Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Tuesday, May 30, 2023 8:21 PM
To: eccompliance-guj@gov.in; iro.gandhingr-mefcc@gov.in
Cc: ec-rdw.cpcb@gov.in; ro-gpcb-kute@gujarat.gov.in; ms-gpcb@gujarat.gov.in; mefcc.ia3@gmail.com; monitoring-ec@nic.in; direnv@gujarat.gov.in; Snehal Jariwala
Subject: Half Yearly EC Compliance Report WFDP Submission for Period Oct.'22 to March'23
Attachments: EC Compliance Report_WFDP-2009_Oct'22 to Mar'23.pdf

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Ports and Logistics

APSEZL/EnvCell/2023-24/009 **Da**

To
The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),
Ministry of Environment, Forest and Climate Change,
Aranya Bhawan, A Wing, Room No. 409,
Near CH 3 Circle, Sector – 10A,
Gandhinagar – 382007.
E-mail: eccompliance-guj@gov.in, iro.gandhingr-mefcc@gov.in

Sub : Half yearly Compliance report for Environment and CRZ Clearance for "Water Fro Project at Mundra, Dist. Kutch, Gujarat.

Ref : i) Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide l January, 2009 and 19th January, 2009 bearing MoEF letter No. 10-47/2008- IA.III.
ii) Environment and CRZ clearance Extension order granted to Water Front Develop Mundra in Kutchh District (Gujarat) vide letter dated 7th October, 2015 bearing MoE 47/2008- IA.III.
iii) MoEF&CC's Order dated 18.09.2015

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, i copy of the compliance report for the Environmental and CRZ Clearance for the period of Octobe 2023 is being submitted through soft copy (e-mail communication).

Kindly consider above submission and acknowledge.

Thank you,
Yours Faithfully,
For, **M/s Adani Ports and Special Economic Zone Limited**

Bhagwat Swaroop Sharma
Head - Environment
Mundra & Tuna Port

Thanks & Regards,

Bhagwat Swaroop Sharma
Sr. Manager - Environment
Mundra & Tuna port

Adani Ports & Special Economic Zone Ltd.

Environment Cell | 1st floor | Adani House | Mundra Kutch | 370421 | Gujarat | India
Mob +91 6357231713 | Ext. 52474 | www.adani.com

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Ports and Logistics

APSEZL/EnvCell/2023-24/009 **Date:** 25.05.2023

To
The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),
Ministry of Environment, Forest and Climate Change,
Aranya Bhawan, A Wing, Room No. 409,
Near CH 3 Circle, Sector – 10A,
Gandhinagar – 382007.
E-mail: eccompliance-guj@gov.in, iro.gandhingr-mefcc@gov.in

Sub : Half yearly Compliance report for Environment and CRZ Clearance for "Water Front Development Project at Mundra, Dist. Kutch, Gujarat.

Ref : i) Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide letter dated 12th January, 2009 and 19th January, 2009 bearing MoEF letter No. 10-47/2008- IA.III.
ii) Environment and CRZ clearance Extension order granted to Water Front Development Project at Mundra in Kutchh District (Gujarat) vide letter dated 7th October, 2015 bearing MoEF letter No. 10-47/2008- IA.III.
iii) MoEF&CC's Order dated 18.09.2015

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Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of October 2022 to March 2023 is being submitted through soft copy (e-mail communication).

Kindly consider above submission and acknowledge.

Thank you,
Yours Faithfully,
For, **M/s Adani Ports and Special Economic Zone Limited**

Bhagwat Swaroop Sharma
Head - Environment
Mundra & Tuna Port

Encl: As above

Copy to:

1) The Director (IA Division), Ministry of Environment, Forests & Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi-110003.
2) The Zonal Officer, Regional Office, CPCB – Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara – 390023.
3) The Member Secretary, GPCB – Head Office, Paryavaran Bhavan, Sector 10 A, Gandhi Nagar – 382010.
4) The Director, Forests & Environment Department, Block – 14, 8th floor, Sachivalaya, Gandhi Nagar – 382010.
5) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham – 370201.

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Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
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Environmental Clearance Compliance Report

Waterfront Development Project, Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited Mundra, Kutch

For the period of
October-2022 to March-2023

Index

EC & CRZ Clearance Compliance Report

adani Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra.	From : Oct'22 To : Mar'23

Status of the conditions stipulated in Environment and CRZ Clearance

The name of the company was changed from **"Mundra Port and Special Economic Zone Limited"** to **"Adani Ports and Special Economic Zone Limited"** on 6th January, 2012.

Activities/facilities approved, major components completed and proposed future activities as per Environment and CRZ Clearance are as below:

Description (Type of Facility or Berth)	Approved Berths or Length as per Environmental & CRZ Clearance	So far Developed and In Operation
	Nos. of Berths or Length	Nos. of Berths
Multipurpose	4 (550 m + 2 Berths)	4
Container	16 (2680 m + 2000 m)	7 (2110 m)
Ro-Ro	2	-
Coal	6	4
Dry-Bulk Cargo	5	-
Liquid/POL	9*	-
LNG	2	Developed and operated by GSPC LNG Limited as per separate permissions obtained and NOC given by APSEZ
Light & Heavy Engineering	2	-
Port Craft	1 (330 m)	-
Shipyard	2	-

* Liquefied Petroleum Gas (LPG) Terminal has been developed by M/s. Mundra LPG Terminal Pvt. Ltd. under Waterfront Development Project of Adani Ports and SEZ Limited and LPG is being handled at existing Multipurpose Terminal APSEZ. M/s. Mundra LPG Terminal Pvt. Ltd is 100% subsidiary of APSEZ.

In addition to above berths or facilities, following components were also approved.

1. Dredging Quantity: 210 Mm^3. Overall dredging to the tune of 123 Mm^3 is completed till date.
2. Back-up area, back-up facilities like railway line, rail sidings, rail truck loading, open paved areas, associated buildings, utilities, amenities, etc. and connectivity to rail and road corridor for each port were approved and majority of them are constructed and in operation. Remaining facilities will be developed based on future requirements.
3. Seawater intake channel and outfall channel for power plants, desalination plants (47 MLD is operational out of 300 MLD) and other industrial requirements approved and is already in operation.

adani Ports and Logistics	**Adani Ports and Special Economic Zone Limited, Mundra.**	**From : Oct'22** **To : Mar'23**
Status of the conditions stipulated in Environment and CRZ Clearance		

Note:

- APSEZ has applied for EC & CRZ Clearance for expansion of Waterfront Development Project vide dated 7th March, 2019.
- MoEF&CC has issued Terms of Reference (ToR) vide Ref. – F. No. 10-24/2019-IA-III dated 17th May, 2019 and it is further amended on 27th Sep, 2019 & 10th April, 2020.

Compliance Report of Environmental and CRZ Clearance

Half yearly Compliance report for Environment and CRZ Clearance for the project "Water Front Development Project (WFDP) at Mundra, Dist. Kachchh, Gujarat of M/s. Adani Ports and SEZ Limited"

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	Complied. **<u>Conservation of mangroves:</u>** • In and around APSEZ, approx. 1800 ha. Mangrove area was identified by NIO in an EIA report prepared the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, mangrove cover in and around APSEZ was over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha. NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around was submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions, which was submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.
• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction.
• Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.
• The cost of the said study was INR 23.56 Lacs incurred by APSEZ.</td></tr>
<tr><td>2.</td><td>Tidal observation in creeks in and around APSEZ</td><td>• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM.
• The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.
• The cost of the said activity was INR 1.0 Lacs.</td></tr>
<tr><td>3.</td><td>Removal of Algal and Prosopis growth from mangrove areas</td><td>• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023		
				found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 2.35 Lacs during the FY 2022-23. The details of Removal of Algal and Prosopis growth from mangrove areas is attached as **Annexure -1**.
		4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Celebrated the International Mangrove Day for the Conservation of the Mangrove Ecosystem every year on 26th July, • Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity during FY 2022-23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 200.89 Lacs during FY 2022-23, which was incurred by APSEZ. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in 190-acre area and produce 3800 Fodder Tons Yield annually, lead to save Approx Rs 52 Lacs of farmers. • **Grass Land development:** AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring. • Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value More than 2250 Cattle will sustain with Improving quality and Quantity of Milk. • Other than this dedicated security guard with gate system deployed by

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		APSEZ across the coastal area and no unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The photographs of celebration were submitted in last compliance period Apr'22 to Sep'22. • Refer CSR report attached as **Annexure – 2**. Details of activities done as a part of GCZMA recommendations and NCSCM mangrove conservation action plan were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21. To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no proper response from NCSCM side regarding resolution, the work order has been revoked. After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work is 23.60 Lacs (Including Taxes), which will be paid by APSEZ.
ii	There shall be no filling up of the creek and reclamation of the creeks.	Complied. **<u>Conservation of creeks:</u>** • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river).

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		• All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the recent study of NCSCM in 2017-18, which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. • APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs showing the same were submitted along with half yearly compliance report for the period Apr'17 to Sep'17. • Please refer condition no. i of EC & CRZ compliance report for further details.
iii	The Project proponent shall comply with all the Orders/directions of the Honorable High Court of Gujarat and Supreme Court in the matter.	Complied. **1. SLP (Civil) no. 5509 of 2019** The Hon'ble Gujarat High Court dismissed the matter dated 06.02.2023 and also stated that the petitioners are at liberty to approach National Green Tribunal as a part of the alternative remedy available to them. The order copy of Hon'ble Gujarat High Court is attached as **Annexure-3**. There are two ongoing matters pending (One pending at High Court and other pending at Supreme Court). Details of status of legal cases is attached as **Annexure-4**.
iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	Complied. The hydrodynamic study for the waterfront area has been carried out by HR Wallingford, a maritime design expert. As per the recommendations in their report, the following safety measures are implemented. 1. The alignment of the berth has been kept in line with the current flow in order to reduce the effect of current on vessels moored alongside. 2. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		3. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels. 4. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal. 5. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed. 6. The strength of the fenders at the berth and the SWL of the bollards / winches are sufficient to absorb the forces of vessels alongside keeping in mind the monsoon weather conditions. 7. Sufficient depths are maintained at all times to ensure 10% UKC at the time of berthing / un-berthing. 8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled. 9. The berth has been designed at an appropriate distance from the existing berths at MMPT-1 in order to safely allow berthing / un-berthing of vessels at MMPT-1 with vessels berthed at the South Port tanker terminal. 10. Berths have been planned close to the breakwater as there is a reduced strength of current along the coastline.
v	The shore line changes in the area shall be and monitored periodically the report submitted every 6 months to Regional Office Bhopal.	Complied. Shore line change aspect has been studied in detail as part of following two studies; • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. As per the outcome of these studies, no erosion is observed on the coast of the project area. As part of the Regional Impact Assessment study, the possible changes in shoreline that may occur due to the proposed developments in 10 km area on either side of the waterfront development project have been predicted. It has been inferred from the modelling study that the shift in the shoreline will be less than 0.5

<table>
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m/year, which reconfirms that the APSEZ facility would pose insignificant impact on the Mundra shoreline. Accretion is observed at South port and at West port due to approved reclamation activities.

Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years.

APSEZ has already awarded work to the agency namely M/s. Gujarat Institute of Desert Ecology, Bhuj for carrying out Shoreline Change Assessment Study for Mundra region vide P.O. No. 4802013270 dated 30.03.2022. The cost of said study is INR 17.39 Lacs. The said study is under progress.

Shore line change study was carried out by M/s. Gujarat Institute of Desert Ecology, Bhuj as a part of the Environmental Management Plan (EMP) compliance with the CIA study.

In the present study, the rate of shoreline changes statistics on a time series of multiple shoreline positions of a totally 43 km coastline stretches (16 km on the west side and 27 km on the east side of Adani main port) on either side of Adani Ports and Special Economic Zone Ltd (APSEZL) has been taken into account for the calculation by using satellite images.

As a part of EMP compliance of CIA study, the shoreline change analysis has been carried out for the years 2015-2022 to study the immediate changes after the commissioning of the port and initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out.

The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.
<table>
<tr><th rowspan="2">Period</th><th rowspan="2">Name of the block</th><th rowspan="2">Average Shoreline Change(M/Year)</th><th colspan="2">Shoreline Change(M)</th></tr>
<tr><th>Maximum Accretion</th><th>Maximum Erosion</th></tr>
<tr><td>2015-</td><td>West Port</td><td>-11.43</td><td>39.86</td><td>-78.68</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023

2022	Eastern side	-26.60	191.32	-165.19

The Shoreline Change Assessment Study report of GUIDE is attached as **Annexure- 5**.

However, shoreline change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study is as below.

To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis

10 km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition.

The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively.

The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		Please refer **Annexure – B** (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.
vi	The recommendations of the risk assessment shall be implemented; any change in the design of the project shall come before the committee for seeking necessary approval.	Complied. Risk Assessment was carried out at the time of preparation of the EIA report for the Liquid Berths and LNG terminal. However, it may be noted that liquid berths are not yet developed. Hence recommendations of Risk Assessment will be implemented once the liquid berths & pipelines are developed by APSEZ. The LNG terminal is constructed by GSPC LNG Ltd. and a separate Environment and CRZ clearance is obtained by them. Please refer general condition no ix below for details regarding the same. LPG is being handled from the existing multipurpose terminal. A detailed risk assessment study as per MoEF&CC letter no. F. No. 10-47/2008-IA-III dated 31st May, 2016 was carried out by iFluids Engineering for handling as well as storage activities. Recommendations of the risk assessment have been implemented as part of the construction activity and details of the same were submitted along with half yearly compliance report for the period Oct'18 to Mar'19. Reports of the same were submitted to MoEF & CC along with half yearly compliance report for the period Apr'17 to Sep'17. Implantation report of risk assessment study during operation phase was submitted along with half yearly compliance report for the period Oct'19 to Mar'20. There are no other activities which attract requirement of Risk Assessment.
vii	Mangrove plantation of 200 ha to be done in consultation with GEER / GEC of Forest Department, a detailed plan shall be submitted within six months from the date of receipt of this letter.	Complied. APSEZ has consulted Gujarat Institute of Desert Ecology (GUIDE) as they are one of the authorized agencies of Dept. of Forest & Env., Govt. of Gujarat for carrying out mangrove afforestation. GUIDE has completed mangrove plantation in an area of 200 ha at Jakhau, Gujarat during the year 2012-13. Copy of the mangrove plantation completion certificate was submitted along with EC compliance report for the period

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		Apr'18 to Sep'18. Total expenditure for the said work was INR 40 lakh. To enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in 3890 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 1070.81akh. Details on Mangroves afforestation & Green belt development carried out by APSEZ till Mar'23 is annexed as **Annexure – 6**. Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, Gujarat. . Please refer attached **Annexure – 2** for CSR activity report carried out by Adani Foundation.
viii	It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.	Complied. During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, so far APSEZ has provided seven (7) access roads instead of four (4). Total length of all the approach roads is approx. 23 Kms and expenditure involved is Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats. APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>
Adani Foundation is working in main four persuasions as below.

- Education
- Community Health
- Rural Infrastructure
- Sustainability Livelihood

Brief information about activities in the main four persuasions is mentioned below. Activities carried out for the same are summarized as below.

<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Community Health</td><td>
• Mobile Heath Care Units and Rural Clinics
• 09 Rural Clinics
• 06 villages of Mundra, 02 villages of Anjar & 01 village Mandvi block has benefited by rural clinic service.
• Total Patients Benefitted FY 22-23:- 25088 (direct & indirect).
• 5 financially challenged patients has been supported with Dialysis treatment at 97 Times which added day in their Life.

Health camp:
• Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies.
• Specialty health (Gynec Pediatric eye specialty health camp) :- 1527 Patients Benefited.
• General health camp :- 3379 Patients benefited
• Women's Health: Provided health services to over 1150 women through 102 + Menstrual Hygiene workshops.
• Dialysis Support: During this year, 4 patients were supported for regular dialysis (twice a week) with partial support
• Total 590800 CC quantity of Blood had been donated by 1710 Employees.
• Medical Supports: 2460 beneficiary in 63 village.
• TB screening & Awareness session: benefited 1795.
• 25 villages and 07 fishermen settlements covered, with 90 types of general and lifesaving medicines through Mobile healthcare unit
• 1491 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.
• For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 4906 patients of Mundra Taluka.
</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023	
			• Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages. Total 17299 cattle of 19 Villages had benefitted with different kind of medicines and vaccines. • Lumpy Disease Vaccination Drive: Total 40 000 cattle were covered through therapeutic and ayurvedic treatment and Nutritive Cattle feed Support with association District Animal Husbandry department through vaccination and awareness drive.
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application. • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. • Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seva. • Natural farming- 1392 farmers benefitted by 20 nos of training from which 60 farmers chemical usage is reduced to half extent in 500 Acres approximately. • 100 nos. of Facilitation of Home Biogas-under Gobardhan Yojna. • Benefited 837 people linkages with Govt. cow based Nurturing Scheme. • Supported 1500 farmers for barrel & wormi compost. • 19 nos. of Market Linkage for supporting to green carnival at Samudra Township & Shantivan colony 17 472 Kg Vegetable with Rs. 4.36 Lacs. • 257 Farmers have started to prepare Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Adani Foundation has also provided 7.31 lacs kg Dry Fodder and 23.59 lacs kg green fodder in 29 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 200.89 Lacs during FY 2022-23. • Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 14116 Cattels / 3008 farmers and, hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super **NAPIER Grass** in 190-acre area and produce 3800 Fodder Tons Yield annually, lead to save Approx Rs 52 Lacs of farmers.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023	
			• **Grass Land development:** AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village. • **Self Help Groups (SHGs):** Established 82 self-help groups in various rural and urban areas to provide financial and social support to women We provided training and capacity building workshops to members of these SHGs to help them develop income generating activities and improve their livelihoods Through this initiative, we have empowered over 850 women to become self-reliant with Savings of Rs 30 42 Lacs. • Mangrove plantation and Nursery development work has created a two facet impact by providing Livelihood to Fisherfolk during two months Fishing during Off season and developing 162 hector dense mangrove afforestation. • 5200 Men days work provide to 285 Fisherfolk of Luni, Sekhdiya and Bhadreshwar Villages in coordination with Horticulture Det. • Formed **Sagar Saheli SHG** of Navinal Fisherfolk Women and Linked with DRDA after completion of Stitching Training, received first order of Rs 80 000 to prepare Cotton Bags. Total 12 Women are engaged and planning to expand with more Women and Order. • During FY2022-23 Approx. INR 185.37 lakh were spent for Fisherfolk Amenitites work in different core areas. • Till FY 2022-23, Adani Foundation has done total expenditure of INR 1338.19 lakh for Fisherfolk Amenitites work in different core areas. • To protect Cattles against Bovine Brucellosis zoonotic disease, Awareness and vaccination program is ongoing with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages. In end of the year 100 percentage female calves will be benefitted by this initiative. • Current year KKPC served for Date Packaging box, Milk Supply to Colonies, NB 21 Off suits Supply, Vegetable Seed, Mineral Mixture and Cattle feed supply and plan to extend more service. The company has been set up with 237 Farmers shareholders. Current Year turnover is Rs 28 89 lacs by started Different Kind of Initiatives. • Skill Development and Income Generation –Adani Foundation is working with 15 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job.
		Education	• Conduct baseline assessment of 7034 Students, 3364 Students were progressive learner, 1403 Students mainstreamed. • ISLM (International School Library Month) was celebrated by 69 Utthan schools. And school from Russia joined with us in zoom to engage under the virtual connection around the world. • 100 hours capacity building programs for Uthhan sahayak and school Teachers specially focusing on

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023	
			Foundational Literacy and Numeracy Utthan sahayak attend CBP (Capacity building program) once in every month. • Utthan sahayak create 150 Worksheets on Yoga In the run up to India's 75th Independence Day celebrated across India's Azadi Ka Amrit Mahotsav The tour covers 75 heritage, tourist and archaeological sites and landmark architectural sites across Gujarat. • Provided facility for preparing JNV, NMMS & PSE examination. 898 number of students participated for JNV, NMMS & PSE. • Mental and Physical Cognitive Education with Joy full learning activities to 2.5- to 6-year-old children. Provide Nutritional Food Facilities. Capacity Building program for Balwadi teachers. • Total 82 Active SHG Group – 850 women are engaged with Adani Foundation for Savings activity. Among 15 SHG groups are involved in income generation. We facilitate them capacity building training for quality, Marketing Finance and team work to made them self-sustain. • 507 underprivileged students of Fisherman & Maldhari communities underprivileged from 8 villages taking education at the Adani Vidya Mandir school. • Celebration of various days is villages school. • **Training Skill Development:** Conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing These training programs helped women develop their skills and start their own businesses We have trained over 320 women in various skills, and many of them have started their own businesses. • motivating 150 Woman from different 82 SHG's. Current year theme was Digital ALL: Innovation & technology for gender equality
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and built various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** • 40 RRWHS structure have been completed • 208 Bore-well recharging activity is completed. • Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023	
			• Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar. • Developed of Cricket Ground at Hatdi Village **ENVIRONMENT SUSTAINABILITY PROJECTS** • **Miyawaki Forest Development, Nana Kapaya** - Plantation of 5880 saplings of different 42 species is completed which will result in dense forest within 2 years • **Smruti Van** – Plantation more than 47,000 sapling with more than 115 species through Miyawaki methodology. • **Ecosystem Restoration, Guneri** – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years. The site visit and soil samplings conducted by GES team. Regular bi monthly meeting conducted to assess the annual phase wise growth of ongoing activities. • **Multi-Species Mangrove Park** - Adani Foundation at Mundra's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, • Mangroves Biodiversity Park within one year • **Home biogas** - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Total 325 farmers are supported with Biogas as sustainable environment protection. • As per SORI use of biogas each farmer can save Rs.23400/year.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023	
			Water Conservation Projects – • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.
		Skill Development	Over the previous few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes. **ASDC, Mundra** • **Youth Employment: -** Adani Foundation is committed for youth employment with imparting technical and Non-Technical Training for Fisherfolk Youth and started Electrical, Welder ad Masson work training under Adani Skill Development Centre. • 23 Youth have been Placed in Different company after Completion of Technical training. • Total 217 Fisherfolk are Employed and earning on Monthly Base. Average Monthly Income Rs.14500/ Individual. **ASDC and Thermax Foundation Done MoU** • ASDC and Thermax Foundation Jointly Organised , Skill Development training program for " Dhrab Village youth", In 1st phase completed Domestic Data Entry Operator training with 50 students (25 girls and 25 boys)

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		• Chief Guest of this program was Mr. Anees Shaikh-Head, ER & Administration, Thermax, Ashlambhai Turk-Dhrab Village Sarpanch remained present • CSR head Thermax Ms. Sujata Deshpande has joined from Pune and given motivation and best wishes for training. • In this MOU ASDC has provided training of Digital Literacy to 1341 students and Basic Functional English to 2659 students in Kachchh District Schools. As per MOU Kachchh District Education Office has provided 4000 candidates to us for training (Adani Skill Development Centre). Funding from Thermax, CFS and DEO made it possible • **Skill Development and Income Generation –**Adani Foundation is working with 82 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. • **Soft Launch of Data Entry Operator Batch:** Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie up. **ASDC, Bhuj** ✓ **Mud Work Training–Outreach Batch at Samundra township** Total 45 candidates are enrolled. ✓ **Soft Launch of Data Entry Operator Batch** Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie-up ✓ **Soft Launch of Solar Panel Manufacturing** Technician Training of Solar Panel Manufacturing Technician Training at Bhuj, ITI with 25 candidates. ✓ **Soft Launch of DL Training under DEO Project** Soft Launch of DL Training at AVMB School with 61 Students Tie Ups with (Thermax Foundation, Empazer, Navin Group and DEO Kutch @ Rs.24.25 lacs . • MOU with Kachchh District Education Office. In this MOU we will provide training of Digital Literacy and Basic Functional English in Kachchh District Schools. As per MOU Kachchh District Education Office will provide minimum 4000 candidates to us for training (Adani Skill Development Centre). • During FY 2022-23, Total 4706 people directly trained in various trainings to enhance socio economic development.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>Please refer Annexure – 2 for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2022-23 is to the tune of INR 1894.42 lakh. Out of which, Approx. INR 1527.49 lakh is spent during the FY 2022-23.</td></tr>
<tr><td>ix</td><td>Relocation of the fishermen community if any shall be done strictly in accordance with the norms prescribed by the State Government.</td><td>Not Applicable

The project was conceptualized in such a way that there are no fishermen settlements in the project proposal. Hence there is no relocation of fishermen communities required.</td></tr>
<tr><td>x</td><td>Marine ecology monitoring shall be done regularly during construction of breakwater and dredging /disposal operation.</td><td>Complied.

