
(viii)	Environmental clearance must be obtained from the Ministry of Environment & Forests.	<p>Complied Environment & CRZ Clearance (EC) has been obtained from Ministry of Environment & Forest vide MoEF letter dated 03.01.2014 (F.No.11-122/2011-IA.III) which is having validity up till 02.01.2025.</p>
(ix)	An adequate financial provision has to be made for environmental protection measures.	<p>Complied A total of approx. Rs. 40 Crore has been set aside for environmental protection measures as per the EIA report. Till date, an amount of Rs. 26.09 Crores has been spent on environmental protection measures. The activity-wise fund break-up and expenditure is enclosed as Annexure VII.</p>
(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 challan receipt in original be forwarded to the Science & Technology Department quoting this letter.	<p>Not Applicable The condition is not applicable since the application for EC was submitted by Vizhinjam International Seaport Ltd. (VISL), a Government of Kerala (GoK) undertaking.</p>

Annexure V
Compliance of the Commitments made during
Public Hearing

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Annexure V

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
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	<p>Being Complied</p> <p>In consultation with the fishermen, enhanced livelihood compensation of Rs. 101.86 Crores was sanctioned by GoK, instead of Rs. 8.55 crores; as suggested earlier in the EIA stage. Till date an amount of Rs. 100 crores have been disbursed till 30.09.2022 for a total number of 2641 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost as well during the port construction period. Verification of the documents of few balance LAPs is in progress. <i>(Source: VISL)</i></p> <p>There are 5 identified EMP areas: Port Site, Road/Rail Corridor, Warehouse Area, PAF (Project Annex Facility) and Backup Areas. Recommendations of the construction stage EMP for these areas are being implemented and strict adherence to EMP compliance with all relevant rules and regulations is being done. Status of construction stage EMP in matrix format is enclosed as Annexure VI.</p>
2	Land under the Jamaath which includes Karimppaly, Magham, Varuthari Pally, etc. need to be protected and should not be acquired.	<p>Complied</p> <p>These lands have not been acquired.</p>
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.	<p>Complied</p> <p>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 acquisition also viz-a-viz applicable. <i>(Source: VISL)</i></p>
4	Additional fish landing centre will be constructed	<p>Being Complied</p> <p>Based on the recommendation of the study carried out by Central Water and Power Research Station (CWPRS), Harbour Engineering Department (HED) has prepared the preliminary design and estimate for the extension of seaward breakwater of the existing fishing harbour. Detailed design including physical model study is</p>

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
		required before its construction. Also, discussions between Fisheries Department and Ports Department, Government of Kerala (GoK) and consultation with the fishermen community are ongoing. GoK would be soon finalising the plan of action to develop and make available the additional fish landing centre for the benefit of the local fishermen. <i>(Source: VISL)</i>
5	Existing harbour will be improved under the CSR provisions of the project	Being Complied Tender 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. GoK has formed a higher-level committee to prepare a master plan for the old fishing harbour. Government Departments concerned are coordinating to resolve the differences and to arrive at a mutually acceptable plan in consultation with all stakeholders. <i>(Source: VISL)</i>
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 Based on the Shoreline Monitoring Plan prepared by L&T Infra Engineers Ltd (L&T IEL) under the guidance of National Institute of Ocean Technology (NIOT), Shoreline monitoring is being carried out by agency Shankar & Co. (SAC) for a stretch of 40 km (20 km on both sides of the project site) and reports are being regularly submitted to MoEF&CC as a part of the HYCR. Broadly the scope covers: <ul style="list-style-type: none"> • Wave Observations • Onshore Cross beach profiling • Offshore Cross beach profiling • Littoral Environmental Observations (LEO) • Beach Sampling • Multi-beam Echo Sounder (MBES) survey • River cross section surveys • Grab Sampling • Current Observations • Tide Observations • Weather Observations • Marine Water Sampling

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Compliance of the Response/Commitments made during Public Hearing

S. No.	Responses/Commitments	Status as on 31.03.2023														
		<p>Shoreline Monitoring Report by SAC for the period October 2022 to March 2023 is enclosed as Annexure I. During the compliance period, for the months of October, November and December 2022 SAC could not conduct shoreline monitoring field data collection along some of the coastal areas and at the port site due to the protests and strike by the Latin Archdiocese and others. The agitation was withdrawn at the Port site on 08.12.2022 and the contractors resumed regular monthly monitoring. However, local people at stretches in Pulluvila still oppose the shoreline monitoring and obstruct the monitoring team from conducting the surveys. SAC shall be able to resume the full scope of shoreline monitoring once the safe and secure working conditions in the areas are ensured.</p> <p>L&T IEL had prepared Mathematical Modelling Reports based on available Shoreline Monitoring data; which were vetted by NIOT.</p> <p>Five mathematical modelling reports have been prepared by L&T IEL so far and submitted to MoEF&CC; as detailed below:</p> <table border="1"> <thead> <tr> <th>Data Period</th> <th>Submitted with HYCR for the Period</th> </tr> </thead> <tbody> <tr> <td>Feb 2015 to Feb 2017</td> <td>Apr 2017 to Sep 2017</td> </tr> <tr> <td>Mar 2017 to Feb 2018</td> <td>Apr 2018 to Sep 2018</td> </tr> <tr> <td>Mar 2018 to Feb 2019</td> <td>Apr 2019 to Sep 2019</td> </tr> <tr> <td>Mar 2019 to Feb 2020</td> <td>Apr 2020 to Sep 2020</td> </tr> <tr> <td>Mar 2020 to Feb 2021</td> <td>Apr 2021 to Sep 2021</td> </tr> <tr> <td>Mar 2021 to Sep 2022</td> <td>Apr 2022 to Sep 2022</td> </tr> </tbody> </table> <p>As per the instructions of the NGT Appointed Shoreline Monitoring Cell vide Minutes of Meeting dated 19.04.2022, <i>The reporting period of NIOT shall be half yearly verified with LNTIEL analysis period and shall match with EC compliance reporting period.</i> Therefore, as a part of data synchronization with the HYCR Period (October – March and April – September), AVPPL have submitted the shoreline data from March 2021 to September 2022 to L&T IEL for</p>	Data Period	Submitted with HYCR for the Period	Feb 2015 to Feb 2017	Apr 2017 to Sep 2017	Mar 2017 to Feb 2018	Apr 2018 to Sep 2018	Mar 2018 to Feb 2019	Apr 2019 to Sep 2019	Mar 2019 to Feb 2020	Apr 2020 to Sep 2020	Mar 2020 to Feb 2021	Apr 2021 to Sep 2021	Mar 2021 to Sep 2022	Apr 2022 to Sep 2022
Data Period	Submitted with HYCR for the Period															
Feb 2015 to Feb 2017	Apr 2017 to Sep 2017															
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Mar 2019 to Feb 2020	Apr 2020 to Sep 2020															
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Mar 2021 to Sep 2022	Apr 2022 to Sep 2022															

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
		<p>mathematical modelling to assess the impact on shoreline under the guidance of NIOT. Hereafter, the data period for the mathematical modelling reports will be October to September.</p> <p>From all the data analyses and model studies carried out by L&T IEL, it has been concluded that there was minimal variation on shoreline, beach morphology and water quality compared to the previous years and that the port construction has not induced any additional changes to these parameters in the vicinity of the port.</p>
8	Water supply provision to the Vizhinjam fishing village	<p>Complied</p> <p>Kerala Water Authority (KWA) set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake which was commissioned in April 2013 by VISL by expending an amount of Rs. 8.10 Crores. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. For Operation & Maintenance (O&M) of the same, an amount of Rs. 5.38 crores have been spent up to 31.03.2021. From 04.04.2019 onwards, O&M of the scheme is being done by KWA. An additional amount of Rs. 1.74 Crores has been sanctioned and deposited by VISL to KWA to extend piped water connections for treated water supply facilities to the community at Kottapuram Village. More than 1000 free domestic water connections have been given to the project affected areas. KWA now have adequate coverage of water supply around the port and project affected areas. VISL is coordinating with local body representatives to identify water shortage areas and taking effort to resolve the same. <i>(Source: VISL)</i></p>
10	Railway work will be initiated after Environment Clearance (EC)	<p>Will be Complied</p> <p>Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the</p>


**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
		<p>project. Out of the total rail route length of 10.7 km, 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway. Geophysical and geomorphological studies, flood mapping studies and hydrogeological studies have also been completed. EC amendments in this regard had been submitted to MoEF&CC on 17.08.2022 vide Proposal No. IA/KL/NCP/285459/2022 and File No. 11-122/2011-IA.III.</p> <p>The Expert Appraisal Committee (EAC) during their 308th and 322nd meetings held on 15.09.2022 and 21.03.2023, 22.03.2023 respectively, considered this amendment. The observations/clarifications sought by the committee had been prepared and submitted. The additional information and clarification sought by the EAC during the latest meeting is under preparation for submission to the committee. <i>(Source: VISL)</i></p>
11	Job Opportunity - Preference will be given to local people during construction stage	<p>Being Complied</p> <p>Preference is being given to local people based on Skill & competency during the construction stage. Out of an average of 626 persons (employees, staff and construction workers) engaged at site for different construction activities during the compliance period, 275 people are from Kerala and out of them 75 are from nearby wards of the project site.</p> <p>During the compliance period, manpower details for the months of October and November 2022 were not captured due to the agitation by Latin Archdiocese and others. The agitation was withdrawn at the Port site on 08.12.2022 and the contractors resumed their work thereafter.</p>
13	Take all possible measures for judicial use of lighting system as part of the Green Port concept to reduce the carbon footprint	<p>Will be Complied</p> <p>Is being considered with appropriate planning.</p>

**Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing**

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
16	Waste management is included in the EMP and C&D waste management is part of the SWMP.	<p>Being Complied</p> <p>Adequate budgetary provision has been kept for waste management as part of EMP as well as CSR.</p> <p>As mentioned in EIA, contractors have been made responsible for management of Waste. All contractors working at site are following the waste management practices in line to waste management rules 2016, as amended. A dedicated integrated solid waste management facility is planned which will be constructed along with project.</p> <p>Additionally, as a part of CSR activities, AVPPL are taking up activities with respect to solid waste management (Refer Annexure III).</p>
17	Upgradation of PHC at Vizhinjam will be carried out	<p>Being Complied</p> <p>The construction work of Community Health Centre at Vizhinjam has been resumed after the COVID restrictions. The project cost is Rs. 7.79 Crore where the Government component of Rs. 482 Lakhs and CSR component of Rs, 297 Lakhs from Adani Foundation. Adani Foundation handed over the second instalment of Rs. 118 Lakhs to the HED. Most electrical works, plumbing works and cement mortar plastering for terrace area are completed. The works that are presently being carried out/done are as follows:</p> <ul style="list-style-type: none"> • The setting up of framework for the false ceiling is progressing. • The tiling work for 5 toilets completed. • The tiles for the floor area are transported and stacked at site. • Level difference of nearly 6cm measured in various parts of floor area. Hence Plain cement concrete was laid on the floor to achieve uniform thickness. • Water pipes and required number of fire detectors and water sprinklers being set up in the roof area and over walls by the Fire and Safety Department. • The work of various workstations as per the hospital norms is also progressing.

Vizhinjam International Deepwater Multipurpose Seaport
Compliance of the Responses/Commitments made during Public Hearing

Compliance of the Response/Commitments made during Public Hearing		
S. No.	Responses/Commitments	Status as on 31.03.2023
		 <p style="text-align: center;">Community Health Centre, Vizhinjam</p>
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	<p>Being Complied</p> <p>Resort owners evicted have been compensated for land and not for the structures since they were in violation of CRZ notification. Remaining land of 2.865 Ha is to be acquired by Land Acquisition (LA) process; for which notification has been published and the acquisition is in an advanced stage. <i>(Source: VISL)</i></p>
20	Rail, Road, Coastal and Inland Waterways connectivity will be ensured to the rest of Kerala and other Indian Peninsula Ports	<p>Being Complied</p> <p>Multi-Modal (Road, Rail & Coastal) connectivity is within the scope of the project and this will be fully materialised once all phases of the project are implemented.</p> <p>Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway. Geophysical and geomorphological studies, flood mapping studies and hydrogeological studies have also been completed. EC amendments in this regard had been submitted to MoEF&CC on 17.08.2022 vide Proposal No. IA/KL/NCP/285459/2022 and File No. 11-122/2011-IA.III.</p>

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		<p>The Expert Appraisal Committee (EAC) during their 308th and 322nd meetings held on 15.09.2022 and 21.03.2023, 22.03.2023 respectively, considered this amendment. The observations/clarifications sought by the committee had been prepared and submitted. The additional information and clarification sought by the EAC during the latest meeting is under preparation for submission to the committee. <i>(Source: VISL)</i></p> <p>Road connectivity approval from National Highways Authority of India (NHAI) is in progress. In-principle approval received for the junction between NH66 and port road. Detailed design and methodology for the final approval is under preparation.</p> <p>Development of Coastal shipping and Inland Waterways connectivity are being planned to the rest of Kerala and other peninsular ports by Government Departments concerned. <i>(Source: VISL)</i></p>
21	Waste Management, Water Treatment plants, etc. will be part of an operational EMP	Being Complied Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner is being planned and will be implemented in line with CRZ Notification along with the commissioning of the project.
23	VISL will ensure that appropriate dredging and reclamation methodology as suggested in EIA report will be adopted to contain the turbidity within applicable limits.	Being Complied During the compliance period, 0.41 Mm ³ material has been dredged and the total dredged material amounting to 3.31 Mm ³ has been utilized for reclamation. The turbidity details for the compliance period are given in Annexure II .
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

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		<p>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. Organizational Structure for Environment, Health, and Safety (EHS) & CSR for construction phase is enclosed as Annexure VIII.</p> <p>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 has also been provided/ensured.</p>
25	VISL will ensure that livelihood issues of Mussel collectors are addressed as per the EIA report	<p>Being Complied Government Orders have been issued for disbursal of Rs. 12.65 Crore for 271 mussel collectors. Till date 262 Mussel collectors have collected the compensation amount totalling to Rs. 12.36 Crore. Although they were offered alternate livelihood plan through cage fishing, they opted for one-time settlement citing the risks involved in such fishing. <i>(Source: VISL)</i></p>
26	VISL will ensure all the project 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.	<p>Being Complied Refer point 20 above.</p> <p>CSR activities are detailed in Annexure III. Status of construction stage EMP in matrix format is enclosed as Annexure VI.</p>
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	<p>Being Complied Refer point 24 above.</p> <p>Regular monitoring of Environment Parameters are being carried out. Detailed Monitoring Reports for the period October 2022 to March 2023 is enclosed as Annexure II. Half Yearly Compliance Reports (HYCRs) which are six monthly reports on the status of compliance of the stipulated clearance conditions including results of monitored data are regularly submitted</p>

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		<p>to all the concerned regulatory authorities/agencies.</p> <p>As per the MoEF&CC Notification dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable, therefore the HYCR for the period April 2022 to September 2022 has been submitted to the MoEF&CC, Regional Office (Bangalore), Zonal office of the CPCB (Bangalore), KSPCB & KCZMA via email dated 22.11.2022 (a copy of the email is enclosed as Annexure IX).</p> <p>Additionally, as per the MoEF&CC Office Memorandum dated 14.06.2022, the HYCR for the period April 2022 to September 2022 has been submitted online through newly developed compliance module in the PARIVESH Portal.</p>
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.	<p>Being Complied</p> <p>Being complied with the extent possible, but in line with the technical requirements of the project. Due permission is taken for tree felling from concerned department (Forest Department).</p> <p>AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department, which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port.</p> <p><u>Phase 1:</u> Approximately 15,540 trees on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50 Lakhs has been spent towards compensatory afforestation at Sainik School.</p> <p><u>Phase 2:</u> Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has</p>

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		been spent towards compensatory afforestation at Muttathara STP and Kerala University Campus.
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	Being 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 effect has been issued on 31.05.2018 and compensation has been disbursed to 602 eligible fishermen amounting to a total of Rs. 36.42 Crore. <i>(Source: VISL)</i>
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 The final Integrated Area Development Plan prepared through CEPT University, Ahmadabad in consultation with Town Planning, Tourism, Industry and other line departments was reviewed by the expert committee constituted by GoK. Tourism management plan would be discussed with tourism department for a way forward. <i>(Source: VISL)</i>
34	Maximum 3 ships are expected per 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	Will be Complied Restrictions on fishing will be as per the applicable laws.
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 are given in Annexure III . Refer point 33 above for area development plan.