Constructions as well as maintenance dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'22 to Mar'23 is mentioned below.

Total Sampling Locations & frequency: 09 Nos.
(Frequency: Once a month)

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="3">Surface</th><th colspan="3">Bottom</th></tr>
<tr><th>Min</th><th>Max</th><th>Average</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH</td><td>--</td><td>7.96</td><td>8.28</td><td>8.17</td><td>7.68</td><td>8.14</td><td>8.02</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>2.4</td><td>3.4</td><td>2.92</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>86</td><td>162</td><td>129.76</td><td>78</td><td>148</td><td>110.48</td></tr>
<tr><td>DO</td><td>mg/L</td><td>5.8</td><td>6.32</td><td>6.08</td><td>5.63</td><td>6.22</td><td>5.91</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>35.02</td><td>36.82</td><td>35.71</td><td>35.56</td><td>37.02</td><td>36.24</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35108</td><td>37210</td><td>35902</td><td>35614</td><td>37840</td><td>36425</td></tr>
</table>
*BDL – Below Detection Limit
*MDL – Minimum Detection Limit

Please refer Annexure – 7 for detailed analysis reports. Approx. INR 15.32 Lakh is spent for all environmental monitoring activities during the FY 2022-23 for overall APSEZ, Mundra.</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		Marine monitoring for west port area is being carried out by M/s. Adani Power (Mundra) Limited (Pre-monsoon & Post-monsoon) through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. Monitoring reports are also enclosed as **Annexure – 7**. Summary of ecological parameters of M/s. Adani Power (Mundra) Limited is given below: **PLANKTON DIVERSITY:** Sampling was carried out at 5 stations near west port area. At each station, water samples were collected from surface and bottom waters during the sampling period Oct'2022 & Jan'2023. The phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 31 to 36 phytoplankton genera belonging to diatoms (29-31 genera) and dinoflagellates (4-5 genera). The phytoplankton abundance in the study region was ranged from 180 to 249 cells×10^2/L & 90 to 207 cells×10^2/L respectively. The highest phytoplankton abundance was observed at Station 2 in surface (231 cells×10^2/L & 207 cells×10^2/L respectively) and then at Station 5 in bottom water (249 cells×10^2/L & 171 cells×10^2/L respectively). The lowest phytoplankton abundance (101 cells×10^2/L & 90 cells×10^2/L respectively) was observed at Station 3 in bottom water. The study shows that the marine water around was enriched with the diverse phytoplankton population.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td><u>BENTHIC DIVERSITY</u>: In the sub-tidal region, the high macrobenthos abundance and biomass were reported at station 5 (527 no/m^2 & 1.6 g/m^2) and station 4 (969 no/m^2 & 6.91 g/m^2) respectively. The lowest abundance (309 no/m^2) and biomass (0.9 g/m^2) was recorded at station 1. The more abundance of macrobenthic communities suggests the stable and enriched substratum supports their growth. In turn benthic macrofauna could support the benthic feeder fish population in this region. In the <u>Intertidal region</u> the sandy substratum with low organic matter affects the occurrence of the microbenthic community. Low macrobenthos biomass was measured (0.20 g/m^2 to 0.34 g/m^2 & 0.24 g/m^2 to 0.52 g/m^2 respectively) in the intertidal region at the APMuL. The lowest density of macrobenthic organisms was reported at station IT-2 (HW) (88 no/m^2) and station IT-2 (HW) (100 nos./m^2) respectively, whereas the highest density was reported at Station IT-1 (LW) (137 no/m^2) & Station IT-1 (LW) (250 nos./m^2) respectively.</td></tr>
<tr><td>xi</td><td>Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.</td><td>Complied.

Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'22 to Mar'23 is mentioned below:

Air sampling locations & frequency: 12 nos. (twice a week including surrounding villages) & Noise sampling locations & frequency: 9 nos. (once in a month)
<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit$</th></tr>
<tr><td></td><td colspan="5">AAQM</td></tr>
<tr><td>PM_{10}</td><td>µg/m^3</td><td>41.79</td><td>89.86</td><td>69.93</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m^3</td><td>18.62</td><td>49.12</td><td>31.39</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m^3</td><td>8.80</td><td>36.63</td><td>19.67</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m^3</td><td>11.30</td><td>43.65</td><td>26.16</td><td>80</td></tr>
<tr><td colspan="6"></td></tr>
<tr><th>Noise</th><th>Unit</th><th>Leq Min</th><th>Leq Max</th><th>Leq Ave.</th><th>Leq Perm. Limit*</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>57.90</td><td>69.90</td><td>64.85</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>53.60</td><td>64.80</td><td>59.86</td><td>70</td></tr>
</table>
$ as per NAAQ standards, 2009
* as per CC&A granted by GPCB</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>Values recorded confirms to the stipulated standards.

Please refer Annexure – 7 for detailed analysis reports. Approx. INR 15.32 Lakh is spent for all environmental monitoring activities during the FY 2022-23 for overall APSEZ, Mundra.

Ambient air quality monitoring in surrounding villages is being carried out by M/s. Adani Power (Mundra) Limited, Mundra through NABL accredited and MoEF&CC authorized agency namely M/s. UniStar Environment & Research Labs Pvt. Ltd. and monitoring reports of the same are also enclosed in Annexure – 7.

Following safeguard measures are taken for abatement of dust / fugitive emissions.

• Regular water sprinkling on road and other open area
• Regular cleaning of roads through mechanized equipment
• Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts
• Use of water mist canon
• Closed type conveyor belts
• Regular sprinkling on coal heaps with mechanized system
• Covering other types of dry bulk cargo heaps
• Installation of wind breaking wall
• Development of greenbelt along the periphery of the storage yards/back up area
• Mechanized handling system for coal and other dry bulk cargo
• Wagon loading and truck loading through closed silo</td></tr>
<tr><td>xii</td><td>Sewage arising in the Port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized / recycled for Gardening, Plantation and Irrigation.</td><td>Complied.

Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.

<table>
<tr><th>Location</th><th>Capacity</th><th>Quantity of Treated Water (Avg. from Oct'22 to Mar'23)</th><th>Type of ETP / STP</th></tr>
<tr><td>LT</td><td>265 KLD</td><td>107 KLD</td><td>Activated Sludge</td></tr>
<tr><td>West Port</td><td>55 KLD</td><td>12.86 KLD</td><td>FAB</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023

Third party analysis of the treated water is being carried out once in a month at ETP & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Summary of the same for duration from Oct'22 to Mar'23 is mentioned below.

Parameter	Unit	Min	Max	Average	Perm. Limit[$]
Industrial Effluent / Sewage (For ETP)					
pH	--	6.94	7.48	7.19	6.5 – 8.5
TSS	mg/L	26	42	33	100
TDS	mg/L	904	1480	1226	2100
COD	mg/L	78.60	86.40	82.22	100
BOD (3 Days @ 27°C)	mg/L	21	23	22	30
Ammonical Nitrogen as NH_3-N	mg/L	18.60	29.80	24.72	50
Domestic Sewage (For STP)					
pH	**--**	7.21	7.42	7.32	6.5 – 9.0
TSS	**mg/L**	22.00	28.00	24.33	100
BOD (3 Days @ 27 °C)	**mg/L**	14.00	19.00	16.83	30
Residual Chlorine	**ppm**	0.70	0.94	0.82	--
Fecal Coliform	**MPN/ 100 ml**	23.00	80.00	47.50	<1000

[$] as per CC&A granted by GPCB

Values recorded confirms to the stipulated standards.

Please refer **Annexure – 7** for detailed analysis reports. Approx. INR 15.32 Lakh is spent for all environmental monitoring activities during the FY 2022-23 for overall APSEZ Mundra.

It is also noted that GPCB is doing regular site inspection along with wastewater sampling and analysis. The last GPCB sample analysis reports were submitted during half yearly EC Compliance report for the period of Apr'21 to Sep'21 which shows all the parameters are well within the permissible limit.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
xiii	Adequate Plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.	Complied. APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial greening as well as mangrove plantation. The species such as *Ficus Infectoria, Ficus religiosa, Terminalia arjuna, Cocos nucifera, Washingtonia fillifera, Casurina spp., Azadirachta Indica, Eucalyptus spp., Jatropha curacus, Ficus bengalensis, Subabool spp., Casia fistula, Date Palm* and *Delonix regia* are grown within APSEZ area. Within the port areas approx. 189.41 hectare of greenbelt having 4,92,349 trees with the density of 2599 trees per hectare is developed till date within port premises. So, far APSEZ has developed 457.99 ha. area as greenbelt with plantation of more than 9.06 Lacs saplings within the APSEZ area. Please refer **Annexure – 6** for further details regarding greenbelt development, mangrove afforestation and updated green belt development plan. The spent budget of Horticulture Department for the period of financial year 2022-23 is INR 979 lacs. Out of which, Approx. INR 956 lakh are spent during the FY 2022-23.
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	Complied. APSEZ does not draw any ground water for the water requirement. Present source of water for various project activities is desalination plant of APSEZ and/or water through Gujarat Water Infrastructure Limited (GWIL). Average water consumption for entire APSEZ area is 4.52 MLD during compliance period i.e. Oct'22 to Mar'23.
xv	Specific arrangements for rain water harvesting shall be made in the Project design and the rain water so harvested shall be optimally utilized. Details in this regard shall be furnished to this Ministry's	Complied. Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rainwater within project area is managed through storm water drainage. We have installed Rainwater recharge bore well (4 Nos.) within our township to recharge ground water. Details of the

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
	Regional Office at Bhopal within 3 months.	same were submitted along with half yearly EC compliance report for the period Apr'19 to Sep'19. During FY 2022-23 monsoon Approx. 5.56 ML of rainwater has been recharged to increase the ground water table. We have also connected roof top rainwater duct of operational building (Tug berth building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Details of the same were submitted along with EC Compliance report for the period Oct'18 to Mar'19. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		• Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. With the objective of to preserve the rain water to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Please refer **Annexure – 2** for full details of CSR activities carried out by Adani Foundation in the Kutch region.
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	Complied. Out of approved reclamation area of 1138 ha for west port, 695 ha area is reclaimed and out of approved reclamation area of 700 ha for south port, 665 ha area is reclaimed. Details of the same were submitted along with last compliance report submission for the period Apr'17 to Sep'17 and there is no further change.
xvii	No Product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.	Complied. No products other than those permissible in the CRZ Notification 1991 are stored in the CRZ area.
General Conditions		
i	Construction of Proposed structures, if any in the Coastal Regulation Zone	Complied.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td>area shall be undertaken meticulously confirming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification 1991 and its amendments. All the construction designs/ drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments/ Agencies.</td><td>All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.

Further, the requisite permissions from Gujarat Maritime Board (GMB), for carrying out construction activities are taken from time to time. Details of the same are mentioned below:

• Permission for starting construction work for South port vide letter no GMB/N/PVT/711/870 dated 26.02.2009
• Permission for starting construction work for West port vide letter no GMB/N/PVT/711/871 dated 26.02.2009

The copies of these letters were submitted as part of the compliance report submission for the period Apr'16 to Sep'16.

The project has been developed as per Consent to Establish (CtE) and Consent to Operate (CtO) granted by SPCB. The present in-force CtE & CtO are mentioned below.
<table>
<tr><th>S. No.</th><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr>
<tr><td>1</td><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/PCB ID-53331/473995</td><td>03.10.25</td></tr>
<tr><td>2</td><td>CtE – Amendment</td><td>WFDP</td><td>17739 / 15618</td><td>18.05.27</td></tr>
<tr><td>3</td><td>CtO - Fresh</td><td>LPG Terminal</td><td>AWH-103906</td><td>27.06.24</td></tr>
<tr><td>4</td><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/GPCB ID-53331/587015</td><td>01.03.26</td></tr>
<tr><td>5</td><td>CC&A - Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/GPCB ID-53331/595228</td><td>27.06.24</td></tr>
<tr><td>6</td><td>CC&A - Renewal</td><td>West Port – WFDP</td><td>AWH-113458</td><td>01.02.27</td></tr>
<tr><td>7</td><td>CC&A – Renewal</td><td>Mundra Port Terminal</td><td>AWH-117045</td><td>20.11.26</td></tr>
</table>
The permissions mentioned above (Sr. 1 to 6) were submitted along with earlier compliance report submission. The permission copies (Sr. No. 7) were submitted in previous compliance report submission for the period of Oct'21 to Mar'22.</td></tr>
<tr><td>ii</td><td>Adequate provision for infrastructure facilities</td><td>Not applicable</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
	such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid felling of trees/mangroves and pollution of water and the surroundings.	Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.
iii	The project authorities must 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 waste, 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.	Complied. Monitoring of environmental attributes viz. Air, Water, Noise, Soil, etc. is being carried out on regular basis by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi and Approx. INR 15.32 Lakh is spent for all environmental monitoring activities during the FY 2022-23 for overall APSEZ, Mundra. Please refer Specific Conditions no. x, xi & xii for further details regarding environmental monitoring. **Liquid Effluent & Sewage** – It is being treated at decentralized treatment plants and treated water confirming the stipulated norms is being utilized for horticulture purposes within APSEZ. Please refer specific condition no xii above for details regarding the same. **Waste Management** – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste. **Non-Hazardous Solid Waste**: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, and Glasses, etc. are then sent to

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plant (M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel). APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland India Pvt. Ltd. (valid up to 31.05.2024). Details of the same were submitted as as part of compliance report submission for the duration of Apr'21 to Sep'21. **Hazardous & Other Waste:** • Bio medical waste generated from OHCs and Adani Hospital is being disposed at Common Bio Medical Waste Treatment Facility namely M/s. Distromed Kutch Services Pvt. Ltd., Bhuj. • E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. Galaxy Recycling, Rajkot and Sabnam Enterprise, Kutch respectively. • Solid Hazardous Waste is being disposed through co-processing / incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau, Safe Enviro Private Limited, Bharuch and/or cement industries of Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem - Bhavnagar. It is also being reused within organization for lubrication purpose. • Discarded drums / barrels are being sold to authorized decontamination facility i.e. M/s. Jawrawala Petroleum, Ahmedabad. It is also being reused within organization for filling hazardous waste. • Solid hazardous waste i.e. Tank bottom sludge is being sold to authorized recycler namely M/s. Mundra Oil Pvt. Ltd., Mundra for recycling. • Expired paint materials is being disposed by incineration through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau. • Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>
recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals.
• Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Western India Petro Chem Ind - Bhavnagar, Aviation Corporation - Kutch & Aroma Petrochem – Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no received or disposal of Slope Oil.
• Horticulture waste is collected from various green belt areas and it is using for making of manure and manure is being utilizing in horticulture purpose within plant premises.

Details of permissions / agreements of hazardous waste authorized vendors were submitted along with pervious half yearly EC Compliance Reports. And there is no further change.

The following table summarizes the waste management practice (from Oct'22 to Mar'23) for different types of wastes at APSEZ:
<table>
<tr><th>Type of Waste</th><th>Quantity in MT</th><th>Disposal method</th></tr>
<tr><td colspan="3">Hazardous Waste</td></tr>
<tr><td>Pig Waste</td><td>7.12</td><td rowspan="2">Co-processing at cement industries</td></tr>
<tr><td>Oily Cotton waste</td><td>64.56</td></tr>
<tr><td>Used / Spent Oil</td><td>57.09</td><td>Sell to registered recycler</td></tr>
<tr><td colspan="3">Other Waste</td></tr>
<tr><td>E-Waste</td><td>31.37</td><td>Sell to registered recycler</td></tr>
<tr><td>Battery Waste</td><td>17.83</td><td>Sell to registered recycler</td></tr>
<tr><td>Bio Medical Waste</td><td>3.38</td><td>To approved CBWTF Site</td></tr>
<tr><td colspan="3">Non-Hazardous Waste</td></tr>
<tr><td>Recyclables Dry Waste / Scrap</td><td>1413.91</td><td>After recovery sent for recycling / Reuse within premises</td></tr>
<tr><td>Non-Recyclable Dry Waste (RDF)</td><td>230.01</td><td>Co-processing at Cement Industries</td></tr>
<tr><td>Wet Waste (Food waste + Organic waste)</td><td>465.86</td><td>Converted to Manure for Horticulture use / Biogas for cooking purpose</td></tr>
</table>
</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		Horticulture Waste | 385.7 | Used for making of manure and utilize for horticulture purpose
iv	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 Gujarat Pollution Control Board before commissioning of the Project and copy of each of these shall be sent to this Ministry.	Complied. All construction activities were carried out confirming to the existing rules and regulation and as per the CRZ notification. Please refer General condition no. i for permission granted from state pollution control board regarding the same.
v	The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.	Complied There are no sand dunes and corals at the project site. 1254 ha area identified as potential mangrove conservation is being conserved and there is no disturbance to the mangroves in this area. Please refer specific condition no i above for details regarding the same.
vi	A copy of the clearance letter will be marked to the concerned Panchayat / Local NGO, if any from whom any suggestions /representations has been received while processing the proposal.	Complied. Copy of the clearance letter was marked to the concerned panchayats. A typical proof of the same submitted to Mundra village Panchayat on 21.03.2009 was submitted as a part of compliance report submission for the period Apr'16 to Sep'16.

<table>
<tr><th>Sr. No.</th><th>Conditions as per clearance letter</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td>vii</td><td>The funds earmarked for environment protection measures shall be maintained in a separate account and there shall be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.</td><td>Complied.

Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is done accordingly. All the expenses are recorded in advanced accounting system of the organization.

Budget for environmental management measures (including horticulture) for the FY 2022-23 is to the tune of INR 1448.06 lakh. Out of which, Approx. INR 1366.28 lakh are spent during the year FY 2022-23. Detailed breakup of the expenditures for the past 3 years is attached as Annexure – 8.

Details regarding the past six compliance report submissions are mentioned below:

<table>
<tr><th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Oct'19 to Mar'20</td><td>20.05.2020</td></tr>
<tr><td>2</td><td>Apr'20 to Sep'20</td><td>26.11.2020</td></tr>
<tr><td>3</td><td>Oct'20 to Mar'21</td><td>25.05.2021</td></tr>
<tr><td>4</td><td>Apr'21 to Sep'21</td><td>30.11.2021</td></tr>
<tr><td>5</td><td>Oct'21 to Mar'22</td><td>30.05.2022</td></tr>
<tr><td>6</td><td>Apr'22 to Sep'22</td><td>30.11.2022</td></tr>
</table>
</td></tr>
<tr><td>viii</td><td>Full support shall be extended to the Officers of this Ministry's Regional Office at Bhopal and the Officers of the Central and State Pollution Control Boards by the Project Proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental Protection activities.</td><td>Complied

APSEZ is always extending full support to the regulatory authorities during their visit to the project site. All necessary documents are submitted as per the request of the visiting authorities.

Last visit of Regional Office, GPCB was done on 09.04.2021 for West Port APSEZL has submitted the reply to the site visit report vide letter dated 12.04.2021. Details of the same were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21.

As well as last visit of Regional Office, GPCB was done on 23.03.2022 for Main port & APSEZL has submitted the reply vide letter dated 05.04.2022. Details of the same were submitted in the last compliance period Apr'22 to Sep'22.</td></tr>
</table>

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
		Inline to the compliance certification process of Environment Clearance condition of Waterfront Development Plan, RO, MoEF&CC Bhopal had visited the site on 27th & 28th January, 2020 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer MoEF&CC). During the said compliance verification visit and as per the compliance certification received, there was no major non-compliance observed. Inline to the compliance certification process of Consent to Operates of existing facilities developed under Waterfront Development Plan, RO, GPCB, Gandhidham had visited the site on 17th March, 2021 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer GPCB). During the said compliance verification visit and as per the compliance certification received, there was no non-compliance observed. Inline to the compliance of MoEF&CC Order dated 18th September, 2015, Joint Review Committee (JRC) comprising officials from various competent authorities visited the APSEZ, Mundra from 1st to 3rd September, 2021 to monitor the progress of implementation of the conditions stipulated in the order. APSEZ provided all requisite information and documents required by the JRC. As per the report received by MoEF&CC vide dated 01.12.2021, there was no non-compliance observed.
ix	In case of deviation or alteration in the Project including the implementing agency, a fresh reference shall be made to this Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection.	Complied. LNG terminal was initially approved under the Waterfront Development Project. However the same has been developed by GSPC LNG Ltd. for which, separate EC and CRZ clearance has already been obtained from MoEF&CC by them. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17. LPG terminal was initially approved under the Waterfront Development Project of Adani Ports and SEZ Limited and the same has been developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidiary of APSEZ. Details of the same were submitted along with half yearly compliance report for the period Oct'17 to Mar'18.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
x	The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	Point noted and agreed.
xi	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection which shall be complied with.	Complied As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed. • Bathymetry & Topography study, preparation of plan for protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region. Please refer **Annexure – B** for further details regarding the mentioned studies.
xii	The project proponent shall advertise at least in two local newspapers widely circulated in the region around the Project, one of which shall be in the vernacular language of the locality concerned informing that the Project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forest at http://www.envfornic.in. The advertisement shall be made within 7 days from	Complied. The original copy of the EC and CRZ clearance was obtained on 10.03.2009 and advertisement (containing informing that the EC and CRZ clearance is accorded to the proposed project and a copy of clearance letter is available with the SPCB and may also be seen at the website of MoEF&CC) was given in The Indian Express newspaper dated 18.03.2009. Copy of the same was submitted along with compliance report submission for the period Apr'16 to Sep'16.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
	the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.	
xiii	The Project proponent shall inform the Regional Office at Bhopal 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. APSEZ had informed the Regional Office of MoEF&CC at Bhopal as well as MoEF&CC, New Delhi regarding the date of financial closure and the date of start of land development work vide letter sent in August, 2009.
xiv	Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within period of 30 days as prescribed under section 11 of the National Environment Appellate Act, 1997.	Point noted and agreed. This EC and CRZ clearance was challenged in National Environment Appellate Authority. In this matter, Order has also been passed in favour of APSEZ. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.
4.	The above mentioned stipulations will be enforced among others under the Water (Prevention & Control of Pollution) Act 1974, the Air (Prevention & Control of Pollution) Act 1981, the Environment (Protection) Act 1986, the Hazardous chemicals (Manufacture, Storage & Import) Rules 1989, the Coastal Regulation Zone Notification 1991 and its subsequent amendments and the Public Liability	Point noted and Agreed APSEZ is being complied all the conditions said rules and regulations mentioned in EC point no. 4. APSEZ has valid insurance policy under PLI act 1991 as below. 1. APSEZ – Liquid Terminal: Valid till 31.03.2024 2. Mundra LPG Terminal Pvt. Ltd.: Valid till 31.03.2024 The updated/renewed PLI policy of APSEZ – Liquid Terminal & Mundra LPG Terminal Pvt. Ltd are attached as **Annexure – 9**.