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37	"Inconvenience Allowances" during construction period of three years to the fisherman (As per EIA Report)	Complied An amount of Rs. 27.18 Crores have been sanctioned by the GoK as inconvenience compensation in the form of kerosene in November 2017. The entire Rs. 27.18 Crore has been given to the disbursal agency (Matsyafed) for the work. <i>(Source: VISL)</i>
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 the resort	Complied Compensation for livelihood loss; Rs 6.08 Crores out of allocated Rs. 6.11 Crores has been disbursed to 211 out of 213 number of resorts workers and settled completely. The remaining two workers were unable to provide the requisite necessary documents and therefore could not be confirmed for disbursement. <i>(Source: VISL)</i>
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 VI 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 and is in the process of being developed. Refer point 26 above.
43	The port project will not affect the inflow of Neyyar river and AVM canal	Not Applicable Not affected 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	Not Applicable The port road will not be access controlled and connectivity for the residents will not be affected.
46	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	Being Complied Being complied on a routine basis through HED; the maintenance agency for the fishing harbour and the coastal road network.

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	best practice and beautification process	
47	The development of the warehouse area will be taken up	Will be Complied This is part of the proposed port estate development.
49	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 Additional Skill Acquisition Program (ASAP) is a GoK initiative aimed to impart required skills to students for improving their employability. ASAP proceeded with the construction of a Community Skill Park (CSP) in an area of 1.5 acres of land at Vizhinjam and the infrastructure is completed. It will operate on a PPP model wherein 25,000 sq. ft. building with facilities for students' hostel are constructed by GoK by ASAP with ADB assistance, whereas the operation of the centre with logistics and other high-end courses are being taken up by Adani Skill Development Centre (ASDC) as per agreement with GoK/ASAP/VISL. CSP building construction is 90% completed inside Vizhinjam Port area in association with ASAP. The land handover by VISL to the ASAP team for construction having 3 storied building as Ground Floor for office space, Seminar Hall Training Rooms, G-1 Floor for IT lab & Other Training room facilities including Library, Meeting room, Faculty room. We planning to start High End Port related courses accordingly to the anticipated vacancies in abroad as well as in the top organizations. ASAP is planning to handover the building by the end of June 2023 once the building is commissioned. ASDC is planning to start high end port related courses to suite the anticipated vacancies arising in the port and other top organizations. Preference will be given to local students based on qualification, skill, and aptitude. Preference is being given to local people based on Skill & competency during the construction stage. Out of an average of 626 persons (employees, staff, and construction workers) engaged at site for different construction activities during the

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		compliance period, 275 people are from Kerala and out of them 75 are from nearby wards of the project site.
51	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 Restrictions on fishing will be as per the applicable laws.
52	The existing notification of the 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.	Will be Complied GoK notified the limits of the Vizhinjam International Deepwater Multipurpose Seaport and altered the limits of the existing Vizhinjam Port (Vizhinjam Fishing harbour) vide G.O. (P) No. 22/2019/F&D dated 21.05.2019. Vizhinjam fishing harbour is excluded from revised notification. Restrictions on fishing will be as per the applicable laws.
53	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.	Noted for Compliance Barge movement will be planned as per the requirements in such a way that it will not be a hindrance to fishermen.
56	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 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 focussing on the Kovalam-Vizhinjam-Poovar tourism corridor.

Annexure VI
Status of Environment Management Plan

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Annexure VI

Status of Environment Management Plan-Port Site-Construction Stage Potential Impacts and Mitigation Measures of Various Project Activities				
S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
1	Capital dredging	Marine water quality Marine ecology	<ul style="list-style-type: none"> 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 	<p>Being Compiled</p> <ul style="list-style-type: none"> o During the compliance period, 0.41 Mm³ material has been dredged and the total dredged material amounting to 3.31 Mm³ has been utilized for reclamation. o The turbidity details for the compliance period are given in Annexure II. o Dredging Management plan has been prepared o Discharge of waste into sea is prohibited and not being carried out o After duly incorporating the comments of Indian Coast Guard (ICG), the final facility Level Oil Spill Disaster Contingency Plan (OSDCP) in line with the National Oil Spill-Disaster Contingency Plan (NOS-DCP) has been submitted to ICG for approval vide letter No. AVPPL/ICG/2020-21/1134 dated 22.05.2020. After final review by PRT (West), ICG has made specific remarks on the compliance of OSDCP prepared in line with NOS-DCP guidelines; directing AVPPL to submit the OSDCP for approval only after pollution response equipment are in place. Considering that the procurement of pollution response equipment will be in line with the development of the port, the final OSDCP will be

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				<p>submitted to ICG for approval prior to commissioning of the port; when the pollution response equipment are in place. In the meantime, a Shipboard Emergency Plan is in place along with procedures for reporting oil pollution incidents, a listing of authorities to be notified; a detailed description of actions to be taken by the vessel's crew to reduce or control an oil discharge, and procedures for co-coordinating shipboard activities with national and local authorities.</p> <ul style="list-style-type: none"> o Slop tanks will be provided to barges for collection of liquid/ waste o Marine Environmental Monitoring at 5 locations 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 2017 after suggestion from NGT committee and the parameters are comparable with baseline. o Six monthly monitoring reports are regularly submitted to regulatory authorities as a part of Half Yearly Environmental & CRZ clearance Compliance Reports (HYCRs).
2	Material transport and construction	Air Quality	<ul style="list-style-type: none"> o Most of the Breakwater stones will be transported from the quarries to the nearest harbour. From there through Barges it will 	<p>Being Complied</p> <ul style="list-style-type: none"> o Rock placing for breakwater construction is being undertaken using the stones brought through barges from nearby harbours (Kollam and Muthulapuzhi).

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	activities		<p>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.</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 Signage for speed control are displayed inside port area restricting vehicle speed to 20km/hr o Water sprinkling is carried out for supressing dust o It is ensured that all trucks transporting material are covered by tarpaulin. o Regular awareness programme on various Environment aspects is being imparted to workers and employees.

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			<ul style="list-style-type: none"> 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 vehicles engaged in transportation 	
		Noise	<ul style="list-style-type: none"> 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 	<p>Being Complied</p> <ul style="list-style-type: none"> 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 limits. o Protective gear like earplugs, muffs are provided to workers exposed to noise level beyond threshold limits. o Acoustic Barriers and Enclosures shall be set up

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>source noise levels less than 75 dB (A)</p> <ul style="list-style-type: none"> 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 gear like earplugs, muffs, etc. o Ambient noise levels will be 	<p>wherever necessary for noisy equipment.</p> <ul style="list-style-type: none"> o Well-maintained construction equipment, which meets the regulatory standards for source noise levels, is being used. o No piling activity carried out during the compliance period.

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
		Disturbance to Natural Drainage pattern	<p>monitored at regular intervals</p> <ul style="list-style-type: none"> 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 	<p>Being Complied</p> <ul style="list-style-type: none"> 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. o A study has been conducted to assess the rainwater harvesting potential and recommend for planning accurate, successful and implementable rainwater harvesting management system within the proposed sites for the sustainable development of existing groundwater resources and thereby suitable rainwater harvesting structures are recommended. In order to capture, store and reuse a percentage of the estimated runoff, rainwater collection and storage sumps are recommended at suitable locations. o Provision for installing Sewage Treatment Plant (STP) facility of adequate capacity in phased manner is being planned and will be implemented in line with CRZ Notification along with the commissioning of the project. o Drains/streams passing through the port area are not closed/diverted.
		Vegetation and Strain on existing infrastructure	<ul style="list-style-type: none"> o Port development is planned mostly on reclaimed land; o Land use at backup area, PAF 	<p>Being Complied</p> <ul style="list-style-type: none"> o Although a natural greenbelt exists, the greenbelt of adequate width with suitable species as identified in the

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			<p>Zone and warehouse area will be mostly coconut plantation and low mixed plantation</p> <ul style="list-style-type: none"> 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. 	<p>EIA will be developed in all possible areas including back-up areas and along the boundary of the project area in line with the establishment of the project. A greenbelt development plan has been considered in the Master Plan and adequate budgetary provision has been kept for this purpose. Landscape development work has been completed at several locations in the port areas.</p> <ul style="list-style-type: none"> o Care is taken to limit the felling of trees to the bare minimum. Due permission is taken for trees being cut down as a result of the port development from concerned department (Forest Department). o AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department; which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port. Phase 1: Approximately 15,540 trees on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50 Lakhs has been spent towards Phase-I of the compensatory afforestation at Sainik School. Plantation of saplings along the road margins, road medians and port boundary are being carried out as part of the master plan development/greenbelt development plan. Phase 2:

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				<p>Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has been spent towards Phase 2 of the compensatory afforestation at Muttathara STP and Kerala University Campus.</p> <ul style="list-style-type: none"> There are no labourers residing in the labour camps. It is ensured that construction workers who are staying outside in the contractor rented houses/apartments are provided with necessary infrastructure facilities.
		Existing Traffic	<ul style="list-style-type: none"> NH-47 bypass under construction around 2.0 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 Regularization of truck movement Majority of rock for breakwater construction will be transported through sea route via barges from 	<p>Being Complied</p> <ul style="list-style-type: none"> Development of dedicated road connectivity approach road (2.0 km) from the port to the NH-47 Bypass is in progress. Road connectivity approval from National Highways Authority of India (NHAI) is in progress. It was jointly decided that AVPPL will resubmit the revised plan after integrating it with Outer Ring Road (ORR) Intersection plan of NHAI. AVPPL integrated both the plans and the revised plan of junction point after integrating with the interchange proposed by NHAI was submitted to the NHAI. Traffic monitoring & regularization is being carried out

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			<p>nearby quarry sites</p> <ul style="list-style-type: none"> o A dedicated rail network of approximately 15 km is proposed from port to Nemom railway station 	<p>for maximum efficiency.</p> <ul style="list-style-type: none"> o Transportation of construction materials is being carried out taking into account the non-peak traffic timing and local restrictions during festivals, strikes, etc. o Rock placing for breakwater construction is being carried out using the stones brought through barges from nearby harbours (Kollam and Muthulapuzhi). o Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has been approved by Southern Railway. Geophysical and geomorphological studies, flood mapping studies and hydrogeological studies have also been completed. EC amendments in this regard had been submitted to MoEF&CC on 17.08.2022 vide Proposal No. IA/KL/NCP/285459/2022 and File No. 11-122/2011-IA.III. The Expert Appraisal Committee (EAC) during their 308th and 322nd meetings held on 15.09.2022 and 21.03.2023, 22.03.2023 respectively, considered this amendment. The observations/clarifications sought by the committee had been prepared and submitted. The additional information and clarification sought by the EAC during

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				the latest meeting is under preparation for submission to the committee. <i>(Source: VISL)</i>
3.	Land Reclamation	Existing Water Resources like Groundwater and surface water	<ul style="list-style-type: none"> 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> o During the compliance period, 0.41 Mm³ material has been dredged and the total dredged material amounting to 3.31 Mm³ has been utilized for reclamation. o During dredging return sea water is sent back to sea through appropriate channels. o The existing drains are maintained for unhindered disposal of surface drainage water.
4.	Solid Waste Management	Soil quality	<ul style="list-style-type: none"> 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 	<p>Being Complied</p> <ul style="list-style-type: none"> o Construction waste is used within port site for filling of low lying areas in line to C&D Waste Management Rules 2016, as amended. o Contractors working at the site have been made responsible for management of Solid Waste during construction stage. They are complying with the provisions pertaining to management of Solid Waste in line to Solid Waste Management Rules 2016, as amended. o An Organic Waste Converter (OWC) has been installed at site and is operating for bio-degradable waste; output is being used as manure in greenbelt development. o General refuse waste is being stored separately and sent

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>will be collected in waste skips and separated from construction waste.</p> <ul style="list-style-type: none"> Burning of refuse at construction sites will be prohibited. All control measure will be taken to avoid the contamination of groundwater during construction phase 	<p>to approved recyclers and/or sold.</p> <ul style="list-style-type: none"> No burning of refuse at construction sites is being done. 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	<ul style="list-style-type: none"> Adequate safety measures as per OSHA standards will be adopted Construction site will be secured by fencing with controlled/limited entry points. Hazardous materials such as lubricants, paints, compressed gases, and varnishes etc., will be stored as per the prescribed/approved safety norms. Medical facilities including first aid will be available for attending to injured workers. Handling and storage as per 	<p>Being Complied</p> <ul style="list-style-type: none"> Adequate safety measures as per OSHA standards are adopted as and when necessary as per the HSE Plan. Construction site is being secured by fencing wherever possible with controlled/limited entry points. Boundary wall construction is ongoing at available fronts. Medical facilities including first aid are available for attending to injured workers. Ambulance is also available at site for shifting the injured to the nearby hospitals. Handling and storage of Hazardous Materials is being done as per statutory guidelines. Hazardous waste is disposed through approved KSPCB/CPCB vendors.

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			statutory guidelines. o Positive isolation procedures will be adhered o Hazardous wastes will be 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 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	Being Complied o KWA set up a 3.00 MLD water supply scheme for the project with the source of water being Vellayani Lake. The net availability of treated water from this supply scheme is 2.49 MLD of potable water out of which 1.49 MLD of water shall be distributed to the local people as part of social welfare measures of VISL. The balance 1.0 MLD was to be used for port related activities. However, at present, the entire treated water from the scheme is being utilised by the community. o The water for construction purposes for the port is being sourced from the open market/private suppliers. On an average about 104 KLD water is being consumed for construction related activities during the compliance period. o Care is being taken to prevent the runoff from the construction site to the nearby natural streams.

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
7.	Fishing	Fishermen and fishing villages	<ul style="list-style-type: none"> 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 	<p>Being Complied</p> <ul style="list-style-type: none"> o Signboards have been placed for demarcation of construction area. o Navigational buoys/marker buoys are placed in the marine area for fishing boats to maintain a safe distance from the areas of breakwater construction. o The number of buoys for monitoring in the project area has been optimized, considering the safety of fishermen and ease of movement during construction. o The number of buoys for monitoring in the project area has been optimized, considering the safety of fishermen and ease of movement during construction. o Using the technological advancement the dedicated CSR team of AVPPL are in constant touch with the fishermen/fishing community members to facilitate the flow of various project related information/updates. o AVPPL CSR team also provides regular updates to the committee which has been formed by the local church representatives adjoining to the port area, who in turn pass on port project execution information to the fishermen.
8.	Tourism	Effect on tourism	<ul style="list-style-type: none"> o Tourism activity is observed at Kovalam located about 2.0 km towards the North of Proposed Port. Mathematical Modelling 	<p>Being Complied</p> <ul style="list-style-type: none"> 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 km (20 km on

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>studies on shoreline changes show the insignificant impact due to the port development on the existing coastline. However, the Shoreline monitoring during construction as well as operation Phases were proposed.</p> <ul style="list-style-type: none"> 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 	<p>both sides of the project site) is being done and reports are regularly submitted to regulatory authorities.</p> <ul style="list-style-type: none"> 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 focussing on the Kovalam-Vizhinjam-Poovar tourism corridor o Resort owners evicted have been compensated for land and not for the structures since they were in violation of CRZ notification. Remaining land of 2.865 Ha is to be acquired by Land Acquisition (LA) process; for which notification has been published and the acquisition is in an advanced stage. (Source: VISL)
9	Breakwater	Change in shoreline	<ul style="list-style-type: none"> o Shoreline monitoring shall be carried out o Suitable Shoreline protection measures will be implemented based on the observations 	<p>Being Complied</p> <ul style="list-style-type: none"> 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. The existing Shoreline Monitoring consists of: <ul style="list-style-type: none"> o Wave Observations o Onshore Cross beach profiling

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				<ul style="list-style-type: none"> ○ Offshore Cross beach profiling ○ Littoral Environmental Observations (LEO) ○ Beach Sampling ○ Multi-beam Echo Sounder (MBES) survey ○ River cross section surveys ○ Grab Sampling ○ Current Observations ○ Tide Observations ○ Weather Observations ○ Water Sampling ○ L&T Infrastructure Engineering Ltd. (L&T IEL) had prepared Mathematical Modelling Reports based on Shoreline Monitoring data; which were vetted by National Institute of Ocean Technology (NIOT). ○ Several mathematical modelling reports have been prepared by L&T IEL so far and submitted to MoEF&CC. These mathematical modelling reports have affirmed that the shoreline change is in line with prediction in the EIA study. As per these reports, from all the data analyses and model studies carried out by L&T IEL, it can be concluded that there was minimal variation on shoreline, beach morphology and water quality compared to the previous years and that the port construction has not caused any unnatural changes to

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				these parameters in the vicinity of the port.
10	Effect on existing fishing harbour	Movement of fishing boats	<ul style="list-style-type: none"> o Detailed modelling studies have been carried out on tranquillity conditions in the fishing 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 	<p>Being Complied</p> <ul style="list-style-type: none"> o Wave, current and tide data are being 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 During operation phase traffic of Marine vessel/fishing boats will be planned without affecting each other as per the applicable laws. o Based on the recommendation of the study carried out by Central Water and Power Research Station (CWPRS), Harbour Engineering Department (HED) has prepared the preliminary design and estimate for the extension of seaward breakwater of the existing fishing harbour. Detailed design including physical model study is required before its construction. Also, discussions between Fisheries Department and Ports Department, Government of Kerala (GoK) and consultation with the fishermen community are ongoing. GoK would be soon finalising the plan of action to develop and make available the additional fish landing centre for the benefit of the local fishermen. (Source: VISL) o In consultation with the fishermen, enhanced livelihood compensation of Rs. 101.86 Crores was sanctioned by

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			taken care of in the new port premises or adequately compensated mostly in the form of employment	GoK, instead of Rs. 8.55 crores; as suggested earlier in the EIA stage. Till 31.03.2023 an amount of Rs. 100 Crores have been disbursed for a total number of 2641 Livelihood Affected Persons (LAPs) whose verification was complete in all respects; this includes boat owners to whom kerosene is supplied free of cost during the breakwater construction period. Verification of documents of a few remaining LAPs is in progress. <i>(Source: VISL)</i>
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.	Being Complied <ul style="list-style-type: none"> o NIOT has been engaged to give technical advice on aspects related to shoreline monitoring & shoreline 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. o L&T IEL had prepared Mathematical Modelling Reports based on Shoreline Monitoring data; which were vetted by NIOT. o Several mathematical modelling reports have been prepared by L&T IEL so far and submitted to MoEF&CC.

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S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				<p>These mathematical modelling reports have affirmed that the shoreline change is in line with prediction in the EIA study. As per these reports, from all the data analyses and model studies carried out by L&T IEL, it can be concluded that there was minimal variation on shoreline, beach morphology and water quality compared to the previous years and that the port construction has not caused any unnatural changes to these parameters in the vicinity of the port.</p>

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Environmental Management Plan – Rail*/Road Corridors

*No Construction work was carried out during the compliance period in the rail corridor

S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
1	Environmental Management and Monitoring Facility Equipment for EMP (Meters, Vehicles and Buildings)	<ul style="list-style-type: none"> This will include institutional requirements, training, environmental management and monitoring. Provision for purchasing required equipment. 	<p>Noted for Compliance</p> <ul style="list-style-type: none"> An Environment Management Cell has been established to look after day to day affairs like Monitoring, Training, etc. 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, Horticulture. In addition to the above, independent environment, health and safety consultants have been appointed as required in the concession agreement signed with AVPPL. Organizational Structure for Environment, Health, and Safety (EHS) & CSR for construction phase is enclosed as Annexure VIII. 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. Necessary equipment will be purchased; adequate provisions have been made in the budget for the same. Third party environmental monitoring has commenced since August 2016 and the monitoring results are satisfactory.
2	Altered Road	<ul style="list-style-type: none"> Retaining walls and gabions should be provided 	<p>Noted for Compliance</p> <ul style="list-style-type: none"> AVPPL had awarded the work to Kerala State Remote

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S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
	embankment		<p>Sensing and Environment Centre (KSREC) to undertake study on Groundwater impact due to construction of port approach road.</p> <ul style="list-style-type: none"> o KSREC have studied the impact due to construction of port approach road. o Recommendations of KSREC are being implemented and suitable mitigation measures as suggested in the KSREC report are being adopted during construction.
3	Dust	<ul style="list-style-type: none"> 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 reduce spills and dust blowing off the load. 	<p>Being Complied</p> <ul style="list-style-type: none"> o Regular Water Sprinkling is done on the approach road by water tankers. o Water spraying is carried out at regular intervals after compaction o Tarpaulin cover is used in vehicles delivering materials.
4	Air Pollution	<ul style="list-style-type: none"> 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). 	<p>Being Complied</p> <ul style="list-style-type: none"> 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 entering port have Pollution

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S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
			Under Control (PUC) Certificate.
5	Noise	<ul style="list-style-type: none"> 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 wherever 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> 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 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 ponds	<ul style="list-style-type: none"> o Impacted ponds can be enhanced by constructing 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. 	<p>Will be complied</p> <ul style="list-style-type: none"> o AVPPL had awarded the work to KSREC to undertake study on Groundwater impact due to construction of port approach road and also suggest mitigation measures. o For impacted ponds in road alignment an elevated road is planned as suggested by KSREC. Other suitable mitigation measures as suggested in the KSREC report will be adopted during construction. o Konkan Railway Corporation Limited (KRCL) has been engaged for turnkey execution of the project. Out of the total rail route length of 10.7 km, 9.0 km is planned to be passing through an underground tunnel to minimize the disturbance to the local population. Detailed Project Report (DPR) has

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S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
			been approved by Southern Railway. Geophysical and geomorphological studies, flood mapping studies and hydrogeological studies have also been completed. EC amendments in this regard had been submitted to MoEF&CC on 17.08.2022 vide Proposal No. IA/KL/NCP/285459/2022 and File No. 11-122/2011-IA.III. The Expert Appraisal Committee (EAC) during their 308th and 322nd meetings held on 15.09.2022 and 21.03.2023, 22.03.2023 respectively, considered this amendment. The observations/clarifications sought by the committee had been prepared and submitted. The additional information and clarification sought by the EAC during the latest meeting is under preparation for submission to the committee. <i>(Source: VISL)</i>
7	Flood Impacts and Cross Drainage Structures	<ul style="list-style-type: none"> Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events. 	<p>Being Complied</p> <ul style="list-style-type: none"> During the construction, care was taken such that the formation level is as per suitable design and the cross drainage structures are also being implemented.
8	Alteration of drainage	<ul style="list-style-type: none"> 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. 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 	<p>Will be Complied</p> <ul style="list-style-type: none"> AVPPL had awarded the work to KSREC to undertake study on Groundwater impact due to construction of port approach road and also suggest mitigation measures. For impact on water quality, suitable mitigation measure as suggested in the KSREC report will be adopted.

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		systems in conformity to the Contractors visual integration and management plan and EMP.	
9	Contamination from Wastes	<ul style="list-style-type: none"> All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into rivers and irrigation systems. 	<p>Being Complied</p> <ul style="list-style-type: none"> Measures are being taken up to prevent the wastewater produced during construction from entering directly into rivers and irrigation systems. An STP will be developed along with the port and the sewerage and storm water flow from two streams near the port will be treated in the proposed STP. No waste water is disposed into the water bodies.
10	Borrow pits	<ul style="list-style-type: none"> Borrow pits are to be identified, opened and closed after consultations and proper documentation. 	Will be Complied as and when required
11	Quarrying and Material sources	<ul style="list-style-type: none"> Quarrying will be carried out at approved and licensed quarries only. 	<p>Will be Complied</p> <p>The road constructed so far has been made with material available on site.</p>
12	Soil Erosion and Soil Conservation	<ul style="list-style-type: none"> On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. On sections with filling and deep cutting their slopes should be covered by sod, or planted with grass, etc. If existing irrigation and drainage system, ponds are damaged, they will be suitably 	<p>Will be Complied</p> <ul style="list-style-type: none"> AVPPL had awarded the work to KSREC to undertake study on Groundwater impact due to construction of port approach road. KSREC has submitted the final report with recommendations and AVPPL is in the process of constructing the approach road to port. Suitable mitigation measures as suggested in the KSREC report will be adopted during construction.