Sr. No.	Conditions as per clearance letter	Compliance Status as on 31-03-2023
	Insurance Act 1991 and the rules made there under from time to time. The project proponent shall ensure that the proposal complies with the provisions of the approved Coastal Zone Management Plan of Gujarat state and the supreme court's order dated 18 April, 1996 in the writ petition No. 664 of 1993 to the extent the same are applicable to this proposal.	

Compliance Status of CRZ Recommendation given by GCZMA for the Waterfront Development Project

ANNEXURE – A

CRZ Recommendation Compliance Report of WFDP

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2023
Specific Conditions		
1	The provisions of the CRZ notification of 1991 and subsequent amendments issued from time to time shall be strictly adhered to by the MPSEZL. No activity in contradiction to the provisions of the CRZ Notification shall be carried out by the MPSEZL.	Complied. All construction and operation activities are being carried out in line with the CRZ recommendation and permissions granted.
2	All necessary permissions from different Government Departments/ agencies shall be obtained by the MPSEZL before commencing any activities.	Complied. Necessary permissions from competent authority have been obtained before commencing any the activities. Please refer condition no. i & iv of General Conditions of the EC & CRZ Clearance above.
3	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	Complied. All major creeks within the APSEZ area are protected. Please refer specific condition no iii of the EC and CRZ clearance for details regarding this point.
4	The project proponent shall conserve the 1254 ha. of area as committed and proposed in their master plan and shall carry out plantation of various mangrove species in the said area.	Complied. Mangrove conservation area of 1254 Ha is conserved as proposed in the master plan. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
5	Massive mangroves plantation activity in at least 300 ha. area shall be carried out within a time frame of 5 years as committed by the project proponent. This would be in addition to the earlier commitment	Complied. Mangrove plantation is already completed during the year 2012-13. Please refer specific condition no. vii of the EC and CRZ clearance for further details.

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2023
	for 1200 ha. of mangroves plantation.	
6	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	Complied. No effluent or sewage is discharged in to the CRZ area. Please refer specific condition no xii of the EC and CRZ clearance for details regarding this point.
7	All the recommendations and suggestions given by NIO in their Environment Impact Assessment report for conservation / protection and betterment of environment shall be implemented strictly by MPSEZL.	Complied. Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report is attached as **Annexure – 10**.
8	The construction and operational activities as well as dredging and reclamation activities shall be carried out in such a way that there is no negative impact on mangroves and other coastal /marine habitat except the proposed approx. 63 ha of area for which the compensation (300 ha.) is proposed.	Complied. All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. 1254 ha area identified as mangrove conservation area is being conserved by APSEZ. Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.
9	The construction activities and dredging shall be carried out under the supervision/monitoring of the NIO or any such institute of repute.	Complied. Construction activities are carried out as per EIA study carried out by NIO with all mitigative measures as suggested. Requisite permissions are taken from competent authorities such as GMB and GPCB. Site visits are being carried out by govt. officers from time to time to ensure compliance of the conditions stipulated in respective permissions. No capital dredging activities are carried out during the Oct'22 to Mar'23 period.

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2023
		Please refer condition no. i, iv & viii of General Conditions of the EC & CRZ Clearance above.
10	The dredge material generated during capital dredging shall be used only for reclamation and that to be generated during maintenance dredging shall be disposed of at the place identified by NIO/CWPRS/WAPCOS through appropriate modeling and it shall be ensured that it does not create any negative impacts.	Complied. Entire quantity of dredged material is used for reclamation activities only; no disposal is carried out in the sea. No capital dredging activities are carried out during the Oct'22 to Mar'23 period.
11	Necessary measures including the shore protection activities shall be undertaken to ensure that there are no erosion in surrounding area due to the proposed activities.	Complied. All dredging and reclamation activities are carried out as per EC and CRZ Clearance and no erosion is observed. For further details regarding the shoreline change study for the Mundra region, please refer specific condition no v of the EC and CRZ clearance.
12	The alignment of the jetties/berths and other structures shall be done after conducting the detailed modeling to ensure that there are no erosion and accretion in the region due to proposed activities.	Complied. Detailed hydrodynamic modeling was carried out by NIO during preparation of the EIA report. All construction activities are being carried out as per the outcome/recommendations of the modeling report. However, a detailed shoreline change assessment study is also carried out. Please refer specific condition no v of the EC and CRZ clearance for further details.
13	The MPSEZL shall contribute financially for any common study or project that may be proposed by this department for environment management / conservation / improvement for the Gulf of Kutchh.	Complied. There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.
14	The construction debris and /or any other type of waste shall not be	Complied.

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2023
	disposed of into the sea, creek or in the CRZ areas. The construction is over and shall be disposed off in low lying areas in consultation with NIO, NEERI or any such institute of repute.	All construction and operation activities as well as dredging and reclamation activities are being carried out as per the EIA report prepared by NIO. The construction debris, if any, is being used for area development outside CRZ area. For details about management of other types of wastes, please refer general condition no. iii of the EC and CRZ clearance.
15	The construction camps shall be located outside the CRZ area and the construction labour shall be provided with the necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by the construction labors.	Compiled. Please refer general condition no ii of the EC and CRZ clearance for further details.
16	The MPSEZL shall regularly update their Local Oil Spill Contingency and Disaster Management Plan in consonance with the National Oil Spill and Disaster Contingency Plan and shall submit the same to this Department after having it vetted through the Indian Coast Guard.	Compiled. Disaster Management Plan is updated regularly and the updated DMP was submitted as a part of compliance report for the period Apr'16 to Sep'16. On Site Emergency Response Plan and Crisis Management Plan is in place and implemented. There is no further change. The updated Onsite emergency plan was submitted during the compliance period of Oct'21 to Mar'22. Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan is being updated on regular basis and the same was last updated on 30.07.2022 is in place and implemented. The latest Oil spill contingency response plan were submitted in the last compliance period Apr'22 to Sep'22. . For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster

Sr. No.	Specific Conditions	Compliance Status as on 31-03-2023
		Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. Oil Spill Contingency Response Plan (OSCRP) is prepared in accordance with the NOSDCP. Latest Regional Level Pollution Response exercise **"SWACHCHH SAMUDRA-NW 2022"** was carried out by Indian Coast Guard on 12th April, 2022 at Vadinar, Gujarat. All participants from various Oil Handling Agencies and Stakeholders (ICG, RELIANCE, ESBTL, OOCL, APSEZ, BORL, VOTL (NAYARA) were participated in this exercise. Details of the same were submitted in the last compliance period Apr'22 to Sep'22.
17	The MPSEZL shall participate and contribute for the Vessel Traffic Management System to be developed for the Gulf of Kutchh being developed.	Complied. A VTMS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information in Gulf of Kutch is provided to VTMS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch @ yahoo.com and vtsgok@yahoo.com. Mundra port has subscribed and taking VTMS feed from Kandla from link www.vts.gov.in.
18	The MPSEZL shall bear the cost of external agency that may be appointed by this Department for supervision/monitoring of proposed activities and the environmental impacts of the proposed activities.	Complied. There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.

Annexure – B
Compliance Status of MoEF & CC Order dated 18.09.2015

Based on the report submitted by Sunita Narain committee, MoEF&CC issued a Show Cause Notice (SCN) to APSEZ vide their letter dated 30.09.2013. APSEZ replied to the SCN vide letter dated 14.10.2013. Further, an order (containing 10 directions) was issued by MoEF&CC vide their letter dated 18.09.2015. Compliance to these 10 directions is mentioned below.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status as on 31-03-2023
i	The proposal of extension of the validity of environmental clearance granted to the North Port vide letter dated 12.01.2009 will be considered separately at later stage.	Point Noted & Complied After receipt of this order, so far APSEZ has not done any application to MoEF&CC for the proposed North port. The expansion of Waterfront Development plan has been proposed excluding North Port area.
ii	Bocha island, ecologically sensitive geomorphological features and areas in the island and creeks around the island will be declared as conservation zone action plan for its conservation must be prepared. M/s. APSEZ should provide necessary financial assistance for this purpose.	Complied This reply covers condition no ii, iv and v. Based on the MoEF&CC directions, 1. APSEZ, vide letter dtd. 19th October 2015 had requested GCZMA, for consideration of project for finalization of ToR for NCSCM. 2. Project was considered on 28th GCZMA meeting, scheduled on 22nd April 2016, where ToR was discussed and agreed, upon. 3. APSEZ, vide its letter dtd. 25th April 2016, submitted the proposal to GCZMA along with Scope of work, as submitted by NCSCM. 4. Service Order was issued to NCSCM vide SO dtd. 29th Aug 2016. Cost of the study as per the NCSCM proposal was 315 Lakh and 100% of payment has already paid to NCSCM. 5. NCSCM has carried out number of site surveys during the period, February 2017 – April 2018 as per the defined scope 6. The study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) for their consideration and recommendation if any. 7. A reminder letter was submitted to GCZMA vide letter dated 4th Jan 2019. Details of above chronology were submitted along with half yearly compliance report for the period Apr'19 to Sep'19.
iv	A comprehensive and integrated study and protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary, will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area e.g. the reported case of disappearance of mangroves near navinal creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of bocha island up to baradimata and others.	
v	NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA. In recognition of the fact that the existing legal provisions under the E(P) Act 1986 do not provide for any authority to impose ERF by the government, the plan will be financed by the PP. the implementation will be carried out by GCZMA. The monitoring	

Sr. No.	Condition	Compliance Status as on 31-03-2023
	of the implementation will be carried by NCSCM.	The site survey carried out by NCSCM includes: 1. Bathymetry survey of creeks 2. Topography survey of intertidal areas 3. Mangrove survey (health and area demarcation) 4. Sampling of soil and water for analysis of physico-chemical and biological parameters 5. Tide and currents data collection (including residence time of tidal water) 6. Focus Group Discussions with the community in the close vicinity of the project area In addition to the site surveys, NCSCM has procured satellite images for analysis of mangrove cover. The data collected (through site surveys and analysis of satellite maps) was used as input for mathematical modelling. The modelling studies were carried out to understand the impacts of the development activities. Based on the outcome of the modelling studies the necessary conservation plan for protection of creeks and mangrove areas is prepared. Based on the final study report, outcome is summarized in to following points : 1. There is no obstruction to any water stream (creeks / branches of creeks / rivers) 2. Presently, mangrove cover in and around APSEZ is over 2596 ha. There was substantial growth in mangrove cover to the tune of 502 ha (comparison between 2011 and 2019) 3. Mundra has undergone substantial development during this tenure. Hence it can be interpreted that the infrastructure development has not left any adverse impacts on ecology.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>NCSCM study same was submitted to the GCZMA on 04.06.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'19 to Sep'19. The same was further submitted to GCZMA and MoEF&CC for their examination and recommendation vide (with a copy to MoEF&CC vide letter dated 04.06.2018 & reminder letter vide dated 4th Jan, 2019). Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and the recommendation for the same has been received vide email dtd 22nd Sept, 2020 with conditions. Details of the same were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.

<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%.</td></tr>
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Sr. No.	Condition	Compliance Status as on 31-03-2023		
				• This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ.
		2.	Tidal observation in creeks in and around APSEZ	• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
		3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which

Sr. No.	Condition			Compliance Status as on 31-03-2023
				has been removed manually. • The cost of the said activity was INR 2.35 Lacs. The details of algal & prosopis removal is attached as **Annexure – 1.**
		4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity during FY 2022-23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 200.89 Lacs during FY 2022-23, which was incurred by APSEZ. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in 190-acre area and produce 3800 Fodder Tons Yield annually, lead to save Approx Rs 52 Lacs of farmers.

Sr. No.	Condition	Compliance Status as on 31-03-2023
		• **<u>Grass Land development:</u>** AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring. • Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value More than 2250 Cattle will sustain with Improving quality and Quantity of Milk. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The photographs of celebration were submitted in previous compliance period Apr'22 to Sep'22. • Refer CSR report attached as **Annexure – 2**. Details of activities done as a part of GCZMA recommendations and NCSCM

Sr. No.	Condition	Compliance Status as on 31-03-2023
		mangrove conservation action plan were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21. CZMP of Kutch region has been finalized and published on GCZMA website in the Month of Feb-2022. NCSCM has issued final authorized maps for HTL and CRZ Boundary prepared in line with approved CZMP of Gujarat State as per CRZ Notification, 2011. The details of the maps were submitted during the previous compliance period Oct'21 to Mar'22. To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no proper response from NCSCM side regarding resolution, the work order has been revoked. After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work is 23.60 Lacs (Including Taxes), which will be paid by APSEZ.
iii	The violations of specific condition of all the ECs and CRZ clearances, if any, will be examined and proceeded with the provisions of EP Act, 1986 independently.	Complied During the said site visits from various regulatory authorities and as per the compliance certification received, there was no non-compliance observed.

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Sr. No.</th><th>Authority</th><th>Date of Visit</th><th>Purpose of Visit</th></tr>
<tr><td>1</td><td>RO, MoEF&CC, Bhopal</td><td>21st – 22nd Dec, 2016</td><td>EC Compliance Certification of WFDP</td></tr>
<tr><td>2</td><td>RO, MoEF&CC, Bhopal</td><td>3rd May, 2018</td><td>EC Compliance Certification of WFDP & MSEZ</td></tr>
<tr><td>3</td><td>RO, MoEF&CC, Bhopal</td><td>3rd & 4th Sep, 2019</td><td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td></tr>
<tr><td>4</td><td>RO, MoEF&CC, Bhopal</td><td>27th & 28th Jan, 2020</td><td>EC Compliance Certification of WFDP</td></tr>
<tr><td>5</td><td>SPCB, Gandhinagar</td><td>17th March, 2021</td><td>CC&A Compliance Certification of existing facilities developed under WFDP</td></tr>
<tr><td>6</td><td>Joint Review Committee</td><td>1st to 3rd Sep, 2021</td><td>Compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015.</td></tr>
<tr><td>7</td><td>NEERI, Nagpur</td><td>19th & 20th Jan 2023.</td><td>EC Compliance verification site visit of MSEZ.
Copy of last EC compliance verification certificate is attached as Annexure – 11.</td></tr>
</table>

It may also be noted that GPCB, Regional Office does regular site visit of APSEZ area and no non-compliance observed.

Last visit of Regional Office, GPCB was done on 09.04.2021 for West Port APSEZL has submitted the reply to the site visit report vide
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Sr. No.	Condition	Compliance Status as on 31-03-2023
		letter dated 12.04.2021. Details of the same were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21. Last visit of Regional Office, GPCB was done on 23.03.2022 for Main port and APSEZL has submitted the reply report vide letter dated 05.04.2022. Details of the same were submitted in the last compliance period Apr'22 to Sep'22.
vi	There will be no development in the area restricted by the High court of Gujarat. APSEZ shall abide by the outcome of the PIL 12 of 2011 and other relevant cases.	Complied The order passed by Hon' ble high court in context of PIL 12 of 2011 vide dated 10th Nov 2011. Subject PIL has been disposed off by Hon'ble High Court vide their order dated 17.04.2015 and now there is no restriction on development in the subject area. The order reads as *"In view of the aforesaid discussion, we do not find any merit in this writ petition. This writ petition fails and is accordingly dismissed. No order as to cost."* Copy of the order was submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Considering the above status and in line to submission of compliance of all the directions under this order, this condition is closed.
vii	APSEZ will submit specific action plan to protect the livelihood of fishermen along with budget.	Complied. Adani Foundation (AF) is the CSR arm of the Adani Group actively working for upliftment of the communities in the surroundings of various project sites of Adani Group. AF has prepared a specific action plan to protect livelihood of fishermen at Mundra. Various initiatives, as stated below are discussed in detail in the report namely "Silent Transformation of Fisher folk at Mundra". Said report also includes the information related to the planned expenses to the tune of approx.

Sr. No.	Condition	Compliance Status as on 31-03-2023
		13.5 Cr. INR for various initiatives for the next five years (2016 – 2021) (Budget details provided in Page No. 68 of report). Copy of the same is already submitted to MoEF&CC vide our letter dated 10.09.2016. Till, Mar'23 approx. 13.38 Cr. INR, has already been invested fisherfolk livelihood. Further, details regarding the expenditure incurred against the commitment are attached as **Annexure – 12**. APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • **Vidya Deep Yojana** Developing school preparedness programme and empowering balwadis at fisherfolk settlement Under this scheme, 4 balwadis at different settlement has been constructed This programme include nutrition food, hygiene, awareness of health, cleanliness, discipline, regularity and development of basic age appropriate conception • **Vidya Sahay Yojana – Scholarship Support** All basic education supportive facilities have been created to promote education in fisher folk community. • **Adani Vidya Mandir** Children of the family with the income of salary less than 1.5 lac/annum are admitted School focusses on nutrition food, uniform and other services to the children for free. • **Fisherman Approach in SEZ** After due consultative process, APSEZ has provided 7 fishermen access roads for to approach to the sea for fishing activity. • **Machhimar Arogya Yojana** The Fisher folk communities are disposed to several water and air abided diseased due to exposure to unhygienic working conditions. Frequently Special Health care Camps are organized at Vasahat. Our Mobile health care unit van regularly visit fisher folk settlements • **Machhimar Kaushalya Vardhan Yojana** Based on need assessment a number of trades were introduced through the Adani Skill Development Centre in Mundra, where in fisher folk youth could

Sr. No.	Condition	Compliance Status as on 31-03-2023
		join and get a number of technical and non-technical training • **Machhimar Sadhan Sahay Yojana** Fishing material support was provided by AF at Mundra as per the requests of Pagadiya fishermen. According to their needs, fishing nets, ropes, buoys, ice boxes, crates, weighing scales, anchors, solar lights etc., were provided • **Machhimar Awas Yojana** Shelters, equipped with basic facilities of a toilet and pure drinking water have been constructed for living while fishing and to provide a healthy and hygienic residence. • **Machhimar Shudhh Jal Yojana** This scheme of providing potable water has helped in reducing the drudgery of women and contributed largely towards general wellbeing • **Sughad Yojana** Toilets for men and women are constructed at all three Vasahats.Infrastructure was accompanied with continuous awareness campaign on hygiene sanitation and use of toilets in particular. • **Machhimar Akshay kiran Yojana** Solar street lights at each settlement have been installed. For fish landing shed and school extension room have been fitted with solar invertor allowing late evening video shows for awareness and fish sorting work at ease. • **Machhimar Suraksha Yojana** Distance Alarm Transmission System – DATS' project was introduced in order to promote safety of the fishermen. Forced to be at sea to earn their livelihood puts the lives of many fishermen at risk • **Machhimar Ajivika Uparjan Yojana** Mangrove plantation in the area as means of alternate income generating activity for the fisher folk community during the non-fishing months. During the non-fishing months, the fishermen under usual circumstances were benefited by other alternate economic activity to sustain them. • **Bandar Svachhata Yojana** Waste bins have been provided for proper collection and segregation of waste. Further, APSEZ is actively working with local community around the project area and provides required support for their livelihood and other concerns through the CSR arm –

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<tr><th>Sr. No.</th><th>Condition</th><th>Compliance Status as on 31-03-2023</th></tr>
<tr><td></td><td></td><td>
Adani Foundation. Adani Foundation is working in main four persuasions as below.

- Education
- Community Health
- Rural Infrastructure
- Sustainability Livelihood

Brief information about activities in the main four persuasions is mentioned below. Activities carried out for the same are summarized as below.

<table>
<tr><th>Area</th><th>Activity</th></tr>
<tr><td>Community Health</td><td>
• Mobile Heath Care Units and Rural Clinics
• 09 Rural Clinics
• 06 villages of Mundra, 02 villages of Anjar & 01 village Mandvi block has benefited by rural clinic service.
• Total Patients Benefitted FY 22-23:- 25088 (direct & indirect).
• 5 financially challenged patients has been supported with Dialysis treatment at 97 Times which added day in their Life.

Health camp:
• Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies.
• Specialty health (Gynec Pediatric eye specialty
health camp) :- 1527 Patients Benefited.
• General health camp :- 3379 Patients benefited
• Women's Health: Provided health services to over 1150 women through 102 + Menstrual Hygiene workshops.
• Dialysis Support: During this year, 4 patients were supported for regular dialysis (twice a week) with partial support
• Total 590800 CC quantity of Blood had been donated by 1710 Employees.
• Medical Supports: 2460 beneficiary in 63 village.
• TB screening & Awareness session: benefited 1795.
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Sr. No.	Condition	Compliance Status as on 31-03-2023	
			• 25 villages and 07 fishermen settlements covered, with 90 types of general and lifesaving medicines through Mobile healthcare unit • 1491 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 4906 patients of Mundra Taluka. • Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages. Total 17299 cattle of 19 Villages had benefitted with different kind of medicines and vaccines. • Lumpy Disease Vaccination Drive: Total 40 000 cattle were covered through therapeutic and ayurvedic treatment and Nutritive Cattle feed Support with association District Animal Husbandry department through vaccination and awareness drive.
		Sustainable Livelihood – Fisher folk, Agriculture & Women	• Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application. • To promote Natural farming Adani Foundation has originated cow-based farming initiative with interconnected techniques which can increase farmer yield. • Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seva. • Natural farming- 1392 farmers benefitted by 20 nos of training from which 60 farmers chemical usage is reduced to half extent in 500 Acres approximately. • 100 nos. of Facilitation of Home Biogas- under Gobardhan Yojna. • Benefited 837 people linkages with Govt. cow based Nurturing Scheme. • Supported 1500 farmers for barrel & wormi compost.

Sr. No.	Condition	Compliance Status as on 31-03-2023
		• 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony 17 472 Kg Vegetable with Rs. 4.36 Lacs. • 257 Farmers have started to prepare Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation. • Adani Foundation has also provided 7.31 lacs kg Dry Fodder and 23.59 lacs kg Green fodder in 29 villages of Mundra and Anjar Block to support the resource dependent villagers, to avoid their dependency on mangroves. The expenditure for fodder supporting activities was approx. 200.89 Lacs during FY 2022-23. • Adani Foundation provides Good Quality dry and green fodder to 29 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super **NAPIER Grass** in 190-acre area and produce 3800 Fodder Tons Yield annually, lead to save Approx Rs 52 Lacs of farmers. • **Grass Land development:** AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village. • **Self Help Groups (SHGs):** Established 82 self-help groups in various rural and urban areas to provide financial and social support to women We provided training and capacity building workshops to members of these SHGs to help them develop income generating activities and improve their livelihoods Through this initiative, we have empowered over 850 women to become self-reliant with Savings of Rs 30 42 Lacs. • Mangrove plantation and Nursery development work has created a two facet impact by providing Livelihood to Fisherfolk during two months Fishing

Sr. No.	Condition	Compliance Status as on 31-03-2023	
			during Off season and developing 162 hector dense mangrove afforestation. • 5200 Men days work provide to 285 Fisherfolk of Luni, Sekhdiya and Bhadreshwar Villages in coordination with Horticulture Det. • Formed **Sagar Saheli SHG** of Navinal Fisherfolk Women and Linked with DRDA after completion of Stitching Training, received first order of Rs 80 000 to prepare Cotton Bags. Total 12 Women are engaged and planning to expand with more Women and Order. • During FY2022-23 Approx. INR 185.37 lakh were spent for Fisherfolk Amenitites work in different core areas. • Till FY 2022-23, Adani Foundation has done total expenditure of INR 1338.19 lakh for Fisherfolk Amenitites work in different core areas. • To protect Cattles against Bovine Brucellosis zoonotic disease, Awareness and vaccination program is ongoing with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages. In end of the year 100 percentage female calves will be benefitted by this initiative. • Current year KKPC served for Date Packaging box, Milk Supply to Colonies, NB 21 Off suits Supply, Vegetable Seed, Mineral Mixture and Cattle feed supply and plan to extend more service. The company has been set up with 237 Farmers shareholders. Current Year turnover is Rs 28 89 lacs by started Different Kind of Initiatives. • Skill Development and Income Generation –Adani Foundation is working with 15 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job.
		Education	• Conduct baseline assessment of 7034 Students, 3364 Students were progressive learner, 1403 Students mainstreamed. • ISLM (International School Library Month) was celebrated by 69 Utthan schools. And school from Russia joined with us in zoom to engage under the virtual connection around the world. • 100 hours capacity building programs for Uthhan sahayak and school Teachers specially focusing on

Sr. No.	Condition	Compliance Status as on 31-03-2023	
			• Foundational Literacy and Numeracy Utthan sahayak attend CBP (Capacity building program) once in every month. • Utthan sahayak create 150 Worksheets on Yoga In the run up to India's 75th Independence Day celebrated across India's Azadi Ka Amrit Mahotsav The tour covers 75 heritage, tourist and archaeological sites and landmark architectural sites across Gujarat. • Provided facility for preparing JNV, NMMS & PSE examination. 898 number of students participated for JNV, NMMS & PSE. • Mental and Physical Cognitive Education with Joy full learning activities to 2.5- to 6-year-old children. Provide Nutritional Food Facilities. Capacity Building program for Balwadi teachers. • Total 82 Active SHG Group – 850 women are engaged with Adani Foundation for Savings activity. Among 15 SHG groups are involved in income generation. We facilitate them capacity building training for quality, Marketing Finance and team work to made them self-sustain. • 507 underprivileged students of Fisherman & Maldhari communities underprivileged from 8 villages taking education at the Adani Vidya Mandir school. • Celebration of various days is villages school. • **Training Skill Development:** Conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing These training programs helped women develop their skills and start their own businesses We have trained over 320 women in various skills, and many of them have started their own businesses. • motivating 150 Woman from different 82 SHG's. Current year theme was Digital ALL: Innovation & technology for gender equality
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and built various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** • 40 RRWHS structure have been completed

Sr. No.	Condition	Compliance Status as on 31-03-2023
		• 208 Bore-well recharging activity is completed. • Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar. • Developed of Cricket Ground at Hatdi Village **ENVIRONMENT SUSTAINABILITY PROJECTS** • **Miyawaki Forest Development, Nana Kapaya** - Plantation of 5880 saplings of different 42 species is completed which will result in dense forest within 2 years

Sr. No.	Condition	Compliance Status as on 31-03-2023
		• **Smruti Van** – Plantation more than 47,000 sapling with more than 115 species through Miyawaki methodology. • **Ecosystem Restoration, Guneri** – Grassland ecosystem restoration and mangrove conservation in 40 Ha area over a period of 4 years. The site visit and soil samplings conducted by GES team. Regular bi monthly meeting conducted to assess the annual phase wise growth of ongoing activities. • **Multi-Species Mangrove Park** - Adani Foundation at Mundra's initiated multi-species plantation of mangroves in Kutch association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, • Mangroves Biodiversity Park within one year • **Home biogas** - Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. Total 325 farmers are supported with Biogas as sustainable environment protection. • As per SORI use of biogas each farmer can save Rs.23400/year. **Water Conservation Projects** – • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rainwater Harvesting 145 Nos. (40 Nos. current FY 2022-23) which is having 10,000 litre storage which is

Sr. No.	Condition	Compliance Status as on 31-03-2023	
			sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 208 Nos (19 Nos. current FY 2022-23) which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which borewell depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.
		Skill Development	Over the previous few years, Adani Skill Development Center has assessed various aspects of the technical, leadership and soft skills gaps that organizations, in general, face and accordingly focuses on imparting required training in those areas in partnership with various colleges and institutes. **ASDC, Mundra** • **Youth Employment: -** Adani Foundation is committed for youth employment with imparting technical and Non-Technical Training for Fisherfolk Youth and started Electrical, Welder ad Masson work training under Adani Skill Development Centre. • 23 Youth have been Placed in Different company after Completion of Technical training. • Total 217 Fisherfolk are Employed and earning on Monthly Base. Average Monthly Income Rs.14500/ Individual. **ASDC and Thermax Foundation Done MoU** • ASDC and Thermax Foundation Jointly Organised: Skill Development training program for " Dhrab Village youth", In 1st phase completed Domestic Data Entry Operator training with 50 students (25 girls and 25 boys) • Chief Guest of this program was Mr. Anees Shaikh-Head, ER &

Sr. No.	Condition	Compliance Status as on 31-03-2023
		Administration, Thermax, Ashlambhai Turk-Dhrab Village Sarpanch remained present • CSR head Thermax Ms. Sujata Deshpande has joined from Pune and given motivation and best wishes for training. • In this MOU ASDC has provided training of Digital Literacy to 1341 students and Basic Functional English to 2659 students in Kachchh District Schools. As per MOU Kachchh District Education Office has provided 4000 candidates to us for training (Adani Skill Development Centre). Funding from Thermax, CFS and DEO made it possible • **Skill Development and Income Generation –**Adani Foundation is working with 82 Self-help group and supporting to develop entrepreneur skills to become self-reliant, sourcing more than 850 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. • **Soft Launch of Data Entry Operator Batch:** Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie up. **ASDC, Bhuj** ✓ **Mud Work Training–Outreach Batch at Samundra township** Total 45 candidates are enrolled. ✓ **Soft Launch of Data Entry Operator Batch** Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie-up ✓ **Soft Launch of Solar Panel Manufacturing** Technician Training of Solar Panel Manufacturing Technician Training at Bhuj, ITI with 25 candidates. ✓ **Soft Launch of DL Training under DEO Project** Soft Launch of DL Training at AVMB School with 61 Students Tie Ups with (Thermax Foundation, Empazer, Navin Group and DEO Kutch @ Rs.24.25 lacs .

Sr. No.	Condition	Compliance Status as on 31-03-2023
		• MOU with Kachchh District Education Office. In this MOU we will provide training of Digital Literacy and Basic Functional English in Kachchh District Schools. As per MOU Kachchh District Education Office will provide minimum 4000 candidates to us for training (Adani Skill Development Centre). • During FY 2022-23, Total 4706 people directly trained in various trainings to enhance socio economic development. Please refer **Annexure – 2** for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2022-23 is to the tune of INR 1894.42 lakh. Out of which, Approx. INR 1527.49lakh are spent during the FY 2022-23. Till Mar'23, Adani Foundation has done total expenditure of INR 162.97 Cr. for CSR activities in Kutch region since its inception.
viii	APSEZ will voluntarily return the grazing land, if any, in their possession.	Point noted. All lands are acquired through proper procedure prescribed by State Government. However, APSEZ has agreed for voluntarily giving land back to Zarpara village for the purpose of Gauchar. Land has been identified in the presence and confirmation of Gram Panchayat. Necessary procedure has been initiated by APSEZ vide its letter dated 09th Aug 2012 with concerned revenue authority with respect to surrender of gauchar land at village Zarpara. Same has been taken up by revenue department for necessary procedure of transfer and is under process. Details of the same were submitted along with half yearly compliance report for the period Apr'19 to Sep'19. As per recommendations given in Joint Review Committee visit report dated 1st December 2021, APSEZ has approached M/s. Indian

Sr. No.	Condition	Compliance Status as on 31-03-2023
		Grassland and Fodder Research Institute (IGFRI), Jhansi to get the consultancy work for enhancing / upscaling the forage production in Gauchar Land at Zarpara in 400 acres. Proposal received from IGFRI was submitted in the last compliance period Apr'22 to Sep'22. The officials of M/s. Indian Grassland and Fodder Research Institute (IGFRI), Jhansi have visited at proposed Gauchar Land development site at Zarpara village dated 8th to 10th May 2023 for site survey work and according guidance & suggestion of IGFRI, APSEZ will start the work for developing the Gauchar Land.
ix x.	A regional strategic impact assessment report with a special focus on Mundra region will also be prepared. The cost towards these studies will also be borne by PP. In the subject matter of thermal power plant, the proposed regional strategic Impact assessment analysis will take In to account salinity aspect along with Its potential environmental Impact to suggest future corrective actions as well as the guiding tool on extension and addition of the capacities.	Complied This reply covers direction no ix and x. 1. APSEZ vide its letter dtd. 24th Feb 2014 has submitted draft ToR for preparation of CIA report to GCZMA for their approval. 2. GCZMA vide its letter dtd. 19th Dec 2014, has approved ToR for CIA. 3. Based on the ToR finalized by GCZMA (as per the instructions of MoEF&CC) for carrying out regional impact assessment study, APSEZ awarded the work to NABET accredited consultant M/s. Cholamandalam MS Risk Services Ltd. to carry out the studies, vide SO dtd 10th Feb 2016 as stated in these directions. 4. Primary baseline environmental monitoring data collection during March – June 2016 and published secondary data on various environmental attributes have been considered for the study. 5. The study has been concluded and the final report was submitted to GCZMA and MoEF&CC for their consideration vide our letter dated 30.04.2018. 6. Reminder letter has been submitted to GCZMA for their comments and consideration vide letter dated 4th Jan 2019.

Sr. No.	Condition	Compliance Status as on 31-03-2023
		Details of above chronology were submitted along with half yearly compliance report for the period Apr'19 to Sep'19. Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ. The stated study was carried out in following 3 phases • Baseline data collection and review of the past EIA reports and clearances issued to APSEZ. • Mathematical modelling and other technical studies for identification of potential impacts (for the year 2030) of the approved and existing project activities. • Development of macro level EMP for the phase wise implementation of actionable points. As part of the study, following modelling exercises / technical studies have been carried out to study the impacts on all environmental attributes: • Ambient air quality • Marine (Hydrodynamic, Thermal & Salinity dispersion, Sediment transport) • Noise level • Traffic assessment • Oil spill contingency plan • Water resource and salinity ingress • Land Use / Land Cover • Socioeconomic, Regional infrastructure • Waste management • Ecology, Bio diversity and Fisheries • Shoreline change assessment Preparation of these reports require extensive use of modelling software and study of the available information / research reports to assess the impacts on individual attribute of

Sr. No.	Condition	Compliance Status as on 31-03-2023
		environment. Based on the modelling outcomes and findings of the technical studies, a macro level environment management plan is prepared. Inline to the present stage of the project, APSEZ is already complying, as per Environment Management Plan and further recommendations, applicable to APSEZ as mentioned in the EMP, wrt Traffic Management Plan, Ground water quality management, Salinity ingress programme, Air and Noise quality Management, Surface and Marine water quality management, Ecology and Biodiversity Management, Solid & Hazardous waste management, Socio-economic Management and Shoreline Management, will be implemented in phase wise manner as per the progress of development within the boundary limits of APSEZ. The final CIA Report was prepared inline to the ToR by Chola MS and the same was submitted to the GCZMA on 30.04.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and after detailed discussion, authority has decided to constitute committee to discuss the details of the report further. Reminder Letter vide dated 07.09.2020 & 10.03.2021 submitted to the GCZMA, Gandhinagar for further directives to present the findings of the CIA report in detail. Details were submitted as a part of half yearly EC compliance report for the period Oct'20 to Mar'21.

Sr. No.	Condition	Compliance Status as on 31-03-2023
		Presentation done before GCZMA on 31.10.2021 and 16.02.2021 to discuss proposed EMP of CIA study in detail and way forward. GCZMA, Gandhinagar issued a letter to co-ordinate with various departments in the matter of CIA with Gujarat Pollution Control Board as Nodal Agency vide dated 12th July, 2022. APSEZ submitted the letter to GPCB for detailed deliberation and suitable action / way forward vide letter dated 20th July, 2022. The copy of acknowledgement was submitted in the last compliance period Apr'22 to Sep'22. However, APSEZ is already complying with the Environment Management Plan (applicable to APSEZ) suggested in Cumulative Impact Assessment report. The detailed compliance, applicable to APSEZ is attached as **Annexure – 13**.

Annexure – 1

ALGAL REMOVAL WORK FROM MANGROVE AREAS

Creek area is regularly observed for checking algal encrustations. On the mangrove recruits & where the algal encrustation is found to be substantial, it is removed manually by deployment of required manpower. This operation is performed during the low tide conditions. The main object is to provide better growing condition for the growth of mangroves. Periodically, spread of Prosopis sp towards the mangrove areas is also observed as this species will compete with mangrove plants for growth.

Mangroves nursery is developed in a creek behind IOCL & 125,000 nos of new saplings are planted in creek area.

Reference photographs of activities undertaken as per given guidelines,

A) Plantation of Mangroves & removal of algal encrustations:

Annexure – 2

adani
Foundation

Annual Report 2022-23

CSR Kutch

Adani Foundation
Adani House, Port Road, Mundra – Kutch 370 421
[info@adanifoundation.com] [www.adanifoundation.com]

Our Journey by Mr. Rakshit Shah Executive Director APSEZ

The year 2022-23 has passed off with motivation through recognition by ASSOCHEM for health care awards which shows courage to work for the commitment given to the community. It is necessary that sustained growth is achieved at rural level along with the industrial development. This can be made possible by involving more and more people in the rural development programme.

Since beginning, The Adani Foundation Mundra is committed to the cause of the deprived and underprivileged. It has been working relentlessly across 6 Talukas, covering 92 villages, to uplift the lives of more than 60,000 families with a multi-faceted approach.

This year conceded with more streamline and scalable project of Education i.e. Utthan – to enhance primary education of 70 schools of Mundra including 8 High Schools, milestone achievement in Fisherman amenities project by Providing skill and livelihood to 34 fisherfolk youth, 225 Homebiogas with partnership approach with objective to reduce chemical fertilizer usage in seven villages of Mundra , considerable impact created by Mangroves Biodiversity projects and new era defined in agriculture projects i.e. Super Napier, dates offshoots and Dragon Fruit Cultivation

Gram Bharti has proved a benchmark platform for Self help groups at PAN India which is true support with promoting skill & sustainability. Massavie Tree plantation drive "Vriksh Se Vikas" initiated with aim of plantation 1 Lac Trees in Mundra Taluka in upcoming year.

Jyoti ben Tank – one of the best women farmer of Mundra awarded by "Amazing Indian Award by Vice President of India". District Animal Welfare Department recognized Adani Foundation for best contribution during Lumpy outbreak.

The people of Kutch have generously supported the activities carried out by the Adani Group or else this wouldn't have been possible. Their determination, understanding and commitment have strengthened the development even more.

Our Achievement would not be possible without the ultimate support by Mr. Gowda (COO, AF), Mr. V S Gadhvi, Executive Director – AF, Ms. Shilin R Adani (Managing Trustee**) and generous faith and passionate support by Dr. (Mrs.) Priti G Adani, Chairperson– Adani Foundation**

index

CSR

KUTCH

Demographic Details

Block	Villages	No. of HHs	Population
Mundra	61 Village and 9 Fishermen Vasahat	35192	153179
Anjar	3 Villages	4350	18500
Nakhtrana	8 Villages	4093	16373
Bite – Abdasa	12 Villages	2415	9660

1. Adani Ports and SEZ Limited
2. Adani Power Mundra Limited
3. Adani Wilmar Limited
4. Adani Wilmar – Caster Limited
5. Kutchh Copper Limited
6. Mundra Solar Panel Making Unit
7. Green to PVC Mundra Limited
8. Adani Kandla Bulk Terminal Port Pvt Limited
9. Adani Solar Limited – Bitta, Abdasa
10. Adani Green Energy Limited – Nakhatrana
11. Adani Cementation Limited – Lakhpat
12. Adani Transmission Limited – Mandvi

ENVIRONMENT SUSTAINABILITY PROJECTS

ENVIRONMENT SUSTAINABILITY

Environmental sustainability is the responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing for present and future. These components are closely interrelated and mutually re-enforcing Under Corporate Environmental responsibility.

To make connections between human actions Environment & biological diversity found within a habitat and/or ecosystem, Adani Foundation executing various Project i.e. massive tree plantation drive, Mangroves, biogas provision, forest development and drip irrigation

Biodiversity conservation: to preserve biodiversity and Natural Resources.

Regenerative capacity: Protect the depletion of natural resources and keep the harvest rate of renewable resources within the capacity of regeneration.

Environment Sustainability Projects : Ensuring ecological balance, protection of flora and fauna, terrestrial and coastal spices conservation, welfare, agro forestry, conservation of natural resources and maintaining quality of soil, air and water

REDUCING CARBON FOOTPRINT

1. Miyawaki – Nana Kapaya

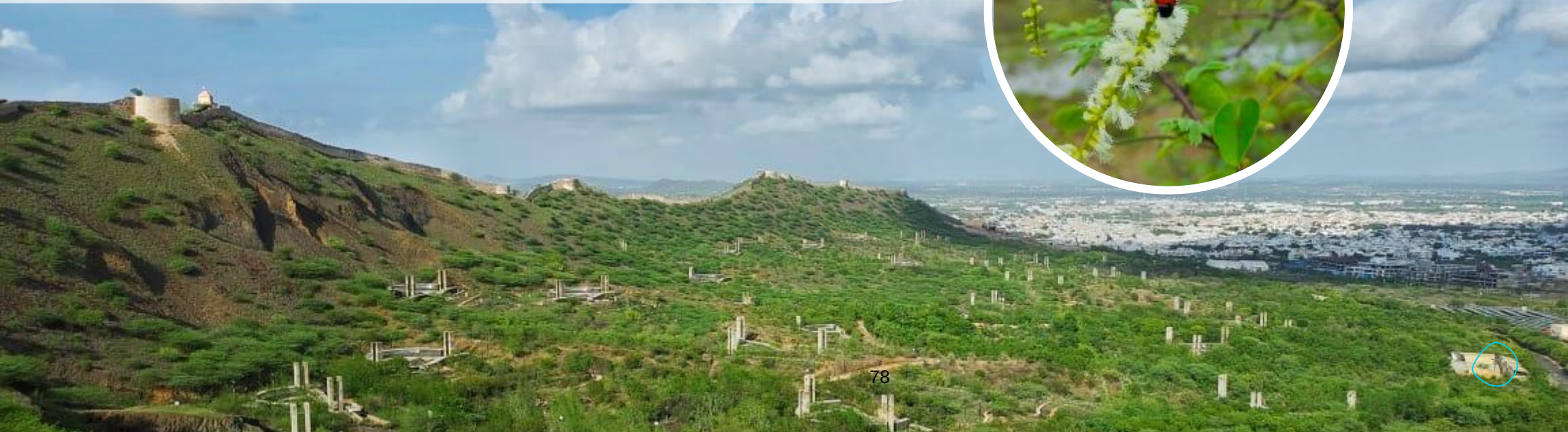
Miyawaki- Dense Plantation is developed n year 2021-22 at Nana Kapaya Village in 2.0 acre land. Miyawaki plot is very close to sewage water tank so watering to plantation by the same. From current year GP has taken ownership for monitoring and watering.

Plantation of 5880 saplings of different 42 spices is completed which will resulted in dense forest due to good rain this year.

2. Smritivan Memorial park– Bhuj

The memorial will occupy around 406 acres of space of the Bhujia Dungar near Bhuj, Kutch that will show people's oppressive response to a natural disaster.

Adani Foundation has supported for 47000 saplings in Smriti van @ 100 Las INR.

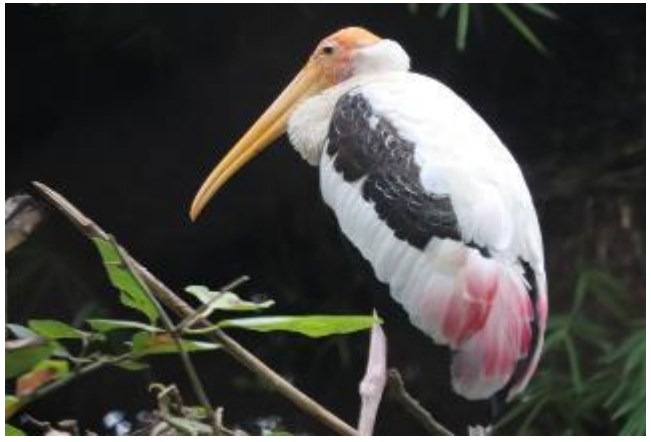


REDUCING CARBON FOOTPRINT

With a vision to Enhance the diversity of mangrove and its associated species in suitable coastal region of Kachchh, which in turn would enhance the faunal diversity and fishery resources of the area by providing suitable habitats and breeding ground. The ultimate aim of the project is to improve overall coastal biodiversity of the region which in turn assist in improving the livelihood of the coastal populace

Total five mangrove species, such as Ceriops, Aegiceras and Rhizophora were selected which in turn enhanced the dependent faunal diversity of the area. Thereby, there will be an increase considerable biodiversity of the area. **The initial pilot trails were undertaken in an area of approximately 16 hector during the period between 2019 and 2023 with the active participation of local communities.** Current year 4 Hector plantation is in progress which will be resulted in 20 Hector Mangroves Biodiversity Park within one year

S. NO	Mangrove Associate	Life form
1	Suaeda Spp.	Herb
2	Porteresia coarctata	Herb
3	Opuntia elatior	Shrub
4	Sesuvium portulacastrum	Herb
5	Ipomoea biloba	Climber
6	Salvadora persica L.	Shrub
7	Urochondra setulosa	Herb



REDUCING CARBON FOOTPRINT

Home biogas is the Israel based company was founded in 2012 manufactures dynamic biogas unit not only for farm waste but for kitchen waste too. Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers periphery Villages.

Promotion of Natural Farming–Home biogas And Improving the health and living conditions for the millions of families that are still cooking on charcoal and wood. Adani Foundation is not only supporting but creating awareness to save environment and health of the community who regularly cooking on Chula. **It is proven that one hour cooking on Chula is as dangerous as smoking 40 cigrates**.

Till date 225 farmers are utilizing it with satisfaction and considerable outcome by saving Average Rs. 23,400 for gas and fertilizer as well – with Economic benefit of Rs. 52.65 Lacs.

100 Farmers are linked up with Gobardhan Yojana in which DRDA is providing Biogas with Rs. 5000 Contribution. Adani Foundation has worked as a facilitator between DRDA and Beneficiaries farmers in filling and submission of forms. Total 325 farmers are supported with Biogas as sustainable environment protection

4,176 TONS OF ANIMAL MANURE TREATED

359,687 HOURS OF CLEAN COOKING;
9.3 TONS OF BIOGAS CREATED
325 TONS OF FIREWOOD REPLACED;

47,375 HOURS SAVED ON REDUCTION OF FIREWOOD &COLLECTION
1225 TONS CO2 EMISSION REDUCTION

Reducing organic waste + Transitioning to renewable energy + Motivation for reduction in use for fertilizer

REDUCING CARBON FOOTPRINT

5. Water Conservation Project - CSR

Since 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased in coastal belt of Mundra as per Government Figures. Our water conservation work is as Below.

- Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams
- Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers
- New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village. Approx Deepening Capacity is 12000 Cum.
- Roof Top Rain Water Harvesting 145 Nos. **(40 Nos current year)** which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family.
- Recharge Bore well 208 Nos which is best ever option to direct recharge the soil
- Drip Irrigation approx. 1505 Farmers benefitted in coordination with Gujrat Green Revolution Company till date
- Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar.
- **Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.**
- **Pond Pipe line work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area.**

REDUCING CARBON FOOTPRINT

- **Impact**

- 218500 men, women, children, and elderly impacted by this initiative.
- Total Dissolved Solids (TDS) in the ground water down by 16.7%.
- Ground water table up by 4.2 ft. over the last 5 years.
- In four villages water levels have increased by 15-20 ft. through bore-well recharging facility
- Storage capacities of check dams and ponds increased by 106.44 MCFT. Total area benefited 2857 hectors.
- Annually 10000 Liters of water saved and up to INR 10000 saved per family.
- 80% reduction in money spent on labour.
- Up to 20% less money spent on electricity bills.
- 50% less water used as compared to conventional methods.
- Potable water available at doorstep. Earlier on an average women used to walk 1.3 kms to fetch water.
- On an average there has been up to 25% decrease in expenses on healthcare.
- Water availability has also ensured safety, security and overall well-being of women and children in the area.
- Initiatives and efforts made under water projects by Adani Foundation continues to provides sustainable solutions for community for their improved farming and ease of living.

Water conservation and Management

Process Flow for Rooftop Rain Water Harvesting System

Social Survey & TDS mapping

Community Contribution

RRWHS

Impact

- Portable water at door step
- Cost saving for portable water
- Improved water quality with
- Creates water conservation awareness in rural community
- Improves standard of living of rural community

Total RRWHS :- 145

RRWHS Constructed in 2022-23 :- 40

Population Impacted :- 500+

Savings per household :- 10000+

TDS difference between Ground water and RRWHS water

REDUCING CARBON FOOTPRINT

6. Tree Plantation

Till the date 70,540 Tree have been planted at various Public places , Schools, GP and crematorium with their responsibility to nurture and maintain regularly.

For this passionate work our team Member Mr. Karshan Gadhvi was Felicited with Van Mitra Award by Forest department and GOG.

Adani Foundation has planted 1100+ fruit bearing trees at Bhujpur and 2100+ neem, pipal and native spices at Dhrub in coordination with District Forest Department and community with partnership approach

EDUCATION

PROJECT UTTHAN

उत्थान

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

8 DECENT WORK AND ECONOMIC GROWTH

PROJECT UTTHAN

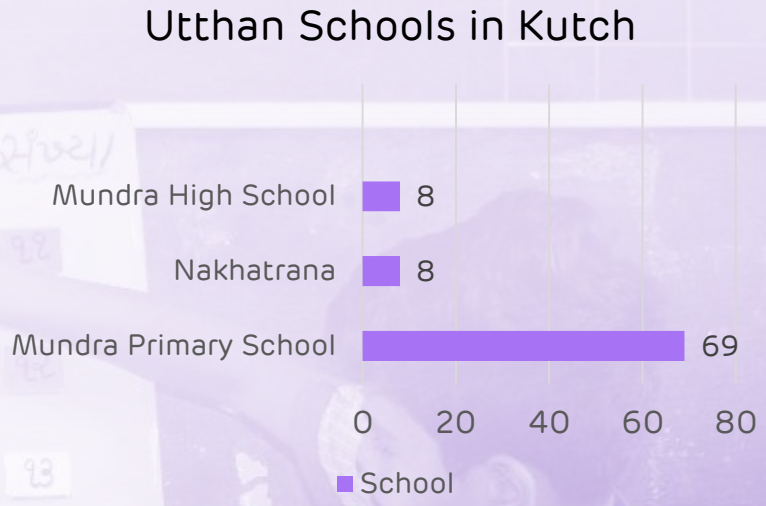
The Adani Foundation set out an innovative intervention in year 2018–19 through project Utthan to improve students' learning capabilities, provide facilities to schools to improve environment and achieve better learning outcomes at the grassroots level with the help of Utthan sahayak. This extensive intervention involves adopting government primary schools, tutoring Priya Vidyarthi's (progressive learners), introducing English as a Third Language, with various academic activities as well co-curriculum activities to end the dropout rates, and working together for staff capacity building. In order to improve children' basic literacy and numeracy skills, it has also engaged the help of educators and parents, especially mothers.

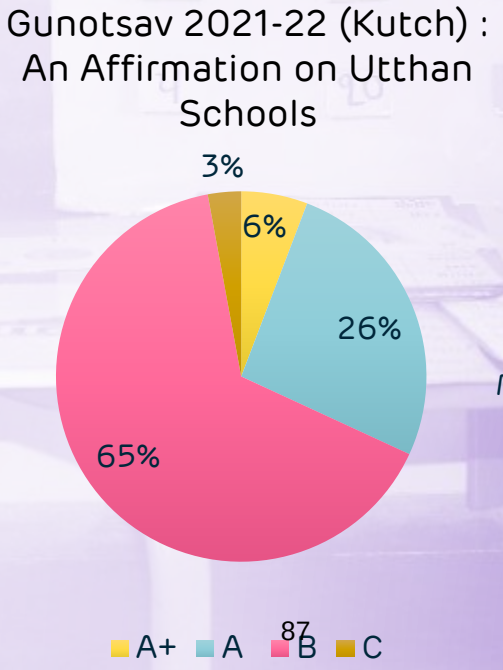
Key Aspect of Project Utthan

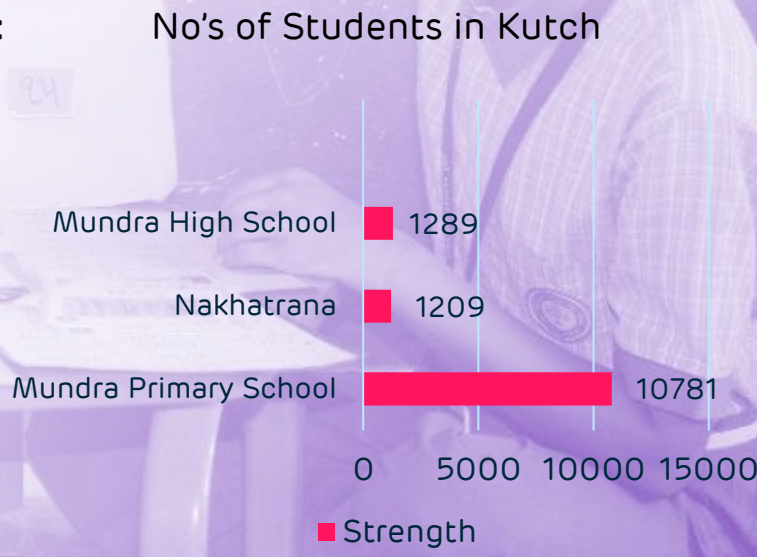
- ✓ Adopting government primary schools.
- ✓ Main streaming Progressive learners
- ✓ Enhancing Learning Outcomes
- ✓ Arresting dropout rates
- ✓ Introducing English as a Third Language
- ✓ Enabling Joyful Learning Spaces
- ✓ Collaborating for teachers' capacity building

Gunotsav is a quality enhancement initiative of the Government of Gujarat for bringing about improvement in learning levels of students at Elementary level
Assessment is based on four core areas :

- ✓ Teaching learning outcomes
- ✓ School management
- ✓ Co-Scholastic activities
- ✓ Usage of resources.







PROJECT UTTHAN

Conduct baseline assessment of 7034 Students, 3364 Students were progressive learner, 1403 Students mainstreamed.

Location	Total Strength	Baseline Assessment	Progressive learner	Mainstream Students
Mundra	**10799**	**6047**	**3029**	**1247**
Nakhatrana	**1267**	**987**	**335**	**156**

Facilitating English from Classes 1-4 : 7500 + are taking the advantage of this intervention.

Cultivating Reading Culture

Introduced DEAR (Drop Everything and Read) period on every first and third Saturdays for an hour; Library activities on every Second & fourth Saturdays.

Year 2020-21	22890 books
Year 2021-22	60780 books
Year 2022-23	110205 books

PROJECT UTTHAN

IT on Wheels : 2 Dedicative Van, 55 Laptops Empowering 2620 Students of 5-8 Std. In Gujarat

IT on wheel program is run to teach them basic emphasizes elementary school digital literacy. In early schooling is the first step to addressing access disparities in this evolving digital environment which is not feasible for rural students. Customize basic syllabus impede their development.

Day Celebration every Month : Summer Camp & Diwali Mela in Vacation

Every month Utthan sahayak celebrates day in which encourage students to participate in co-curriculum Activity which create opportunity to learn and experience new things. Also planned 15 days Summer camp & 10 days Diwali mela during vacation. 2800+ students participated with more than 4000 handmade traditional products, 3500+ footfalls during exhibition cum sale. Diwali mela attracted 7363 students. That included 12 Activities, 28529 Total Expenses &, 37529 earn students. Sarpanch, SMC members, Mothers, and Parents all take part enthusiastically.

Competitive exam Preparation

Location	JNV	NMMS	PSE
Mundra	227	324	347
Nakhatrana	23	48	48

500+ Mothers meet with 11000+ Mothers

Every month, on the Fourth Saturday, Utthan Sahayaks conduct Mothers meets. A child grows a most during the first few years of school, when both the mother and the teacher are crucial in developing their character and personality. Many of the kids are first-generation learners with uneducated parents; in these circumstances, Mother's Meet encourages mothers and teachers in working together to support the education of the child. Also, mothers get a sense of empowerment and value and regularly updates on school activities. Recreational activities during the meeting add an element of surprise and rejuvenation among the Mothers.

PROJECT UTTHAN

International School Library Month (ISLM)

ISLM (International School Library Month) was celebrated by 69 Utthan schools. And school from Russia joined with us in zoom to engage under the virtual connection around the world.
Students from Samaghogha School No.1 performed Garba, while students from Vandh school gave information about library activities. Bookmarks' & Digital bookmarks were distributed with partner schools. This is continuing, 3rd time Utthan schools participated in ISLM.

Signed MoU with 18 more Government Primary Schools at Mundra

Signed MoU with 8 Government High Schools : 8 Village 8 High Schools, 2 Adani Education Evening Center

To overcome challenges of High schools and improve the quality of education, Utthan appointed 2 Utthan sahayak at High schools. 1 for Science/Math's & 1 for English as most of the students facing problems in this subjects. Utthan organized a Parents Teachers Meeting at 8 schools in 8 villages, there were over 450 parents gathered.

After school, children get the opportunity to study at three levels at the Adani Education Evening Center. (AEEC) Remedialcoaching.

Project Title	Participation of Utthan School	Partner Schools	Partner Countries
Bookmark	51	63	08
Digital Bookmark	37	78	10
Virtual Connection Around the World	10	10	09
Total	98	151	27

PROJECT UTTHAN

Utthan's outreach strategies to Increase children's learning

- ✓ Project Utthan has been studied and selected as 'University Practice Connect' by Azim Premji University, Bengaluru.
- ✓ Project is in alignment with NIPUN Bharat (National Initiative for Proficiency in Reading with Understanding and Numeracy Bharat Program) & FLN (Foundational Literacy & Numeracy)
- ✓ Navneet e-Sense software updated in all schools.
- ✓ 100 hours capacity building programs for Utthan sahayak and school Teachers. specially focusing on Foundational Literacy and Numeracy. Utthan sahayak attend CBP (Capacity building program) once in every month.
- ✓ 100% participation in 100 days reading campaign.
- ✓ Google Map : All Utthan schools added in Google map. Utthan sahayak upload photos continuously. that's uploaded Photos got 200k+ views.
- ✓ Utthan sahayak create content for Reading, Writing & Numeracy.
- ✓ Utthan sahayak create 150 Worksheets on Yoga In the run-up to India's 75th Independence day celebrated across India's Azadi Ka Amrit Mahotsav. The tour covers 75 heritage, tourist and archaeological sites and landmark architectural sites across Gujarat.
- ✓ Utthan Sahayak, Hetalba Vaghela encouraged students from Mokha Primary School to write the story. Saptahik Phulwadi, Ahemdabad published the story written by student.
- ✓ TLM, Sports, Music & Science kit distributed to create joyful environment.
- ✓ Inter school competition organized to encourage physical activity & develop talent.
- ✓ Utthan sahayak encouraged & trained students in various competition organized by GoG.

EDUCATION PROJECT

Adani Vidya Mandir, Bhadreshwar

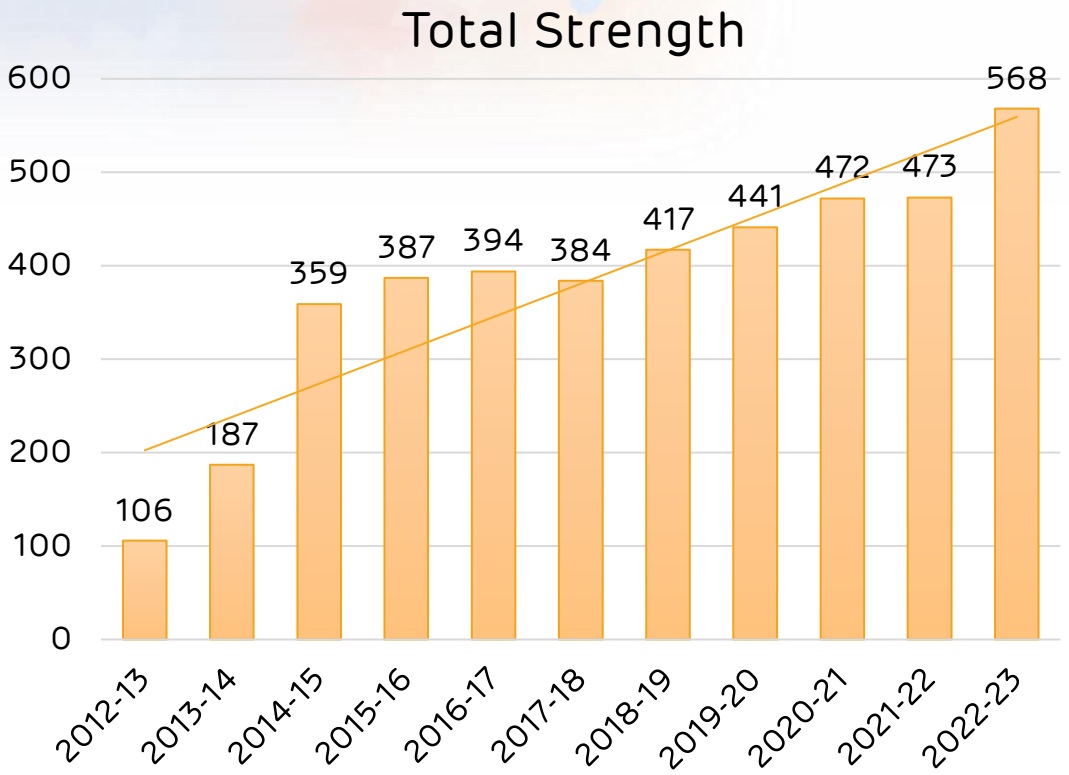
EDUCATION: FREE AND COMPULSORY - vision of Adani Foundation to provide cost-free education, food, uniform, books to the children of economically challenged families of Mundra Bock. Adani Vidya Mandir, Bhadreshwar was established in June 2012, with aim of uplifting the communities through education. The school is equipped with excellent infrastructure and resources required for all-round development of the student. The child is given admission in class 1 and is molded to be an educated and a good human being by experienced and compassionate teachers. The school follows a curriculum designed by GSEB. **507 underprivileged students of Fisherman & Maldhari communities from 8 villages benefitted costfree education at the school**

Teachers Day Celebration with facilitation of all teachers and awarded 5 best teachers in academics. District Education Officer Mr. Prajapati graced the occasion and motivated the staff.

ADANI VIDYA MANDIR, BHADRESHWAR

milestone achievement of Adani Vidya Mandir Bhadreshwar Gujrat Board Standard 10th Examination Result is 100%.

- The grand celebration of the year 2022-23 at AVMB was Shri Gautam Adani sir's Birthday.
- Promoting the harmony across all communities, Special Assemblies are conducted on a regular basis where all the Festivals irrespective of the religion & following are fondly celebrated.
- Periodical assessments and evaluations are conducted for the students and their progress are informed to the parents frequently.



Adani Vidya Mandir Bhadreshwar 2021-22 (10th Board)		
NO	GRADE	STUDENTS
1	Above 80 %	3
2	60-80%	18
3	40-60%	10
	TOTAL	31
	Result	100%

PROJECT UDAAN

Vision : To create a pool of inspired young mind

Mission : To motivate young students to dream big

6204
Total No. of Visit

400577
Total No. of participants

10,000+
Positive Feedbacks

100+
Mementos received

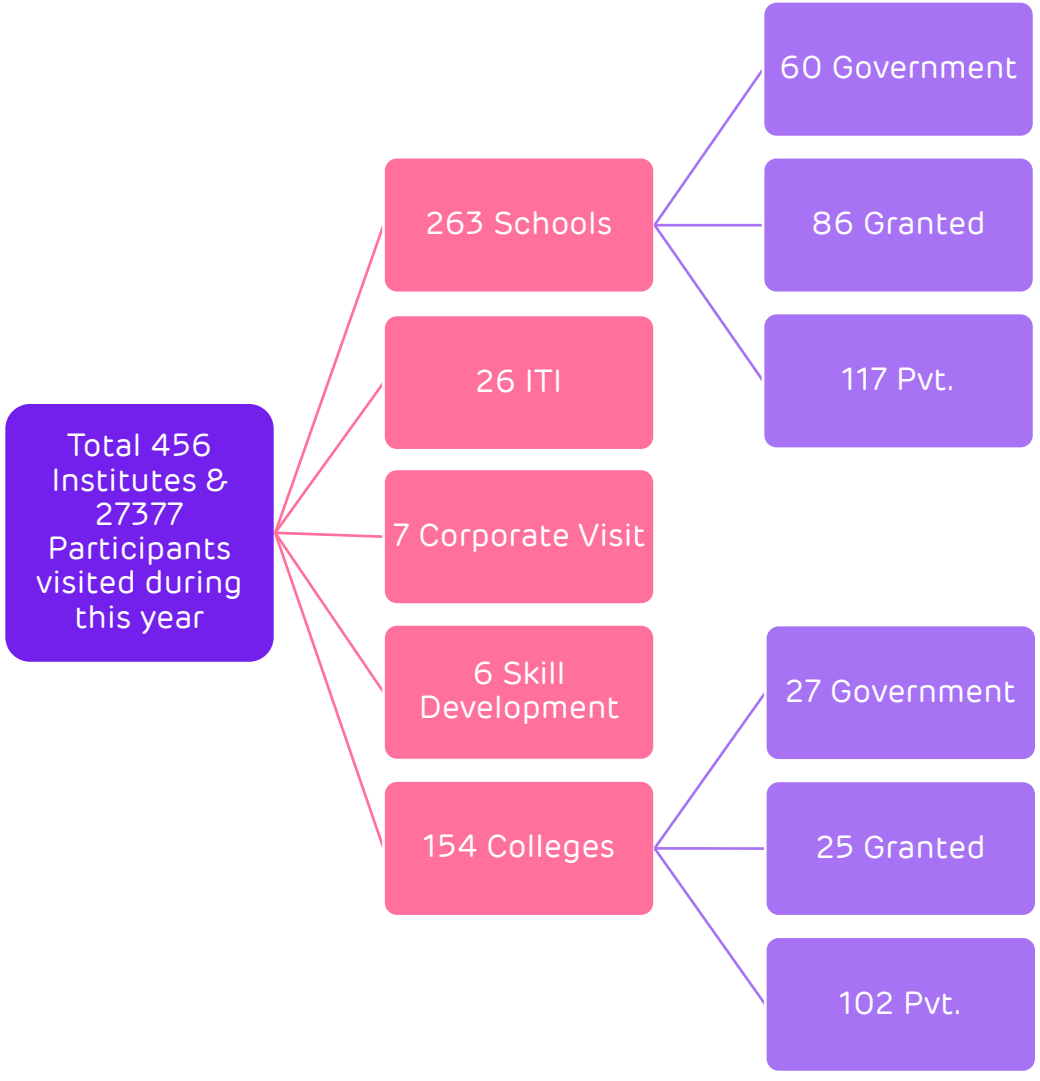
55+
Certificates received

Udaan is a special project inspired by the life changing story of Mr. Gautam Adani. As a child, he had visited the Kandla port in Gujarat, and after looking at the expanse of the port, he dreamt of having his own port one day. The rest is history. Under this project exposure tours are organized where school students are given a chance to visit the Adani Group facilities such as Adani Port, Adani Power and Adani Wilmar refinery at Mundra to get an insight into the large-scale business operations and thus get inspired to dream big in life. The exercise stimulates the young minds to dream big and help them become entrepreneurs, innovators and achievers of tomorrow, and thus play an active role in the process of nation building

Adani Foundation, Udaan Project invited the members of self-finance School Association, Gujarat for an exposure visit. 90 participants were facilitated with extraordinary experience of Port, Power, Wilmar and Solar plants visit.
Under Project Udaan total revenue generation is Rs.218.77 lacs.

PROJECT UDAAN

Dashboard Sustainable project revenue generated



Impact

INSPIRE TO ASPIRE	• Igniting thoughts for the bright future.
UNFORGETABLE EXPERIENCE	• Visitors get to observe and experience the operations on sites.
ENCOURAGE TOWARDS GOAL	• APSEZ existence proves that dreams come true if we convert them in GOALS
INDUCING KNOWLEDGE	• Widening of knowledge horizon.
THOUGHT PROVOKING	• Stimulating young minds to think out of the box.
INFUSE CREATIVITY	• Students gets exposure which enable them to provoke ideas in them during visits.

SUSTAINABLE LIVELIHOOD DEVELOPMENT

SUSTAINABLE LIVELIHOOD DEVELOPMENT

The Pashudhan & Preventive Health care management

Program is a revolutionary initiative by Adani Foundation to provide support and aid to farmers in managing their cattle's health and nutrition needs. The program aims to bring about a positive change in the lives of farmers of Mundra ,who heavily rely on their livestock for income and sustenance.

One of the key components of the Pashudhan Program is providing fodder support to farmers, especially during periods of drought or crop failure. Adani Foundation provides good Quality of dry and green fodder which covered 14116 Cattle of 24 Villages / 3008 farmers. This Program help them to feed their cattle with good quality of fodder that meets all nutritional requirements which increase the productivity of livestock and improve their overall health. In turn, this has resulted in increased income for farmers and improved food security for families.

In addition to this, we also focuses on farmers training for effective cattle health management techniques and Vaccination Drive as prevention measures.

SUSTAINABLE LIVELIHOOD DEVELOPMENT

Grass Land development

AF converted 205 acres of denuded village common pastureland (gauchar) into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring.

Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value. More than 2250 Cattle will sustain with Improving quality and Quantity Of Milk.

Average 2450 cattle get benefitted by green fodder for 72 days –which increase 0.5 litre milk quantity of 50% cattle.

(1225 cattle x 0.5-liter milk quantity Increase x 40 INR per liter=Rs.1592000).