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		<ul style="list-style-type: none"> repaired. Retaining walls and gabions shall be suitably provided. 	
13	Loss of agricultural topsoil	<ul style="list-style-type: none"> Arable land should not be used for topsoil borrowing. Topsoil will be kept and reused after excavation is over. Any surplus to be used on productive agricultural land. 	<p>Being Complied</p> <ul style="list-style-type: none"> Arable land is not being used for topsoil borrowing The topsoil excavated is being stored and will be reused during development of greenbelt.
14	Compaction of Soil and Damage to Vegetation	<ul style="list-style-type: none"> Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation. 	<p>Being Complied</p> <ul style="list-style-type: none"> Construction vehicles are being operated only alongside the road boundary; thereby avoiding damage to soil and vegetation.
15	Loss of trees and Avenue Planting	<ul style="list-style-type: none"> Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. Landscaping shall be done at major junctions. 	<p>Being Complied</p> <ul style="list-style-type: none"> Although a natural greenbelt exists, the greenbelt of adequate width with suitable species as identified in the EIA will be developed in all possible areas including back-up areas and along the boundary of the project area in line with the establishment of the project. A greenbelt development plan has been considered in the Master Plan and adequate budgetary provision has been kept for this purpose. Landscape development work has been completed at several locations in the port areas including turning circle. Care is taken to limit the felling of trees to the bare minimum. Due permission is taken for trees being cut down because of

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S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
			<p>the port development from concerned department (Forest Department).</p> <ul style="list-style-type: none"> o AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department; which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port. Phase 1: Approximately 15,540 trees on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50 Lakhs has been spent towards Phase-I of the compensatory afforestation at Sainik School. Plantation of saplings along the road margins, road medians and port boundary are being carried out as part of the master plan development/greenbelt development plan. Phase 2: Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has been spent towards Phase 2 of the compensatory afforestation at Muttathara STP and Kerala University Campus. o Plantation of saplings along the road margins, road junctions and road medians are being carried out as part of the master plan development/greenbelt development plan.
16	Vegetation	o Tree clearing within the ROW should be	Being Complied

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	clearance	<p>avoided beyond that which is directly required for construction activities and/ or to reduce accidents.</p> <ul style="list-style-type: none"> Especially in plantation and house garden areas both along road and rail alignment. 	<ul style="list-style-type: none"> Care is taken to limit the felling of trees to the bare minimum. Due permission is taken for trees being cut down as a result of the port development from concerned department (Forest Department).
17	Fauna	<ul style="list-style-type: none"> Construction workers should protect natural resources and animals. Hunting of birds and other local animals is prohibited. 	<p>Being Complied</p> <ul style="list-style-type: none"> Regular awareness sessions are conducted for the construction workers regarding importance of natural resources and animals. Hunting of birds & other local animals is strictly prohibited
18	Traffic Jams and congestion	<ul style="list-style-type: none"> 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> In order to avoid traffic congestion, if any, during the construction of the road, measures will be taken to relieve it as far as possible with the co-operation of the traffic police.
19	Health and Safety	<ul style="list-style-type: none"> All contractors' staff and workers must wear high visibility purpose made overalls or trousers/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. 	<p>Being Complied</p> <ul style="list-style-type: none"> All the workers are provided with Personal Protective Equipment's (PPE) and it is ensured that they wear it all the time 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	<ul style="list-style-type: none"> 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> Construction materials/waste are being disposed properly; so as not to block or pollute streams or ponds.
21	Cultural Remains	<ul style="list-style-type: none"> Construction should be stopped until 	<p>Will be Complied</p>

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*No Construction work was carried out during the compliance period in the rail corridor

S. No.	Environmental Impacts and Issues	Mitigation Measures	Status as on 31.03.2023
		<p>authorised department assess the remains to preserve Archaeological relics and cultural structures like Temples, mosques and churches.</p> <ul style="list-style-type: none"> o Archaeologists will supervise the excavation to avoid any damage in the relics. 	<ul style="list-style-type: none"> o A cultural heritage management plan including a procedure to be followed in case of chance find is being prepared. Same will be implemented for preservation of Archaeological sites and any cultural/archaeological structure found.

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Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
1	Material transport and construction activities	Air Quality/Dust	<ul style="list-style-type: none"> 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 	<p>Complied</p> <ul style="list-style-type: none"> 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 It is ensured that all the vehicles entering the site are following speed limit o Tarpaulin cover is used in vehicles o Water sprinkling is carried out to arrest dust generation. o Environment awareness programs are being carried out for staff/contractors on a regular basis.

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<ul style="list-style-type: none"> o out at regular 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	<ul style="list-style-type: none"> 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 	<p>Complied</p> <ul style="list-style-type: none"> o Ambient Noise is being monitored fortnightly for Day & Night time and results are within the prescribed limit. o Construction equipment machinery procurement is done in accordance with specifications conforming prescribed standard. o Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs)

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>such as acoustic controls, insulation and vibration dampers.</p> <ul style="list-style-type: none"> o High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am 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	<ul style="list-style-type: none"> 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> o Care is taken to limit the felling of trees to the bare minimum. Due permission is taken for trees being cut down as a result of the port development from concerned department (Forest Department). o AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department; which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port. Phase 1: Approximately 15,540 trees

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				<p>on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50 Lakhs has been spent towards Phase-I of the compensatory afforestation at Sainik School. Plantation of saplings along the road margins, road medians and port boundary are being carried out as part of the master plan development/greenbelt development plan. Phase 2: Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has been spent towards Phase 2 of the compensatory afforestation at Muttathara STP and Kerala University Campus.</p>
		Water Environment	<ul style="list-style-type: none"> The streams 1 and 2 will be made to avoid entering the warehouse area by diverging them into the Karichal River. 	<p>Will be Complied</p> <ul style="list-style-type: none"> Will be appropriately planned in consultation with the concerned

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> o departments.
			<ul style="list-style-type: none"> o The low lying area in the region is already made use by the local people, and has been degraded. 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 	<p>Will be Complied</p> <ul style="list-style-type: none"> o Will be appropriately planned in consultation with the concerned departments o In G.O. dated GO(MS)No.27/2022/AGRI dated 18.04.2022, the government verified the area in detail and have given permission and order for the conversion of the 24.7980 Ha of paddy land for use of port activities.
			<ul style="list-style-type: none"> 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 	<p>Will be Complied</p>

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>cement being stored in dry areas will be taken care of. Labour camps will be provided with proper support services.</p>	
		Disturbance to Natural Drainage pattern	<ul style="list-style-type: none"> 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 prevent earthworks and stone works from impeding cross drainage at streams and canals or existing irrigation and drainage systems in conformity EMP. 	Will be Complied
		Existing Traffic	<ul style="list-style-type: none"> 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

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Environment Management Plan – Warehouse Area* (Construction Phase)

*Minimal work was carried out in Warehouse area during compliance period

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
3	Solid Waste Management	Soil quality	<ul style="list-style-type: none"> 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

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Project Annex Facility (PAF) Zone - Construction Phase

*Construction work was carried out in a limited way during the compliance period in PAF Zone

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
1	Material transport and construction activities	Air Quality/Dust	<ul style="list-style-type: none"> 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. 	<p>Complied</p> <ul style="list-style-type: none"> o Monthly Ambient Air Monitoring is being carried out and all the parameters are within the stipulated limits. o It is ensured that all vehicles entering the area have a valid PUC certification o Vehicles entering the site 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 program is provided to the personnel engaged in development work

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Project Annex Facility (PAF) Zone - Construction Phase

*Construction work was carried out in a limited way during the compliance period in PAF Zone

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<p>Complied</p> <ul style="list-style-type: none"> o Ambient Noise is being monitored fortnightly for Day & Night time and results are within the prescribed limits. o Construction equipment machinery procurement is done in accordance with specifications conforming prescribed standard. o Personnel engaged in construction activity are provided with appropriate PPE's (Earplugs/muffs)

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Project Annex Facility (PAF) Zone - Construction Phase

*Construction work was carried out in a limited way during the compliance period in PAF Zone

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<p>and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts.</p> <ul style="list-style-type: none"> Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. Ambient noise levels will be monitored at regular intervals 	
2	Construction of Buildings, Roads, Parking features, etc.	Vegetation and Strain on existing infrastructure	<ul style="list-style-type: none"> 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. 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. 	<p>Being Complied</p> <ul style="list-style-type: none"> Due permission is taken for trees being cut down because of the port development from concerned department (Forest Department). AVPPL, in collaboration with Forest department, have carried out planting of trees in two Phases in adequate land as identified by social Forest Department, which have sufficiently covered the requirement of compensatory afforestation required for the development of Vizhinjam Port. Phase 1: Approximately 15,540 trees on 12.05 Ha land; in Sainik School, Kazhakootam (at an aerial distance of 24 km from the Vizhinjam Port project site). Rs. 80.50

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Project Annex Facility (PAF) Zone - Construction Phase

*Construction work was carried out in a limited way during the compliance period in PAF Zone

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
				<p>Lakhs has been spent towards Phase-I of the compensatory afforestation at Sainik School. Plantation of saplings along the road margins, road medians and port boundary are being carried out as part of the master plan development/greenbelt development plan. Phase 2: Approximately 16,500 trees on 12.60 Ha land (in two bits) in Kerala University (KU) Campus, Karyavattom (at an aerial distance of 23 km from the Vizhinjam Port project site) and Approximately 8,000 trees on 5 Ha land at STP, Muttathara (at an aerial distance of 12 km from the Vizhinjam Port project site). Rs. 174 Lakhs has been spent towards Phase 2 of the compensatory afforestation at Muttathara STP and Kerala University Campus.</p> <ul style="list-style-type: none"> Land acquisition has been completed by following due process.
		Existing Traffic	<ul style="list-style-type: none"> Transportation of construction materials will be carried out during non-peak hours. Regularization of truck movement. The existing roads shall be strengthened and shall be used for the construction material 	<p>Being Complied</p> <ul style="list-style-type: none"> Transportation of construction materials is being carried out taking into account the non-peak traffic timing and local restrictions during festivals, strikes, etc.