Apart that Open grazing Benefit save farmer cost to purchase Fodder .(2450 cattle x 7kg /Day X 72 Days = Rs. 37,04,400 (Rs. 3 per kg)

This Intervention could save Rs.52,96,400.00

It would be highlighted as best Demonstration and replicate in the other villages as sustainable fodder development project.

Individual Fodder Cultivation

Farmers were Aware ,Convince and trained to cultivate super Napier Grass- as on farm projects to reduce their Fodder Dependency and expense. its update Varity of grass and Can be harvested three time in year with Good growth and Nutritive Value. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in **190-acre area and produce 3800 Fodder Tonnes Yield annually, lead to save Approx. Rs.52 Lacs of farmers.**

SUSTAINABLE LIVELIHOOD DEVELOPMENT

Cattle health camp

Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages. A cattle health camp typically involves a team of Government veterinary Doctor who provide check-ups and treatments for common ailments and remaining Medicines and Vaccine was provided by AF

Program is very effective to maintaining the optimal health of livestock and help to protect the cattle from deadly diseases such as Foot-and-Mouth Disease (FMD) and Clostridial infections. The vaccines used in these programs are specifically designed to provide long-lasting immunity against specific diseases, ensuring that the animals remain healthy even in harsh environmental conditions.

Total 17299 cattle of 19 Villages had benefitted With different kind of medicines and vaccines.

Apart that 973 camels kharai camels were vaccinated with fitodas and Antisaras in the Phulai-Chhari Dhandh area of Nakhtrana taluka.

Lumpy Disease Vaccination Drive.

An effective and Immediate step was taken to Mitigate lumpy Skin disease outbreak in the Kutch In co-ordination of District Animal Husbandry department through Vaccination and awareness drive at grass Root level. Total 40,000+ cattle were covered through therapeutic and ayurvedic treatment and Nutritive Cattle feed Support.

SUSTAINABLE LIVELIHOOD DEVELOPMENT

Bovine brucellosis is a chronic infectious disease of cattle that causes abortion, the birth of weak or dead calves, infertility and, as a consequence, reduced milk production. Cattle and buffaloes of all ages are susceptible, and infection can persist for many years.

This disease is also zoonotic (a disease that can be transmitted from animals to people
Hence to protect Cattles against Bovine Brucellosis AF Started Awareness and vaccination program with Kutch fodder fruit & Forest development trust (KFFT) in our 11 Villages.

Under this project following activities were carried out,

Meeting with Gram Panchayat, Farmers and Livestock Owners

Development and Distribution of the Awareness Materials among the stakeholders

Mass Level awareness by pasting the poster and meetings with Village Gram Panchayat's

Primary Survey and Sample Collections i.e. , Milk Ring Test, Blood Collection and testing

Brucella Vaccination and Ear Tagging etc. Brucellosis Control Project 2020 Cumulative Progress of various important

No	Name of Activity	2020-21	2021-22	2022-23	Total
1	Awareness Meetings	19	23	18	**60**
2	Milk Ring Test	48	11	34	**93**
3	Blood Sample Collection	29	23	18	**70**
4	Vaccination	2132	2951	2970	**8053**
5	Family Covered (Direct)	287	379	484	**1150**
6	Total Benefited (in Direct) Families	1435	1895	2420	**5750**

Promotion of Natural Farming

Natural farming is a method of agriculture that prioritizes soil health and sustainability Instead of relying on synthetic fertilizers and pesticides. one key aspect of natural farming is the use of cow-based preparation like Jivamrut , Gau Krupa Amrutam and wormy Compost Fertilizers.

Adani Foundation Promote Farmers to adopt Cow based farming with end to End Program from Awareness to Market Linkage. 1392 farmers benefitted by training from which 60% farmers chemical usage is reduced to half extent in 500 Acres approximately.

Impact

I. Production Cost- 20% Reduced
II. Chemical & pesticide exposure- 30 to 40% Reduced
III. Premium product price-5% increase
IV. Crop Yield & Taste - Better taste and quality-

SUSTAINABLE LIVELIHOOD DEVELOPMENT

Implementation Process of Projects

Awareness Session Farmers . — 1392

20 — **Workshop & Training**

Farmers Exposures. — 03

837 — Linkages with Govt. Cowbased Nurturing Scheme. Rs.900/Month. **Rs.95 Lacs Gov Support**

Facilitation of Home Bio Gas- Gobardhan Yojna. Rs.42 Lacs Gov Support. — 100

1500 — **Barrel Support & Wormi compost Support**

Market Linkage Green carnival at Samudra Township & Shantivan colonyl 17 472 Kg Vegetable – Rs. 4.36 Lacs — 19

SUSTAINABLE LIVELIHOOD DEVELOPMENT

Prakrutik Sahkari Mandli

Formation of Shree Raj Shakti Prakrutik Kheti sahkari Mandali Limited Mangara and register Under Gujarat Co-operative Society act-1961 with 60 Members which is the First Organic Company of Registered across Kutch.

AF Started an Initiatives **"Green carnival"** an initiatives to Provide Marketing Platform to farmers to sell Natural Farming Vegetable & Agri Produce at Shantivan and Samdudra town Ship ,Mundra on Weekly base.

We provides resources, and technical assistance to help farmers to market their products successfully.

Farmer's Producer Organization

Kutch Kutch Kalpaturu Producer Entity (KKPC) was established in the year 2020 to address the interests of farmers, particularly to provide an entrance for outputs and inputs. The company was founded with 237 farmers

KKPC served for Date Packaging box, Milk Supply to Colonies, NB 21 Off suits Supply, Vegetable Seed ,Mineral Mixtureand Cattle feed supply and plan to extend more service.

KKPC Current Year turnover is. Rs.28.89 lacs by started Different Kind of Initiatives

SUSTAINABLE LIVELIHOOD – FISHERFOLK COMMUNITY

Access of Pre-primary education.to 3 Vashat – 125 Students

Transportation Facilities to Govt. & AVMB School- 33 Students

Free AVMB –School Education - 147 Students

Book Support -43 High School Students

Scholarship Support -43 Students of SMJ School Luni

Coaching for 10th Exam OF 8th .9th Failed Students -28 Students

Fisherfolk education has had a significant impact on communities to shaping individuals' lives By providing Access of quality education for Pre- primary to Higher Education. More than 500+ Fisherfolk children are getting Education

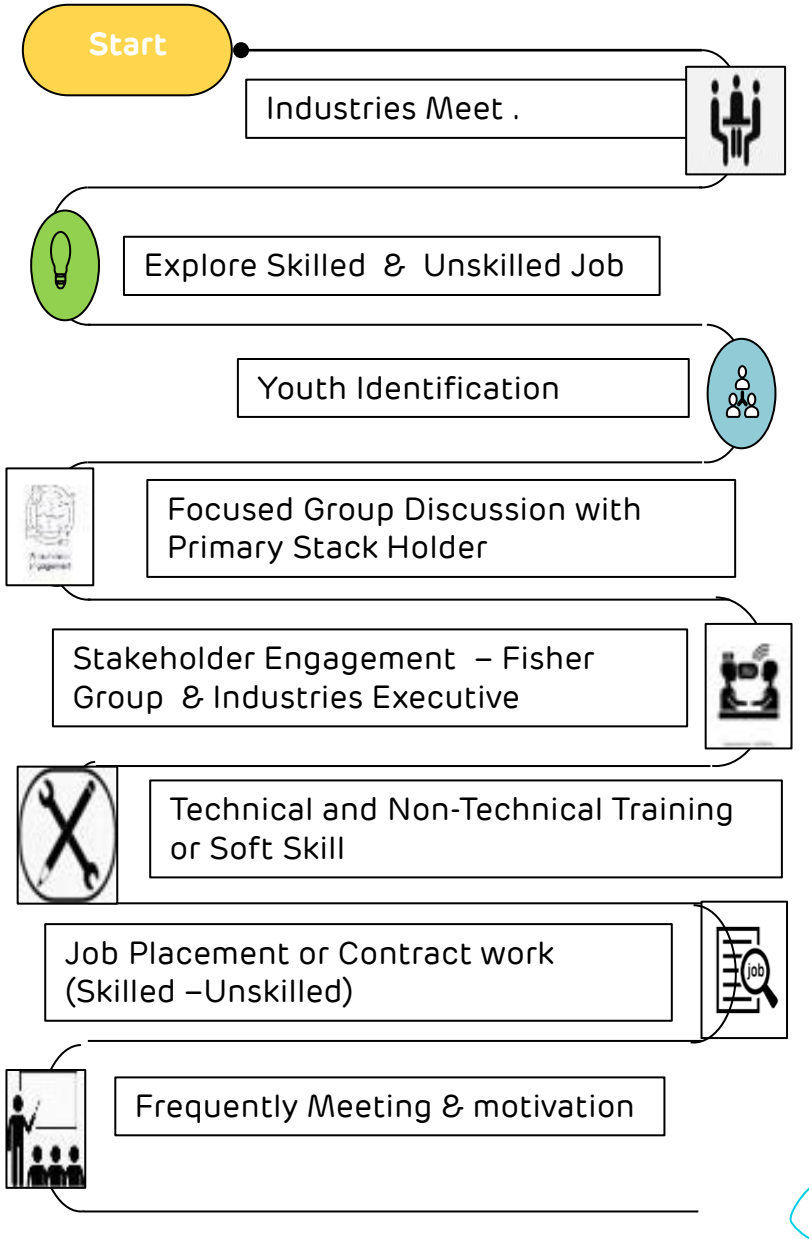
Impact

1. **Access Of Quality Education**
2. **Promoting Girl Child Education.**
3. **Increase Economic Productivity**
4. **Creating Employment Opportunity**
5. **Social Development & Networking**

SUSTAINABLE LIVELIHOOD DEVELOPMENT

- 194 fishermen and women are engaged through Contract adani Group Company on regular base.
- 23 Youth have been Placed in Different company after Completion of Technical training.

Total 217 Fisherfolk are Employed and earning on Monthly Base.
Average Monthly Income Rs.14500/ Individual



SUSTAINABLE LIVELIHOOD DEVELOPMENT

Fisherfolk Livelihood

Mangrove plantation and Nursery development work has created a two facet impact by providing Livelihood to Fisherfolk during two months Fishing during Off season and developing 162 hector dense mangrove afforestation. **5200 Men days** work provide to **285 Fisherfolk** of Luni ,Sekhdiya and Bhadreshwar Villages in coordination with Horticulture Det.

Formed **Sagar Saheli SHG of** Navinal Fisherfolk Women and Linked With DRDA after completion of Stitching Training ,received first order of Rs.80,000 to prepare Cotton Bags. Total 12 Women are engaged and planning to expand with more Women and Order.

Liaising with Fisheries department to Facilitate Fishermen welfare Scheme and Form Filling Process. Pagdiya Fisherfolk Kit, Boat Licence renewal, Boat Token Process.

WOMEN EMPOWERMENT PROJECT

Women are essential to the entire development process, whether in a single household, a village, a state, or a nation. Adani Foundation provides a platform for Community women to overcome the social barriers by becoming change - makers in their communities and societies while maintaining their traditions. Mundra has witnessed a significant shift in the development of women beneficiaries in various fields of occupation including such agriculture, self-employment, horticulture, and so on. The Adani Foundation has a strong emphasis on strengthening rural women and betterment through sustainable livelihood support, resulting to socioeconomic shits in the rural population.

WOMEN EMPOWERMENT PROJECT

- Strategy & Process of Empowering Women by SHG Group
- Identification of target Group
- Mobilization and formation
- Capacity building & Training
- Saving & Credit Activity
- Income generating Activities
- Connect with Government & other organization
- Monitoring & Evaluation

Adani Foundation has been working towards empowering women through various programs and initiatives. Here is a brief overview of our work in women empowerment :

- ✓ **Self Help Groups (SHGs) :** We have established 82 self-help groups in various rural and urban areas to provide financial and social support to women. We provided training and capacity building workshops to members of these SHGs to help them develop income-generating activities and improve their livelihoods. Through this initiative, we have empowered over 850 women to become self-reliant with Savings of Rs. 30.42 Lacs

- ✓ **Training & Skill Development :** We conducted skill development programs for women in various fields such as tailoring, handicrafts, and food processing. These training programs helped women develop their skills and start their own businesses. We have trained over 320 women in various skills, and many of them have started their own businesses.

- ✓ **Women's Health :** We organized several health camps and awareness programs for women, with a special focus on menstrual Hygine. These programs aimed to educate women about their health and empower them to make informed decisions. We provided health services to over 1150 women through these camps.

- ✓ **Assistance in Job & Government scheme :** We empower 256 women by help them to seek Job, they all earn average 9288/- Monthly. Also Gave awareness about government scheme which directly benefit to woman & helped them in the process to apply.

- ✓ **Advocacy and Awareness :** We conduct awareness campaigns and advocacy programs to promote gender equality and women's rights. We aim to challenge the social norms and cultural practices that prevent women from achieving their full potential.

WOMEN EMPOWERMENT PROJECT

1. 56+ women by Gram Bharati Platform

2. 102 + Menstrual Hygiene workshops

3. 12+ Advocacy and Domestic violence sessions

4. 82 SHG - Saving & Credit Activity

5. 220 + Job Placement

WOMEN EMPOWERMENT PROJECT

SHG Name	Our Intervention	No. of Woman	Get Order from	Order of	Total Order (lac)	Grambharati (lac)	Till today Turnover
Jyot Saheli Swa Sahay Juth	Collaboration with RSETI & trained woman by Rural Self Employment Training institute	10	Mundra Navratri Celebration	Moti work, Bead work neckless as well as Panjo	0.42	0.75	1.17
Saheli Swa Sahay Juth	Help them for tender process	10	Jilla Mahila ane Bal Adhikari Kutch,Bhuj	Sanitary Pad	1.20	0.00	2.50
Tejashvi Saheli Swa Sahay juth	Help them to increase variety in stitching related work, Wall Hangings, folder bag, Uniform	15	AVMB – Bhadreshwar	Uniform, Folder bag,Jatt bag	9.12	1.10	20.25
Food Sister Saheli group	Help them to start the Canteen at Rangoli Gate	10	APSEZ + Rangoli Driver Shed	Food	3.00	0.00	3.50
Shradhha Saheli	Tender from ATMA + Various ordered of Food + Snacks provided to various Balvadi	10	ATMA, Adani Public school & Balavadi	Lunch + snacks	8.63	0.20	15.00
Meghadhanush Saheli	organized an exhibition of Eco-friendly Ganpati	11	Utthan Project	Mud frames	1.39	0.60	12.00
Radhe Saheli Swa Sahay Juth	Exhibition cum sale & Inspire them to participate in Grambharti	16	Gram bharati order	various type of Dhadaki	0.40	0.20	2.00
Sonal Saheli Groups	Training them for Making Phynial & Washing Powder	10	Port & Wilmar	Sale washing powder	3.60	0.00	12.00
Karimbhai Mansuri	Namda Craft				1.80	0.00	9.80
Over All Corporate	Marketing & Gift packing Training	35	corporate order	Various order from all SHG	9.76		9.76
Total	-	127	-	-	39.32	2.85	87.98

WOMEN EMPOWERMENT PROJECT

Training, Awareness programs, Exhibition and Certificate courses can play a critical role in the development of women by providing them with the skills, knowledge, and resources they need to succeed in their personal and professional lives. Adani foundation is providing that opportunity to rural women by exposure. This initiative more than 500 woman trained in subject like how to run business, Personal hygiene, Woman rights, social media marketing etc.

30 Women got the Artisan card though the RSETI (Rural self Employment Training Institutes)

Adani foundation celebrated International women's by motivating 150 Woman from different 82 SHG's. Current year theme was **Digital ALL : Innovation & technology for gender equality**.

Community Health

Access to quality healthcare is a fundamental right of every individual

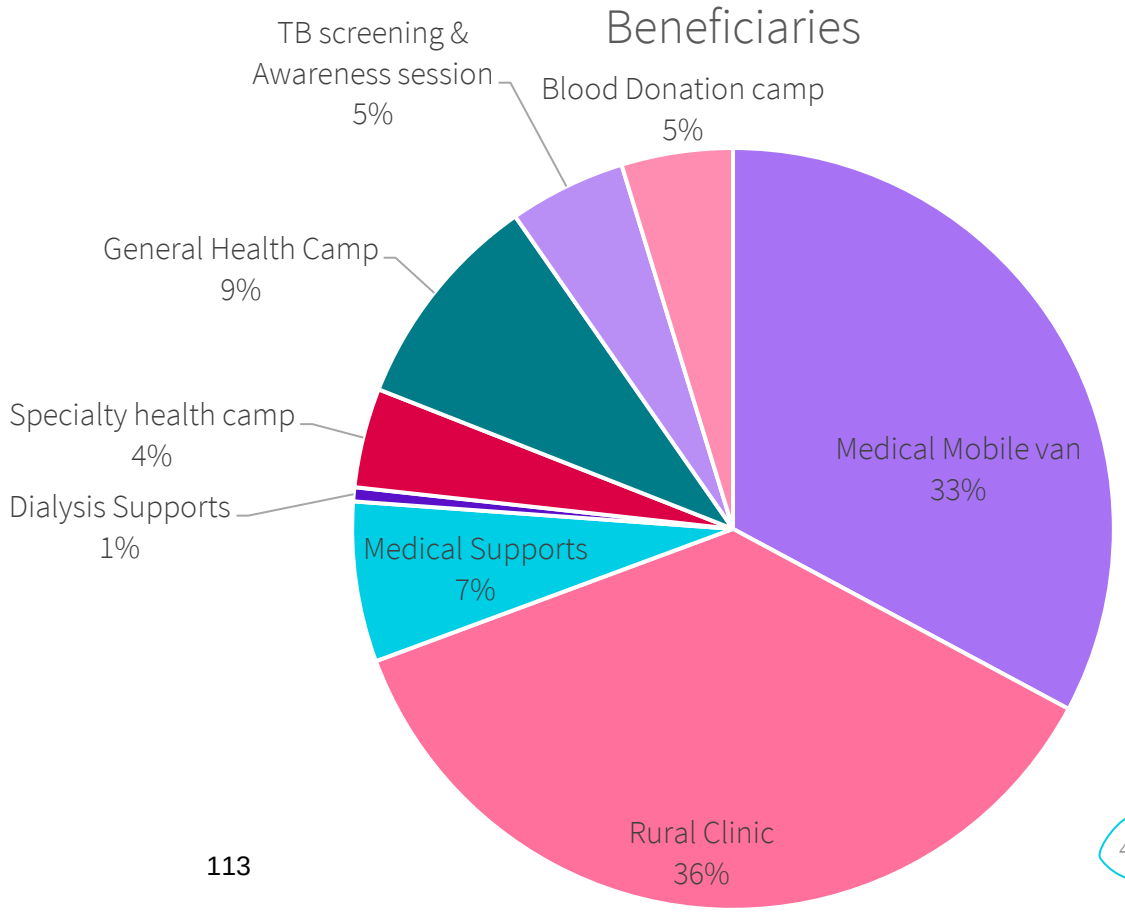
Health plays a crucial role in transforming people's lives.We all realized importance of health after facing challenging situation during Pendamic. Access to quality health care gives a fair chance to lead healthy, productive lives. Healthy people can utilize opportunities available to them.

Community Health

Sr. No.	Project	Beneficiaries	
1	Medical Mobile van	11879	32 village
2	Rural Clinic	13209	9 village
3	Medical Supports	2460	63 village
4	Dialysis Supports	216	63 village
5	Specialty health camp	1527	
6	General Health Camp	3379	
7	TB screening & Awareness session	1795	
8	Blood Donation camp	1710	
	Total	36175	

"Healthy mind remain in healthy body which create health community to make healthy Nation."

Adani Foundation is relentlessly working to Provide access of quality health facilities at Doorstep level to create health Society for healthy nation development through various kind of health Projects



Community Health

Rural Clinic & Mobile Health Care unit

Adani Foundation focuses on ensuring good health for batter contribution to growth and progress. During this panic situation health is the basic need for development of community. Their objective is to live healthier lives by promoting healthcare seeking behavior.

Mobile Health Care Units and Rural Clinic Services are deployed with the objective of providing basic healthcare facilities to remote rural areas as well as poor peoples. The service is being executed by Adani foundation is to reduce travel time, hardships and expenses.

The mobile health care unit cover 25 villages and 07 fishermen settlements. Around 90 types of general life saving medicines are available in these units. This service become boon for women, elderly and children as the service is availed at their doorstep.

Rural Dispensaries are established where there is a gap in the healthcare services. The Adani Foundation operates Rural Dispensaries in 6 villages of Mundra block, 02 villages of Anjar block and 1 clinics in Mandvi Block. Mobile dispensary and rural clinics provide health services with token charge of 20/- rupees per patient daily by a doctor and a volunteer.

During this year total 11879 beneficiaries were benefitted by Mobile van and total 13209 beneficiaries were benefitted benefits by Rural clinics where female ratio is 65%.

Community Health

Medical Support Detail

Adani Foundation provides primary health care and financial assistance to needy poor people for ailments such as kidney related problems, paralysis, cancerous and tumor surgeries, neurological and heart problems, blood pressure, diabetes etc.

Partial Medical Support had been given to 2000+ beneficiaries of Mundra, Mandvi and Anjar Block at Adani hospital, Mundra. where as in the Critical cases after stable them we refer them to GKGH, BHUJ for further treatment.

Dialysis Support

The drinking water of Mundra contains high TDS (Total Dissolved Solids). Hence, the proportion of patients with urinary stones and kidney failure is more. Patients suffering from kidney-related diseases require regular dialysis which is costly and adds to the financial burden of the family.

Hence, the Foundation has undertaken a programme to providing dialysis treatment to help the extremely needy patients to live a healthy life. During this year, 4 patients were supported for regular dialysis (twice a week) with partial support.

NCD Awareness and Prevention

MHCU and Rural Clinic Doctors are working parallelly for creating awareness and prevention measures for Non Communicable diseases, Awareness sessions scheduled in 8 High Schools and 2 community places. More than 110+ patients were supported and counselled for Hypertension and Diabetes. Due to early intervention their life span increased and quality of life became better

Machhimar Shudhh Jal Yojana

To reduce water born disease and women drudgery to get water, Potable water is provided to the fishermen communities at different vasahat through water tanker since 9 years. Coordination done with Gujrat Water Infrastructure Limited For Juna Bandar, Kutadi Bandar, Veera Bandar and Ghavar Bandar. Adani foundation is supporting to 3 fisherfolk settlements.

COMMUNITY INFRASTRUCTURE DEVELOPMENT

The Adani Foundation's Community Infrastructure Development (CID) program is the keystone initiative focus on improving infrastructure facilities of rural and urban area with proper designing and implementation to built robust infrastructure, This project impacted Thousand of life toward health care, education, agriculture, water and sanitation and other basic facilities for sustainable rural development

COMMUNITY INFRASTRUCTURE DEVELOPMENT

- 40 Construction Of RRWHS
- 19 Bore Recharge
- 2 Pond Deepening under SSJY
- Pond Beatification - Bund Strengthening at Bhujpur
- 2 Percolation Bore Recharge
- 3 Re-strengthning of Approach Road
- Cricket Ground at Hatdi
- Construction of house for needy fisherman
- 3 Construction of Water Tank at Luni Bandar
- Construction Common gathering open shed
- Renovation Approach Road
- 4 Common gathering Open Shed

Construction & Development, Repairing & Maintenance and Support Work covered during the year

Community Training center Shekadiya

Vegetable Market at Mundra

Development of Gate Valve at Checkdam

School Compound wall at Rampar

Fisherman approach Road restoration

Bund Strengt-hening at Bhujpur

2 Pond Deepening - Azadi ka Amrut Mahotsav

Renovation Training center Mundra

Renovation Blood storage Lab CHC Mundra

2 Disable Widow Toilet Block

2 CC Road of 700 mtr.

R.O. Plant Mokha 1000ltr /HR

JCB & Hitachi Support for Pre-Monsoon Activity

Check dam Re – strengthening Bharudiya

Pond Pipeline work 800 Mtr

Flood Water Control Sluice Gate at Zarpara

Construction & Development, Repairing & Maintenance and Support Work covered during the year

CRC MUNDRA

Community Resource Center

Community resource Center is the bridge between Government Schemes and real Beneficiaries. It is situated at Adani Field Office, Baroi with the motive to be **Single window point solution (Online Application & Documentation) to Facilitate Government Schemes leveraged to needy and Eligible people.**

Key Achievements of Community Resource Center

Monthly Base

Government Scheme Facilitation				
Sr. No	**Gove Scheme**	**Gov. Support Rs/Month.**	**Total Beneficieries**	**Total Amount/ year**
1	Widow Pension	1250	641	18496350
2	Bal seva Ayog	2000	49	2254000
3	Divyang pension	1000	19	323000
4	Divang Bus pass	300	439	
5	Niradhar Pension	750	126	2808750
6	Palak Mata Pita	3000	5	516000
	Total		**840**	**2,43,98,100**

CRC MUNDRA

Widow Pension Yojna

Objective of this Yojana is to provide Financial support Rs.1250/Month to widow to made Them Financial independent. Parallelly, we are conducting Motivation Session with them to raise their Value and Positivity to create healthy family Environment.
Till The date Total 641 Widow have been Linked with Government Widow pension Scheme.

Monthly Pension and other allied Scheme

Under This Program disabled Person are supported with Monthly Pension @ Rs.1000 As well allied facilities like Bus pass, Railway pass to made them Self sustain and Confident.

Till the date total 458 Divayang are linked with Different Government Scheme.

Bal Sakha Yojna

Aim Of the Yojna is to Provide Financial support Rs.2000/Month for Education Purpose to below 18 year Students who lost their Parents due to Life threatening Disease Including Covid.
Total 49 Students are getting benefit of the scheme.

Palak Mata Pita Yojna:-

Motive of this scheme is to promote parents who is taking care and Nurture the child who is Below 18 year and lost their parents.@ Rs.3000/Month.
Total 5 children are being supported under the scheme.

Niradhar Pension Scheme

Under this Scheme Financial Assistance 750/Month is provide to Senior citizen who don't have Surviving Children (Son) or Below 21 year son.
Till The date 126 senior Citizen availing schematic benefit.

CRC MUNDRA

Some Glimpse of Cow Nutrition Support scheme Biogas Under Gobardhan scheme

Key Achievements of Community Resource Center

One time

Sr. No	Gove Scheme one Time	Gov. Support	Total Beneficiaries	Total Amount/Year
1	Covid Support One Time	50000	12	6,00,000
2	Vahali Dikri @ 18 Year	110000	113	1,24,30,000
3	Divayang Sadhan Sahay one time	5000	176	8,80,000
4	Manrega (NB21)	22000	32	7,04,000
5	Pagadiya Sadhan Sahay Yojana	9000	9	81,000
6	Gau Dattak Yojana	10800	857	92,55,600
7	Gobardhan Yojana	42000	100	42,00,000
8	Fishermen Shram Yogi Yojna		163	
			1487	**2,81,50,600**

ADANI SKILL DEVELOPMENT CENTRE

Total Centre Admissions FY 22 - 23

Mundra

Courses	Female	Male	Total	Revenue Generated
Pedicurist and Manicurist	68	0	68	68000
Beauty Therapist	18	0	18	36000
Self Employed Tailor	31	0	31	38850
Assistant Electrician	0	50	50	188800
Bar Bender and Steel Fixer	0	29	29	0
Meson General	0	29	29	0
Domestic Data Entry Operator	47	11	58	239000
Junior Crane Operator	0	23	23	642000
Interview Skills	14	18	32	0
Mudwork	71	0	71	61600
Solar PV Manufacturing Technician	0	25	25	109500
Basic Functional English	562	670	1232	707300
Digital Literacy	391	461	852	454290
Total	**1202**	**1316**	**2518**	**2545340**

Bhuj

Courses	Female	Male	Total	Revenue Generated
Interview Skills	21	9	30	0
General Duty Assistant	45	8	53	3,09,734
Disaster Management	0	2	2	4000
Basic Functional English	1077	352	1429	8,57,400
Beauty Therapist	2	0	2	4000
Assistant Beauty Therapist	1	0	1	1500
Self Employed Tailor	8	0	8	8000
Digital Literacy	231	270	501	3,00,400
Domestic Data Entry Operator	0	1	1	4,720
Non Domain Employability Skills	21	11	32	0
Diet & Nutrition	02	00	02	9440
GST with Tally	16	01	17	98000
Understanding Operating System	21	7	28	0
Entrepreneurship	23	7	30	20,800
Financial Literacy	51	1	52	3600
Total	**1519**	**669**	**2188**	**16,21,594**

ADANI SKILL DEVELOPMENT CENTRE BHUJ

Soft Launching of Self-Employed Tailor – Outreach Batch at Meghpar
Soft Launched Self-Employed Tailor Batch at Meghpar (Out-reach). Total 25 candidates are enrolled.

Soft Launch of Entrepreneurship Development Program
Soft Launch of Entrepreneurship Development Program Training at Centre under CED with 30 candidates.

Soft Launch of General Duty Assistant Batch
Soft launched General Duty Assistant Batch with 30 candidates under DDU-GKY scheme as per instruction by GLPC.

Soft Launch of FL Training under Special Project
Launching Special Project Jointly with KMVS NGO for FSW (Female Sex Worker) Financial Literacy training Inaugurated on 22-07-2022
Total 46 women participant

ADANI SKILL DEVELOPMENT CENTRE MUNDRA

Mud Work Training– Outreach Batch at Samundra township
Total 45 candidates are enrolled.

Soft Launch of Data Entry Operator Batch
Soft launched Data Entry Operator Batch with 50 candidates under Thermax Foundation Tie-up

Soft Launch of Solar Panel Manufacturing Technician Training
of Solar Panel Manufacturing Technician Training at Bhuj, ITI with 25 candidates.

Soft Launch of DL Training under DEO Project
Soft Launch of DL Training at AVMB School with 61 Students

Tie Ups with (Thermax Foundation, Empazer, Navin Group and DEO Kutch @ Rs.24.25 lacs.

ADANI SKILL DEVELOPMENT CENTRE MUNDRA

DEO Project

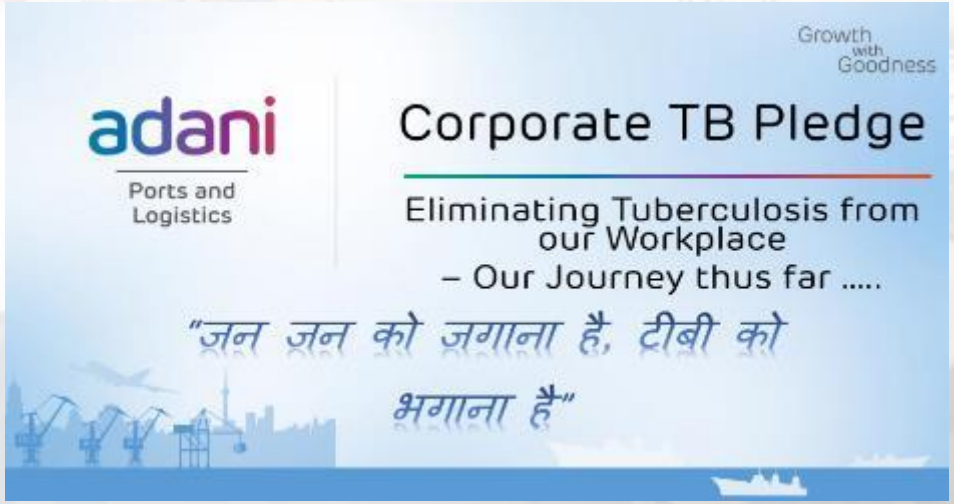
MOU with Kachchh District Education Office. In this MOU ASDC has provided training of Digital Literacy and Basic Functional English in Kachchh District Schools. As per MOU Kachchh District Education Office has provided 4000 candidates to us for training (Adani Skill Development Centre). Funding from Thermax, CFS and DEO made it possible

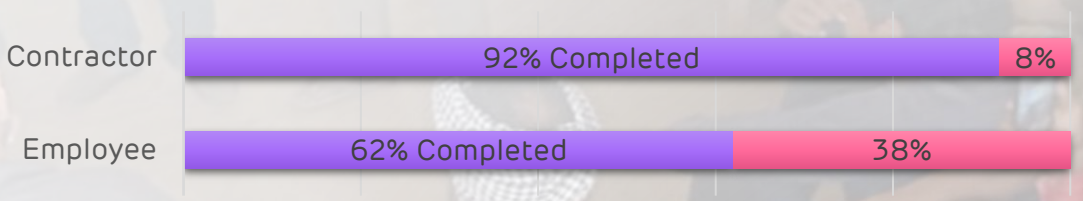
Courses	Total Students Trained
Basic Functional English	2659
Digital Literacy	1341
Total	**4000**

Dignity of Work Force Programe - EVP

India's National TB Elimination Programme (NTEP) aims to meet the ambitious goal, announced by the Honorable Prime Minister Shri. Narendra Modi, of ending the TB epidemic by 2025, five years ahead of the UN Sustainable Development Goals (SDG) of 2030. In response to this call, the Government of India and USAID jointly launched the Corporate TB pledge (CTP), in April 2019 to galvanized corporate support to end TB.

To continue the momentum and efforts, the USAID-supported iDEFEAT TB project, which is working towards institutional strengthening to accelerate actions for Tuberculosis (TB) and drug resistant TB (DR-TB) in India; was launched as USAID/India's flagship TB project. The project works in collaboration with the Central TB Division (CTD), Ministry of Health and Family Welfare (Mo HFW) of the Government of India across a network of diagnostic, treatment, and program management institutions.





No of sessions
200+

No of Trainers:
89

No of days
144

Total no covered:
8000

Dignity of Work Force Programe - EVP

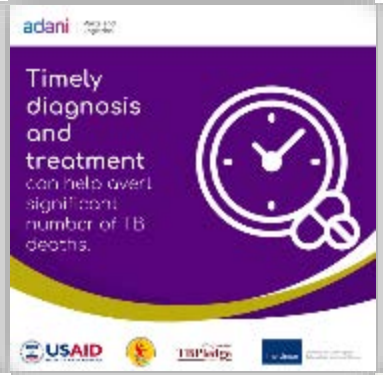
The CTP secretariat, hosted at The Union under the iDEFEAT TB project, provides technical assistance to government and corporates to adapt, implement TB interventions, and guide corporate resources for TB and DR-TB care.

Early diagnostics and treatment initiation are key to saving lives and minimizing disease transmission. In 2019, India reached a milestone of 24 lakh notified cases in India, an increase of 12% compared with 2018. Even then, an estimated 5.4 lakh were 'missing' across India, a serious drawback to our TB elimination efforts as what is not measured is unlikely to be improved. Diagnostic delays are also prevalent in India, with studies indicating that these can be attributed to patients as well as health systems.

Adani foundation with APSEZ, APML, AWL and MSPVL HR department in coordination of FOKIA has launched cluster based screening program to eliminate TB in labors under Dignity of workforce program. Adani Ports and SEZ Limited has completed screening with 8000+ work force.

USAID/India team including Director – Health Office has visited Adani Foundation CSR Activities related to community health. He visited Adani Hospital, GKGH Hospital and related activities.

Dignity of Work Force Programe - EVP



Health Camp for workforce and Green Carinal Celebration

18 Green carnivals

17472 Kg Fruits and Vegetable

436000 INR

It is true that we cannot achieve our goal of development unless and until we support to bring up the lives of this community. Basic needs of this work force need to be considered. In labour Vasahats they were not getting even the facility of pure drinking water, proper living condition, sanitation which Adani Foundation has addressed one by one within last years five years span.

With the objective to build up trust and transparency in labour community, union Labours and Smooth business operations, Adani Foundation had organized 45+ labour camps for 2000+ workforce beneficiaries in coordination with Adani Wilmar Limited

Started the great initiative from world Soil Day - Biggest Employee volunteering program of Adani Ports and SEZ Limited with more than 56 employees as supporter of event organizer and 225 employees with family as a supporter of Farmers n SHGs.
Children used to enjoyed Games and Dance ! Lucky Draw surprise gift was organic ghee..
HR department, IT department and Admin department has supported a lot and will support every fortnight for this sale every sunday

ADANI KANDLA BULK TERMINAL PVT LTD - TUNA

Water at Fisherfolk settlement

Potable water (18 KL per Day) Distribution to Vira and Dhavlvaro Bandar through Water tanker Regularly which improve Hygiene and Health standard and reduce Women drudgery ,Cost and Time to get water by **Linkages through AKBTPL and GWIL daily bases.**

Fodder Support

Support of Dry & Green Fodder to Tuna and Rampar Village Gaushala Cattles during Scarcity which impacted on Cattle health and Milk Productivity ultimately Farmers Income as well. Total 643825 Kg green Fodder Supported for 900 Cattles of Tuna & Rampar.

Tree –Plantation

Total 200 Tree was planted and ensure responsibility for watering and caring. This initiative involved Community and School students and sensitized to plant more trees and nurture. After our plantation, Gram Panchayat also planted 55 Neem trees in same premises.

ADANI KANDLA BULK TERMINAL PVT LTD - TUNA

School Renovation work Rampar
More than 800 students are studying in Rampar near Tuna port. School did great coordination to approve 3 new rooms from Sarv Shiksha Abhiyan. Other part was required renovation which was taken care by Adani Foundation. Due to this Total 6 Rooms are now in full utilization.

CC Road Wandi
Wandi is 1 km away from Adani Kandla Bulk Terminal Port Limited and 100 % Population of Fisherfolk. 1 Km Drainage line is done by WASMO – CC road request received in year 2021. Adani Foundation guided for CC road work after drainage work.

Common Gathering Flooring work, Tuna
Tuna Village is 2 Kms away from AKBTPL. In Tuna Village, community gathering shed was constructed from MLA Grant. Flooring work was not included in the same, which was taken up by Adani Foundation. Shed is well utilized in SHG meetings, Farmer meetings and Gram Sabha

ADANI GREEN ENERGY LTD - ABDASA

Adani Solar Plant Bitta is under Adani Green Energy Limited. Adani Foundation is doing regular support of JCB during monsoon or any accident cases as and when required.
Apart from it Celebrated Chairperson's Birthday by distribution of school bags to the children taking admission in class 1 along with necessary books and Education Material. Which includes Bitta School, Nani Dhufi School and Moti Dhufi School.
Deputy Collector of Abdasa taluka place, called for a meeting to all major industries of taluka area. Agenda of the meeting is to develop 7no's "Amrut Sarovar" in Abdasa taluka area under government proposal at every district level.
As per the proposed identified locations by Deputy collector, one of the location he has asked to develop by Adani Power Limited. He has proposed, "Amrut Sarovar" is developed nearby our plant area with amount Rs 20 lacs as per pond size All such proposed "Amrut Sarovar" are new only, not to develop available old pond in nearby area.

Impact Story

Ratanbhai Keshavbhai Gadhavi is a farmer of Moti Khakhar. On 17th May 2022, he purchased NB Super Grass Stalk to cultivate it in 1 acre of his land. After maintaining, nurturing and hard work the grass thrived lush green with a tremendous height that's when he performed his first mowing of it.

Ratanbhai had to feed fodder to his 35 cattle regularly. While interacting, we came to know that he used to require 16kg of dry grass during summer and winter at an estimated cost of ₹1,60,000 but after planting NB Super Grass, he has saved 80-90,000rs which is approximately 50-55%. Apart from this, Ratan bhai also mentioned that during this period, he usually had a demand for 2 to 3 farm trucks of fodder which he used to order from the market but after cultivation of NB Super, not a single farm truck loaded with fodder is demanded from him.

Moreover, due to the cultivation of NB Super Grass fuel and fare expenses on farm trucks have nearly come to end. Also, Ratan bhai has already mowed the grass twice and 3rd mowing is going on having the height of grass 12-14 ft.

Lastly, Ratan bhai stated that his cattle relishes and is habituated with NB Super Grass more than any distinct fodder.

Impact Story

Amrutaben desired to ask God for one thing, a new pushcart! -

Jiluben is an elderly woman with physical limitations and a terrible economic state. She's been widowed for thirty years. Jiluben's son is 50 years old, unmarried, and almost face continuously ill. while her daughter Amrutaben is divorced (she got married 20 years ago). Jiluben, who is 70 years old only has her daughter Amrutaben is working. Amrutaben used to use her old pushcart, but it was heavy and too old for her to carry around everywhere, plus she didn't have enough money to buy a new one. Amrutaben only desired to ask God for one thing, a new pushcart! because everything else she could take care of on her own despite such bad situation.

An employee of the Adani foundation has spoken with Sarpanch Hawaben about the work being done by the Foundation on support of people with disabilities. As soon as she informed & requested that to make visit at Jiluben house. Their pushcart needs were discussed by representative from the visited, verified all the necessary paperwork, and spoke with Jiluben and her family about government programs for widows and people with disabilities. And a week later the entire process was completed, and the new pushcart was provided to them. She is now able to work promptly and help their family in overcoming this difficulty.

Impact Story

Hiruben Karsan Tharu lives with her parents in Nani Bhujpur village. She fell very ill when she was three years old. After treatment, she recovered, but her both legs were affected by the paralysis in both legs. At such a young age, she started coping up with her disability

Adani Foundation provided platform to women of Nani Bhujpur village by providing them with Sewing Machine and enrolling her in sewing machine training. Moreover, she was provided with Wheelchair and Calipers to help Hiruben move comfortably and attend class regularly.

Presently, she earns Rs. 5,000 to Rs. 6,000 a month from stitching work which is much appreciated and admired by her neighbors and relative.

Impact Story

Empowered Women, empowered nation!

India is a land of culture and traditions. These traditions are kept alive in rural locations. One such tradition is gifting daughter during her marriage for her happy married life. Sonalben too received a cow from her maternal family during her wedding. This was given with a purpose of livelihood generation at the time of crises. For sonalben, this gift was priceless, she decided to utilize income received from one cow to buy more cows. She continued to sell milk, buttermilk, Ghee, and other cow-based products and retain income to buy more cows. Gradually she increased her livestock to 66 cows which provides 165 liters of milk per month. Within 7 years of her marriage her livestock increased from 1 cow to 66 cows.

Looking at her zeal and passion towards animal husbandry, Adani Foundation provided her with Biogas kit so that she can save cooking fuel cost and fertilizer cost as waste slurry from biogas acts as a natural fertilizer.

Recently, On Kisan Divas she was felicitated by Adani Foundation for doing exceptional work in Animal Husbandry. She has now become a guide for all those women who wish to make living out of limited means.

Impact Story

"Agriculture is our wisest pursuit, because it will in the end contribute most to read wealth, good morals, and happiness." – Thomas Jefferson

It is said that one can do everything if he or she has direction and clarity towards the goal. Geetaben, a loving wife, responsible mother of 3 daughters and a son and an amazing farmer has always supported her husband in his farming occupation. Her life took a transformational turn when her husband passed away in 2018 due to severe heart attack leaving all responsibilities on her shoulder. Of course, she was working on farm keeping shoulder to shoulder with her husband before he passed away but managing farming single handedly was a tough business for her. Moreover, raising 4 daughters and a son for a widow is a somber task too. It took couple of months for her to hold herself up for the sake of her children and to make her husband's dream true. Her husband Late. Bharat Bhai Jethva hold recognition to be a first farmer in Mundra district who has initiated to cultivate Kamalam (Dragon fruit) in his farm. He had a dream to cultivate best of organic Kamalam and sell his organic fruit to a larger market. He was on cloud nine when his first harvested kamalam blossomed beautifully. But unfortunately, his heart attack pushed him to changed realm. It was her determination to continue his husband's dream and take kamalam cultivation to the next level.

As Geetaben started inclining towards chemical-free farming, she started getting higher value for her crops resulting more income. With foundation's support and guidance, she understood which crops/vegetable to sow for high returns.

Impact Story

Jethva family holds 4 acres of land and Geetaben took charge of cultivating seasonal fruits and vegetables in that farm. Being a female farmer, the use of chemical-based farming impacted her health a bit but still she used to cope up with daily chores until she had an encounter with Adani Foundation in her village Mangra. Team members Mavji Baraiya, SLD Head and Kalyan Gadhavi, Community Mobiliser from Adani Foundation organized Natural Farming training at Mangra village of Mundra district. All farmers of Mangra village participated in that training. she also attended the training in which she got insights of all techniques of natural farming and proposed support from Adani Foundation. She approached foundation team and expressed her willingness to learn more on natural farming techniques for crops, vegetables, and fruits. Before that Jethva family used to cultivate only Kamalam organically but after the intervention and continuous trainings by foundation, she decided to turn her complete farming through natural techniques by gradually taking baby steps toward this new endeavor.

Looking at her zeal and dedication for 0 chemical farming, Foundation provided her with Biogas Kit, Drip Irrigation system, Development of Vermicompost and Jivaamrut. Presently she has 6 to 7 livestock. With the installation of biogas, the slurry produced by biogas digesters makes excellent fertilizer when applied to farms. Moreover, Geetaben learnt how to make Jivaamrut from Adani Foundation's natural farming trainings, which she then applied to her farm where she noticed significant improvements, including a reduction in nutrient deficiencies, an increase in crop size without the use of chemical fertilizers and the presence of lush green, healthy crops. In addition, the Adani foundation brought knowledge of vermicompost to her farm, which she says has already made a big difference in the soil's fertility. Also, setup of drip irrigation system was done in order to save water, nutrients loss, and to provide the water direct to the soil root zone of the plant.

Prosperity knocked her door, and she provided best education to her children. Her daughters completed Engineering and Son is presently studying in Anand Agriculture University. On asking him about his future, Hariom (Son of Geetaben) shares "*My father is recognized as first farmer of Kamalam in Kutch and my mother is epitome of strength and a proud farmer. My mother has achieved lot dignity and respect in our society since she received foundation's guidance for practicing natural farming and I will follow her footsteps in same direction by establishing natural farming agriculture business to provide best quality crops to the society.*" Geetaben continues to strive excellence in learning farming training regularly and become a promoter of same to encourage other farmers to adopt Natural Farming for better cultivation and higher returns.

Impact Story

At Ratadia Ganesh wala village in Mundra taluka, Rabari Megha Vanka lives with 60 percent of his legs divyang.

Meghabhai was working in a garment shop in Mundra two years ago. Bhabhi Ben used to help in running the house by making several pedas. Meghabhai lost his job during Corona time. Then Meghabhai started selling pedas in nearby villages. With the help of Adani Foundation, he was given small help for home based industry and also helped him in the process for obtaining medical certificate and bus pass. Now, Meghabhai with the help of his wife Pabi Ben started home industry 'Pena Home Udyog' and made it as the main means of livelihood. They sell 300 kilos of pedas every month. On an average they earns 18000/- per month.