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

Project Annex Facility (PAF) Zone - Construction Phase

*Construction work was carried out in a limited way during the compliance period in PAF Zone

S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			transportation.	<ul style="list-style-type: none"> ○ Traffic monitoring & regularization is being carried out for maximum efficiency. ○ Existing roads are being used for transportation of construction material.
		Solid Waste	<ul style="list-style-type: none"> ○ Construction waste will be used within port site for filling of low lying areas. ○ Composted bio-degradable waste will be used as manure in greenbelt. Other recyclable wastes will be sold. ○ Excavated soil will be stockpiled in a corner of the site in bunded area to avoid run off with storm water. ○ General refuse generated on-site will be collected in waste skips and separated from construction waste. ○ Burning of refuse at construction sites will be prohibited. 	<p>Being Complied</p> <ul style="list-style-type: none"> ○ Construction waste is used within port site for filling of low lying areas in line to C&D Waste Management Rules 2016, as amended. ○ No burning of refuse at construction sites is being done. ○ Contractors working at the site have been made responsible for management of Solid Waste during construction stage. They are complying with the provisions pertaining to management of Solid Waste in line to Solid Waste Management Rules 2016, as amended.

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

BACK UP AREA – Construction Phase Construction of buildings is ongoing in reclaimed area during the compliance period				
S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
1	Material transport and construction activities	Air Quality	<ul style="list-style-type: none"> ○ To reduce impacts from exhausts, emission control norms will be enforced / adhered. ○ All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards ○ Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt ○ Providing adequately sized construction yard for storage of construction materials, equipment tools, earthmoving equipment, etc. ○ Provide enclosures on all sides of construction site ○ Movement of material will be mostly during non-peak hours. ○ On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic ○ Water sprinkling will be carried out to suppress fugitive dust ○ Environmental awareness program will be provided to the personnel involved in developmental works ○ Use of tarpaulin covers and speed regulations for vehicles engaged in transportation 	<p>Being Complied</p> <ul style="list-style-type: none"> ○ Ambient air quality monitoring is carried out at 5 locations (including one location at port site) as per the Environment Monitoring Plan prescribed in EIA and has commenced since August 2016, the results obtained are within the limits prescribed by NAAQS ○ It is ensured that all vehicles entering the port have PUCs ○ Water sprinkling is being carried out at regular intervals over the temporary road during transportation of materials. ○ All the trucks transporting material are covered by tarpaulin cover. ○ Signage's for speed control are placed within the port area ○ Adequate storage for construction material is provided within the port area on reclaimed land ○ Environmental awareness program is being regularly carried out for contractors working at site.

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

BACK UP AREA – Construction Phase				
Construction of buildings is ongoing in reclaimed area during the compliance period				
S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
		Noise	<ul style="list-style-type: none"> ○ Noise levels will be maintained below threshold levels stipulated by Central/Kerala State Pollution Control Board (CPCB)/KSPCB ○ Procurement of machinery/construction equipment will be done in accordance with specifications conforming to source noise levels less than 75 dB (A) ○ Well-maintained construction equipment, which meets the regulatory standards for source noise levels, will be used ○ Any equipment emitting high noise, wherever possible, will be oriented so that the noise is directed away from sensitive receptors ○ Noise attenuation will be practiced for noisy equipment by employing suitable techniques such as acoustic controls, insulation and vibration dampers ○ High noise generating activities such as piling and drilling will be scheduled at daytime (6.00 am to 10 pm) to minimise noise impacts ○ Personnel exposed to noise levels beyond threshold limits will be provided with protective gear like earplugs, muffs, etc. ○ Ambient noise levels will be monitored at regular intervals 	<p>Being Compiled</p> <ul style="list-style-type: none"> ○ All the machinery and vehicles are maintained to keep the noise at minimum ○ Regular Ambient Noise monitoring is being carried as per the Environmental Monitoring Plan prescribed in EIA since August 2016, and the readings are within the limits at port site. ○ Personnel exposed to noise levels beyond threshold limits are provided with protective gear. ○ No pilling activity was carried out during the compliance period. ○ During the compliance period, 0.41 Mm³ material has been dredged and the total dredged material amounting to 3.31 Mm³ has been utilized for reclamation.

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

BACK UP AREA – Construction Phase				
Construction of buildings is ongoing in reclaimed area during the compliance period				
S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
2	Construction Activities	Water Environment	<ul style="list-style-type: none"> Formation level should be raised according to the design and the cross drainage structures suitably planned for the flood events. All justifiable measures will be taken to prevent the wastewater produced during construction from entering directly into the water bodies. 	<p>Being Complied</p> <ul style="list-style-type: none"> During the construction, care was taken such that the formation level is as per suitable design and the cross drainage structures are also being implemented. An STP will be developed along with the port and the sewerage and storm water flow from two streams near the port will be treated in the proposed STP. No waste water is disposed into the water bodies.
		Land Environment	<ul style="list-style-type: none"> On slopes and other suitable places along the two proposed corridors, trees and grass should be planted. On sections with filling and deep cutting their slopes should be covered by sod, or planted with grass, etc. If existing irrigation and drainage system, ponds are damaged, they will be suitably repaired. Retaining walls and gabions shall be suitably provided. 	<p>Being Complied</p> <ul style="list-style-type: none"> Plantation of saplings along the port boundary are planned as part of the master plan development/greenbelt development plan. Retaining walls or gabions are suitably provided.
			<ul style="list-style-type: none"> Arable land should not be used for topsoil borrowing. Topsoil will be kept and reused after excavation is over. 	<p>Will be Complied</p> <ul style="list-style-type: none"> Topsoil is not being used for borrowing. If any topsoil needs to be excavated, the same will be stored in a designated area

Vizhinjam International Deepwater Multipurpose Seaport
Status of Environmental Management Plan

BACK UP AREA – Construction Phase				
Construction of buildings is ongoing in reclaimed area during the compliance period				
S. No.	Activity	Relevant Environmental Components likely to be impacted	Proposed Mitigation Measures	Status as on 31.03.2023
			<ul style="list-style-type: none"> Any surplus to be used on productive agricultural land. 	and will be utilized for greenbelt development as per the greenbelt development plan.
			<ul style="list-style-type: none"> Construction vehicles should operate within the Backup Areas avoiding damage to soil and vegetation. 	Being Complied <ul style="list-style-type: none"> Construction vehicles are being operated only alongside the road and port boundaries; thereby avoiding damage to soil and vegetation.
			<ul style="list-style-type: none"> Areas of trees cleared will be replaced according to Compensatory Afforestation Policy under the Forest Conservation Act - 1980. Landscaping shall be done at major junctions. 	Refer point No.15 of Environment Management Plan – Road/Rail Corridors
			<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Tree clearing is done only for the purpose of development of port and/or for avoiding causalities due to natural calamities where the trees were standing very dangerously.

Annexure VII
EMP Expenditure

Vizhinjam International Deepwater Multipurpose Seaport
EMP Expenditure

EMP Expenditure:


Annexure VII

S. No.	Environmental Management Plan	Commitment in EIA	Oct 2016 to Mar 2017	Apr 2017 to Sep 2017	Oct 2017 to Mar 2018	Apr 2018 to Sep 2018	Oct 2018 to Mar 2019	Apr 2019 to Sep 2019	Oct 2019 to Mar 2020	Apr 2020 to Sep 2020	Oct 2020 to Mar 2021	Apr 2021 to Sep 2021	Oct 2021 to Mar 2022	Apr 2022 to Sep 2022	Oct 2022 To March 2023	Total Till date
			(in Rs. Crores)													
1	Cost of Contractors EMP for all planned EMP implementation measures (Action plan report)	1	0.08	0.08	0.12	0.47	0.32	-	-	-	-	-	-	-	-	1.07
2	Cost of Capacity building- Training and Institutional strengthening (Training workshop)	0.2	-	-	-	0.003	-	0.01	-	0.025	-	-	-	0.012	-	0.05
3	Compensatory afforestation for the green cover lost for the port and its associated facilities (2500 plants per Ha for 25 Ha area)	1.25	-	-	-	0.8	-	-	-	-	-	-	-	-	1.74	2.54
4	Air quality monitoring at sensitive locations	0.252	0.27	0.28	0.72	0.21	0.27	0.30	0.29	0.152	0.298	0.27	0.298	0.217	0.09	3.665
5	Water quality monitoring at major water bodies	0.054														
6	Noise monitoring at sensitive locations	0.009														
7	Soil quality monitoring at sensitive locations	0.002														
8	Marine water quality and sediment and marine biology	1.08														
9	Shoreline changes	0.3	1.059	1.08	1.36	1.68	1.65	1.02	1.52	1.295	1.363	1.84	1.035	1.196	0.37	16.468
10	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	-	-	-	-	-	-	-	-	-	-	0.312	0.66	0.236	1.20

**Vizhinjam International Deepwater Multipurpose Seaport
EMP Expenditure**

S. No.	Environmental Management Plan	Commitment in EIA	Oct 2016 to Mar 2017	Apr 2017 to Sep 2017	Oct 2017 to Mar 2018	Apr 2018 to Sep 2018	Oct 2018 to Mar 2019	Apr 2019 to Sep 2019	Oct 2019 to Mar 2020	Apr 2020 to Sep 2020	Oct 2020 to Mar 2021	Apr 2021 to Sep 2021	Oct 2021 to Mar 2022	Apr 2022 to Sep 2022	Oct 2022 To March 2023	Total Till date
			(in Rs. Crores)													
11	Solid waste management (sector wise)-Collection disposal system	2.5	-	-	-	-	-	0.01	-	-	-	-	0.04	0.005	0.18	0.235
12	Storm water Management	5	-	-	0.05	-	-	-	-	-	-	-	-	-	-	0.05
13	Marine Life Protection out of Oil Spill (Provision for scavenger boat) One tugboat with booms and skimmer and dust exhausting equipment	20	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14	Cost of scavenger boat including manpower (Cost of boat)	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	0
15	Dust Sweeper (2 Nos.)	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	0
16	Air Pollution Control (Four water tankers for wetting of road surface and springing system)	1	-	-	0.21	0.03	0.03	0.03	0.15	0.1	0.135	-	0.125	-	-	0.81
17	Water and waste water treatment plants	4	-	-	-	-	-	-	-	-	-	-	-	-	-	0
18	Battery of toilets with bimonthly maintenance provision	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0
19	Desilting and strengthen of Streams	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0
20	Enhancement of water bodies (ponds along road & rail)	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	0
21	Enhancement of religious structures (Temple)	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	0
22	Cultural property rehabilitation cost for sacred grove	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	TOTAL	39.937	1.409	1.44	2.46	3.193	2.27	1.37	1.96	1.572	1.796	2.11	1.81	2.09	2.616	26.088

Annexure VIII
Environment Health, Safety & CSR Organizational
Structure

	Adani Vizhinjam Port Private Ltd	From : October 2022 To : March 2023
Vizhinjam International Deepwater Multipurpose Seaport Environment Health, Safety & CSR Organizational Structure		

Annexure VIII

Environment Health, Safety & CSR Organizational Structure:

S. No.	Name	Designation	Experience	Qualification	Organization
1.	Prasad Kurien	GM-Environment	30 years	B-Tech Civil Engg., M-Tech Env Engg., PMP	VISL
2.	Dr. Nehru Kumar Vaithilingam	Environmental Expert (Independent Engineer)	27 years	BE Civil Engg., ME Env Engg., PhD Env	Indian Institute of Technology Madras
3.	Anil Balakrishnan	National Head SLD and Southern Regional head for CSR	26 Years	MSW, Phd.	Adani Foundation
4.	Hebin C	Head – Environment	16 Years	MS, Oceanography & Coastal Area Studies	AVPPL
5.	Jesse Benjamin Fullonton	Assistant Manager - Environment	13 Years	BSc. Chemical Tech; Msc. Env. Tech	AVPPL
6.	Kanwar P Malik	Head - Horticulture	17 Years	BSc - Agriculture	AVPPL
7.	Arumugam S	Assistant Manager - Safety, Environment and Health	4 Years	M.Tech – Industrial Safety Engineering	AVPPL
8.	Sebastian Britto. A. G	Programme Manager	27 Years	MA, Economics	Adani Foundation
9.	Rakesh R. S	Sr. Project Officer	26 Years	MBA, Bsc Agriculture	Adani Foundation
10.	Stephen Vinod	Project Officer	23 Years	BA, Economics	Adani Foundation
11.	George Zen	Consultant – Livelihood	38 Years	BA, Sociology	Adani Foundation
12.	Maya G	Project Officer Community Health	14 Years	BA, IT-TTC	Adani Foundation
13.	Meera Mariyam Skariah	Asst. SuPoshan Officer	6 Years	MSW	Adani Foundation

**Vizhinjam International Deepwater Multipurpose Seaport
Environment Health, Safety & CSR Organizational Structure**

S. No.	Name	Designation	Experience	Qualification	Organization
14.	Radha S	Engineer	9 Years	MTech	AVPPL
15.	Limna B	Senior Assistant	16 Years	Pre-degree, ITI	AVPPL
16.	Anurag MJ	Project Officer	10 Years	MSc. Computer Science	Adani Skill Development Centre
17.	Sreejith	Placement Manager	10 Years	MBA (Marketing)	Adani Skill Development Centre
18.	Kavitha TR	Trainer – Language & Soft Skill	15 Years	MA, B.Ed. (Eng.), SET, CTET, MA Sociology	Adani Skill Development Centre
19.	Neethu V Nath	Trainer – Domestic Data Entry Operator	5 Years	MTech (Computer Science)	Adani Skill Development Centre
20.	Mini Jose	Trainer – Beauty Therapist	13 Years	S.S.L.C, Diploma in Fashion Technology, Diploma in Beauty Therapy,	Adani Skill Development Centre
21.	Sheeja. M	Trainer – General Duty Assistant	10 years	BSc Nursing	Adani Skill Development Centre
22.	Shaji Joseph	Safety Executive	14 Years	Diploma in mechanical & Diploma in fire and safety	HOWE

Annexure IX
Email Submission of HYCR for the Period
April 2022 to September 2022

From: [PRASAD KURIEN](#)
To: rosz.bng-mef@nic.in; rosz.bng-mefcc@gov.in
Cc: Ssuresh.cpcb@nic.in; tvpmro@gmail.com; Kushal.vashist@gov.in; kczmasandtd@gmail.com; zobangalore.cpcb@nic.in; pamidisuneel; [Rajesh Kumar Jha](mailto:Rajesh.Kumar.Jha); [Hebin Chenthamarakshan](mailto:Hebin.Chenthamarakshan); [Jesse Benjamin Fullonton](mailto:Jesse.Benjamin.Fullonton); [CEO](#); [MD VISI](#)
Subject: EC_F. No. 11-1222011-IA.III dated 03.01.2014-HYCR-Apr2022-Sep2022_31.10.2022 - Half Yearly EC Compliance Report (HYCR) - Apr 2022 to Sep 2022 reg.
Date: Tuesday, November 22, 2022 6:26:40 PM

***CAUTION:** This mail has originated from outside Adani. Please exercise caution with links and attachments.*

Dear Sir/Madam,

MoEF&CC had issued Environmental Clearance and CRZ Clearance (EC) on 3rd January 2014 to the proposed Vizhinjam International Multipurpose Deepwater Seaport at Vizhinjam in Thiruvananthapuram District of Kerala State. (EC No. F.No.11 - 122/20 11 - IA. III) and subsequently extended the EC validity up to 2nd January 2024 (excluding Covid 2019 additional validity) with the same terms and conditions.

Kindly find attached the Half Yearly Compliance Report (HYCR) for the period from April 2022 to September 2022 for records and reference.

Acknowledgement on receipt of the email with contents is highly appreciated.

 [EC_F. No. 11-1222011-IA.III dated 03.01.2014-HY...](#)

With Best Regards,

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Prasad Kurien
General Manager-Environment
Vizhinjam International Seaport Limited
Thiruvananthapuram



VIZHINJAM INTERNATIONAL SEAPORT LIMITED
(A Government of Kerala Undertaking)

Vizhinjam International Deepwater Multipurpose Seaport

**Half Yearly Compliance Report (HYCR) of
Conditions of Environmental and CRZ Clearance
for the Period October 2022 to March 2023**

May 2022