When the bus pass will come he can save more money by traveling by bus for orders from Gandhidham, Bhuj, Mandvi and nearby areas.

Impact Story

Only a teacher can turn the disability into a talent ! - Mundra

Challenges are what make life interesting. Overcoming them is what makes life meaningful". Halepotra sadiya studying in class 4 of Dhrub primary school is the SEN - special education needed .she is not able to see clearly through her eyes that is having the problem of vision by birth , she underwent 4 operations but have a great IQ level which never stopped her from learning new things. sadiya's parents never stopped her coming to school. she had a problem in basic maths ,gujarati reading and writing but within an year she worked continuously during her free time and now is able to read write and perform basic calculation. Her favourite hobby is learning new things , colouring and listening new rhymes from YouTube. she can now stand up in morning assembly and give her introduction in English . "only a teacher can turn the disability into a talent through hard work and self confidence". Her dream is to become a teacher.

Impact Story

Health care service is to save the lives !

Mohammad Sadik Turk, 16, of Dhrub arrived in critical condition because of pain in the area of his kidneys. The condition was treated as an intestinal problem by doctors. The specialists tried their best to treat him & offering variety of medications. Support him for his routine dialysis for six to eight months while paying attention to his condition. He no longer needs dialysis after complete therapy, but he still needs to regularly administer injections three times every month.

Many young children pass away each year from insufficient medical care and inability to pay for necessary treatments. As long as there is only one source of income for the family and everyone depends on him, it is hard to provide costs for those who are living below the poverty line. Although India has more than 50,000 patients who receive long term dialysis, it has only a thousand kidney specialists in the entire country. Furthermore, treatment can be expensive. In situation like this Foundation pays for the child's injections in light of his financial situation and wishes him a quick recovery and a long and healthy life. The main goal of the Adani Foundation's community health care service is to save the lives of children like Sadik.

EVENTS

World water day was celebrated on 22nd March in coordination by Adanl Foundation at Bhuj.

Program was designed on District level awareness on participatory ground water management on the theme of accelerating the change to solve the water and sanitation crises with exhibition of water saving tool, equipment and IEC material.

On this Occasion Mr Dilip Rana (collector Kutch) was the chief guest and guiding force. He emphasized on RRWHS with assurance to provide 50% Support from government to developed single village as model drinking water sustain village with having 100% RRWHS facilities.

Shri Dobariya Sir administrative officer of Atal Bhujal Yojana and Mr.Nimish Padke Director - Fokia also shared about sustainable management of fresh water sources for future generation. Mr.Mahendra Gadhvi (Pramukh, Jilla panchayat) also shared his views. More than 200 farmers + Women and Sarpanch of Mundra.

Project Pragati :- Success of completion of Project Pragati 1st batch was celebrated on 29th April at Adani House, Mundra in esteemed presence of Mr Vikram Tandon, Chief Human Resource Officer, Adani Group, Shri Vasant Gadhavi ,Executive Director, Adani Foundation and Mr Rakshit Shah, Executive Director, APSEZ. Other dignitaries who graced the occasion were Mr AnilKumar Kalaga, , Mr. Charles Douglas, CEO, Mundra and Tuna Ports, Jatin Trivedi, COO, Adani Skill Development Centre and all HR and Department heads of APSEZ, Power, Solar and Wilmar.

The event celebrated by distributing skill training certificate to 52 fisherfolk students, who were trained under Mason and Assistant Electrician job roles under Adani Saksham. All training along with their community leaders shared heartwarming testimonials and expressed emotion of gratitude towards Adani Foundation for providing them skill training opportunities.

EVENTS

Adani Foundation ,Mundra celebrated **World Earth Day on 22nd April** 2022 by distributing 'HomeBio-Gas Kits' to 100 farmers Program intense is to gather 'धरती पुत्रो' who share similar mindset and have determined to use Home Bio-Gas to witness social, economical and environmental impact.

Program was graced by Rakshit Shah, Executive Director, APSEZ along with below mentioned esteemed Guests.

1.Manojbhai Solanki, Trustee, Shree Ram krushna Trust,
KUKMA
2. Prof. Mrugesh Trivedi , Scientist, Kutch University
3. Kalpesh Maheshwari, Project Officer, Atma, Bhuj
4. Dr. U.N Tank, KVK, Mundra
5.Ms. Riddhi Patel, Officer, kutch
6. Shaileshbhai Vyas, Satvik Sanstha, Kutch
7.Shantilal Patel, Officer, Mundra

Adani Foundation Mundra has celebrated the **International Disability day on 3rd Dec** since 2011 with lots of enthusiasm and Zeal in coordination with District Social Welfare office by planning various support to divyang people.

Current year in line of the international Disable day Theme "Transformative solutions for inclusive development: the role of innovation in fueling an accessible and equitable world." Adani Foundation has organized "Divyang Job Fair" in coordination with 11 SEZ Industries at Mundra on 2nd December 2022. More than 50 Divyang had applied for interview out of them 06 were selected For Job.

Apart that Divayand Aid and equipment (Limb,Chair was Supported In the Esteem Presence of Respected Rakshit sir-EDM, APSEZ, Mundra.

EVENTS

World Environment Day was celebrated on 5th June in association with Ayi Shree Vishrimata Seva Trust and Gram Panchayat, Moti Bhujpur at Vishri mata Templae and pledged to plant 51000 for which Gram Panchayat will take responsibility to nurture trees throughout this year.

program was organized at Vishrimata mandir with tree planation activity on this occasion Shree P T Prajapati - Sub Divisional Magistrate remain present and address Public to Nurture environment for Future.

Adani foundation Mundra has celebrated **International women day** on 8tH march at different location of Mundra and Bhuj in coordination with District Animal health department and Sarhad Dairy the day was celebrated at Mundra with Appreciation of best 10 cattle owner women of Mundra who did remarkable work with Sarhad dairy. On this Occasion Dr Thakkar (DAHO) and Dr Lalani (cheif Sarhad dairy) appreciated efforts of Adani foundation in animal vaccination and Animal health care in Mundra. More than 210 cattle owner women remained present.
District Level celebration was done at Bhuj GKGH with Lunching OF Punya sloka book (Stories of 37 empowered women), A Book Written By Adani foundation employee Mrs. Purvi Goswami on The successful women of Kutch. More than 300 Women had participated.

EVENTS

National Farmer day on 22 dec with Honoring Women Farmers.

Animal Husbandry Awareness Program

International wet land ay Celebration Through Poster presentation Competition

Teacher Day & Youth Day Celebration

No Tobacco day celebrated by creating awareness to take preventive measures for workforce

International Yoga Day celebration in coordination with sub divisional Magistrate Mundra.

EVENTS

International coastal Day celebration at Mandavi with Cleanliness Drive

Adani foundation and Agri Department jointly organized district level workshop on Natural Farming Practice with Gram Seval

The International Mangrove Day for the Conservation of the Mangrove Ecosystem is celebrated

AWARDS

ASSOCHAM AWARD FOR HEALTH CARE

Adani Foundation's Community Health project received runner-up position in 'Best CSR excellence award in Healthcare' Associated Chamber of Commerce and Industry of India (ASSOCHAM) in Award ceremony organized at Delhi on 12th October 2022. Community Health project has participated in the grand event to accept the Award on behalf of Adani Foundation, Mundra site.

The award was presented by Chief Guest - Ms Roli Singh, Additional Secretary & Mission Director (NHM), Ministry of Health and Family Welfare, Govt. of India and Dr. Upasana Arora, Co-Chairperson, ASSOCHAM Healthcare Council and Chairperson, Yashoda Super Specialty Hospital.

Awards and Recognition

Adani Foundation participated in QCFI awards on 4th Feb 2023.
Presented Women Empowerment initiatives and received Diamond award for exemplary work done by Adani Foundation for empowering rural women.

our services were appreciated by representative of Ministry of Health Government India, WHO, Union and more than 52 corporate companies present in the National conference on Multisectoral corporate engagement towards TB elimination.

Awards and Recognition

નાયબ પશુપાલન નિયામકશ્રીની કચેરી,

આભાર સહ અભિનંદન પત્ર

Received appreciation letter from District Animal Welfare Depaerment for commendable work for Cattles affected by Lumpy Virus

Jyoti ben tank received Awaard from Vice Precident in Amazing Indians Awards who is member of Prakrutik Sahkari Mandali supported by Adani Foundation.

Support to children lost their parents in Morbi bridge collapsed incidence

Adani Foundation supported 25 Lacs each for 20 children who lost their single/both the parents. Adani foundation was honored by IAS G T Pandya Collector and District magistrate of Morbi district for helping children who lost their parents in Morbi bridge accident.

One step forward towards growth with goodness...

Children residing at Morbi, Kutch, Ahmedabad, Rajkot and Dwarka who lost their single or both parents in Morbi Julta Bridge collapse incidence received support of 25 lacs each from Adani Foundation.

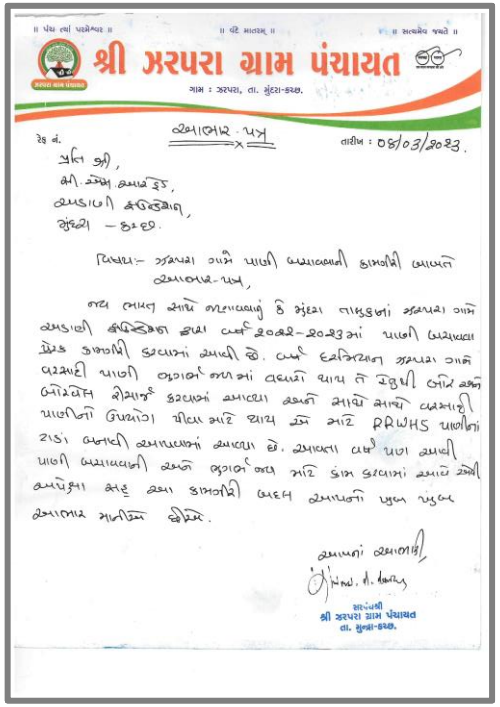
Representatives from Adani Foundation, Karsanbhai and Jagrutiben visited above districts to check on the affected children and also met with SBI bank officials, collectors regarding disbursal of amount. 10 Children received amount in their respective bank accounts. For others, work is under process.

Capacity Building Training

Adani foundation team visited Lakhond and Chandrani plant of sarhad Dairy.
These three plant out of which two plant milk processing and packing and another plant cattle feed plant were
Mr.Nilesh Jalankar, General Manager provided information about how cooperatives work in the field and about their supply chain management.

Adani Foundation team attended Capacity Building Training Program on 3rd and 4th of October on Adani Competency building and mapping.
The training session was conducted by expert trainer Mr Kamal Dabbawala.
Two days sessions were filled with theory sessions, Activity based learning and discussion-based learning.

Awards and Recognition


શ્રી ઝરપરા ગ્રામ પંચાયત

ગામ : ઝરપરા, તા. મુંદ્રા-કચ્છ.

આભાર-પત્ર

તારીખ : ૦૪/૦૩/૨૦૨૩


શ્રી નાના કપાયા પ્રાથમિક શાળા,નાના કપાયા,

મુન્દ્રા-કચ્છ

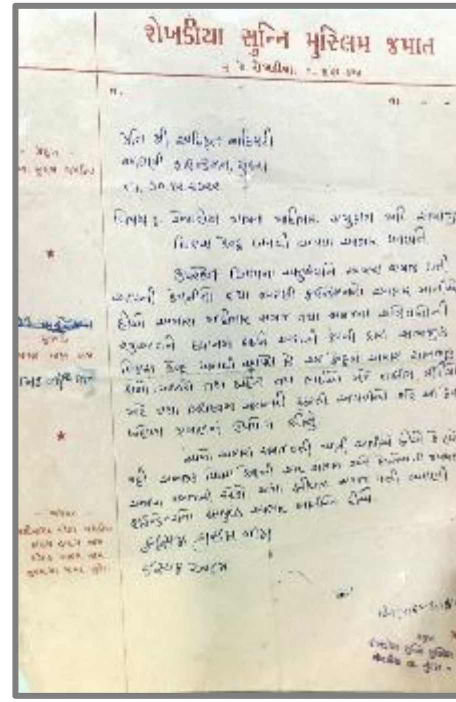
તા.- 26/07/2022

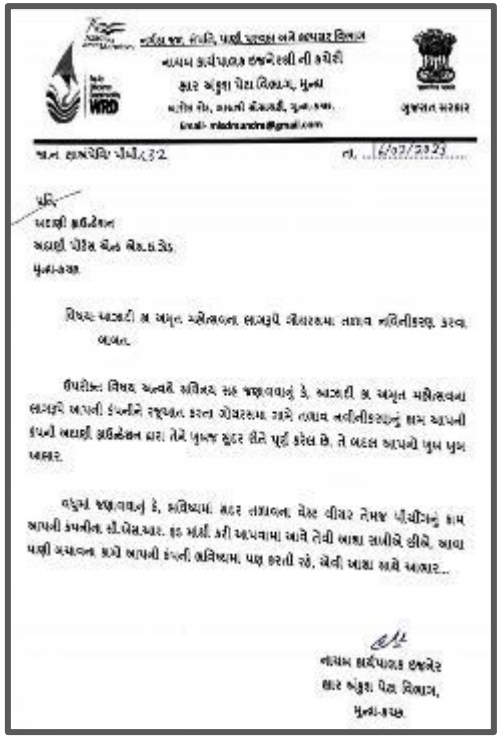
શ્રી નાના કપાયા પ્રાથમિક શાળા

તા. મુંદ્રા - કચ્છ

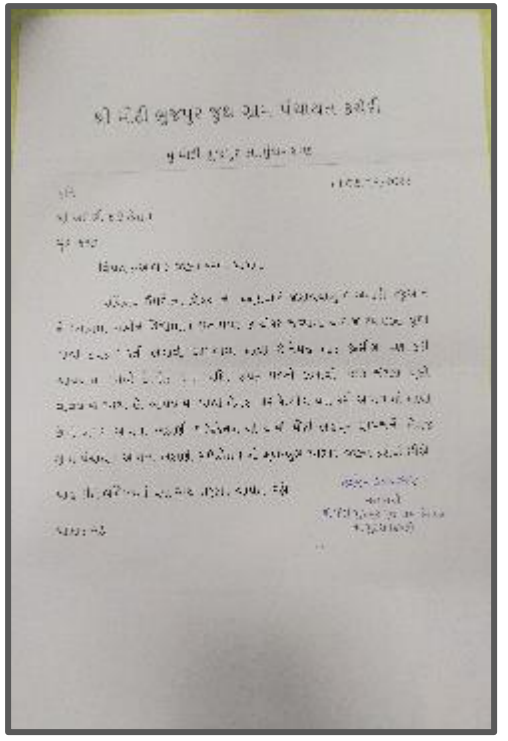

SHREE RAMPAR GRAM PANCHAYAT OFFICE

શ્રી રામપર ગ્રામ પંચાયત કચેરી


શેખડીયા સુન્નિ મુસ્લિમ જમાત




District Primary Education Office,
Bhuj-Kutch



Beneficiaries List

Sr. No	Program	Direct	Indirect	Remarks
1	Education	3505	14020	UT than Mundra
2	AVMB-Vidhya mandir	568	2840	AVMB -Students
3	Community Health-Mundra	35832	141130	Rural clinic, MHCU,Health camp, AHMUPL
5	AHMUPL	42455	127365	OPD & IPD Patients
6	SLD-Women	1359	6795	SHG Group & Individual Income Generation
7	SLD-Agri & Animal Husbandry	7718	30768	Fooder,Home biogas, Farmers training, Cow based farming -20,Cattle camp Etc.
8	SLD -Fisherfolk	5957	4476	Education, Mangrove, Potable -Water and Livelihood
9	CRC-Gov Schemes	1106	5530	Government Schemes
10	CID	11767	47054	Fishermen Amenities & Other Rural Infra Work
11	Nakhtrana	1209	4836	UT than
12	AKBTPL,Tuna	10071	16373	Rural clinic, MHCU,Health camp, Drinking Water,Fooder Support, Infra Work
13	Bite	2500		Pond deepening Dhrubhi and Bita
15	ASDC,Bhuj	2188	10940	soft skill and DL .GDA & Online Training
16	ASDC,Mundra	2518	32590	Technical & Non-Tech DL .GDA Training
17	Uddan	27377		Students
	Total	**156130**	**444417**	

Financial overview – Adani Foundation Mundrta
Executive Summary – Budget Utiliaztion FY 2022-23

Sr No	Particulars	Approved Budget F.Y. 2022-23			Utilization 2022-23	% of utilization
		CAPEX	OPEX	Total		
A	General Management and Administration	1.80	92.35	94.15	98.45	104.56%
B	Education	0.40	141.93	142.33	124.36	87.37%
C	Community Health	-	294.97	294.97	242.16	82.10%
D	Sustainable Livelihood Development	-	466.40	466.40	359.85	77.15%
E	Community Infrastructure Development	-	219.51	219.51	133.88	60.99%
F	EDM Recommended Projects	-	100.00	100.00	98.83	98.83%
	Total AF CSR Budget :	**2.20**	**1,315.16**	**1,317.36**	**1,057.53**	**80.28%**
[I]	Adani Vidya Mandir-Bhadreshwar	6.88	255.44	262.32	221.76	84.54%
[II]	Project Udaan-Mundra	-	314.74	314.74	248.20	78.86%
	TOTAL Budget with AVMB & UDAAN F.Y. 2022-23 :	**9.08**	**1,885.34**	**1,894.42**	**1,527.49**	**80.63%**

સર્વે સંતુ નિરામયા, સર્વે ભદ્રાણી પચયન્તુ

અદાણી ફાઉ. દ્વારા સ્ત્રીરોગ નિદાન કેમ્પમાં ૩૦૦ જેટલી બહેનોને નિઃશુલ્ક નિદાન અને સારવાર

ગુજરાત સમાચાર

મચ્છરના પોરા અને પોરા ભક્ષક માછલીનું નિદર્શન

વિશ્વ મેલેરિયા દિનની ઉજવણીએ સંપૂર્ણ સારવાર પર ભાર મૂકાયો

મુન્દ્રા સેઝમાં રોજગારીની તક આપીને દિવ્યાંગોને પગભર કરવાનો પ્રયાસ

અદાણી ફાઉન્ડેશને વિશ્વ દિવ્યાંગ દિવસની કરી અનોખી ઉજવણી

ભાસ્કર ન્યૂઝ | ભુજ

માછીમાર સમુદાયના છાત્રોને શિષ્યવૃત્તિ

(કચ્છ આવૃત્તિ) ગુજરાત સમાચાર 3

કચ્છની ગ્રામીણ મહિલાઓમાં 'પેડ વુમન' માસિક અંગે જાગૃતિ ફેલાવી રહી છે

મુન્દ્રાની પેડ વૂમન : સેનેટરી નેપકીન બનાવવાના સ્ટાર્ટ-અપ થકી આઠ મહિલાઓ પગભર બની

સરકાર દ્વારા માર્કેટિંગ માટે હસ્તકલા મેળામાં સ્થાન અપાતા વેચાણને ટેકો મળ્યો : સરકારી હોસ્ટેલો દ્વારા ખરીદી કરાતાં મહિલાઓનું મનોબળ વધ્યું

અદાણી ફાઉન્ડેશન, આત્મા અને ખેતીવાડી વિભાગ દ્વારા પ્રાકૃતિક ખેતી માટે તાલીમ

આંતરરાષ્ટ્રીય મિલેટ વર્ષ-૨૦૨૩ને સુસંગત કાર્યક્રમનું સફળ આયોજન

અદાણી કોર્પોરેટ હાઉસમાં ગામડાની કળાને ઉજાગર કરતું 'ગ્રામ ભારતી' ૨૨નું પ્રદર્શન

મહિલા શક્તિની આત્મનિર્ભરતાને સલામ! : ગ્રામીણ ભારતની કળાને ગ્લોબલ બનાવવાનો પ્રયાસ

વિશેષ પ્રતિભા પરાવતા

નખત્રાણાના ફુલાય-છારીઢંઢ વિસ્તા ૯૭૩ જેટલા ઊંટોનું રસીકરણ કર

અદાણી ફાઉન્ડેશન દ્વારા "લમ્પી સ્કીન ડીસીઝ" થી બચાવવા સારવાર ચાલુ કરાઈ

ગાય વર્ગના પશુઓમાં આવેલી મહામારી માટે ફરતું મેડિકલ વાહનથી અપાતી સારવાર

કચ્છમિત્ર ભુજ - શુક્રવાર, તા. ૦૬-

મુંદરા તાલુકા કક્ષાના વિજ્ઞાનમેળામાં ૫૧ શાળાના છાત્રે કરાવ્યાં પ્રતિભાનાં દર્શન

અદાણી ફાઉન્ડેશનના સહયોગથી કરાયું આયોજન : ૧૦૨ વિદ્યાર્થીએ કૃતિ રજૂ કરી

રશિયાના વિદ્યાર્થીઓ કચ્છ અને અહીંની સંસ્કૃતિથી વાકેફ થયા

ઉત્થાન, અદાણી ફાઉન્ડેશન પ્રોજેક્ટ અંતર્ગત મુંદરા-માંડવી તા.ની ૬૯ શાળાના છાત્રોનો વર્ચ્યુઅલ સંવાદ યોજાયો

अदानी फाउंडेशन ने उमरपाड़ा तालुका के चोखवाड़ा गांव में मुफ्त स्वास्थ्य शिविर का आयोजन किया

નેત્રંગના કોટવાળિયાએ બનાવેલી વાંસની બનાવટો અદાણી ગ્રુપના ગ્રામ ભારતીમાં પ્રદર્શિત થઈ

અદાણી ફાઉન્ડેશન દ્વારા ઉમરપાડાના આદિવાસી ખેડૂતો માટે જાગૃતિ શિબિર

ખેડૂતોને જૈવિક ખેતી- ટપક સિંચાઈ ખેતી અંગે જાણકારી અપાઈ

કચ્છની ૫૯ શાળાઓમાં 'ઇકો ફ્રેન્ડલી' રક્ષાબંધનની ઉજવણી

અદાણી ફાઉન્ડેશન પ્રકલ્પ ઉત્થાન પ્રોજેક્ટઅંતર્ગત વિવિધ દિવસોની કરવામાં આવતી અનોખી રીતે ઉજવણી

लोकतेज
epaper.loktej.com
12 Nov 2022 - Page 2

अदाणी फाउंडेशन दहेज द्वारा वागरा तहसील के 14 स्कूलों में परियोजना उत्थान के तहत दीपावली मेले का आयोजन

દહેજ, અદાણી ફોઉન્ડેશન દ્વારા

વાગરા તાલકુાની ૧૪ શાળામાં પ્રોજેક્ટ ઉત્થાન અંતર્ગત દિવાળી મેળો યોજાયો

હેલ્થકેર સમિટમાં અદાણી ફાઉન્ડેશનને પ્રતિષ્ઠિત એવોર્ડ એનાયત કરવામાં આવ્યો

અદાણી ફાઉન્ડેશન પ્રદત્ત આરોગ્ય સેવાઓનું સન્માન, ASSOCHAM એવોર્ડ્સમાં મળ્યું મોખરાનું સ્થાન આરોગ્ય ક્ષેત્રે કરેલી ઉત્કૃષ્ટ કામગીરીને હેલ્થકેર સમિટમાં બિરદાવાઈ

મોરબી દુર્ઘટનામાં છત્રછાયા ગુમાવનારા ૨૦ બાળકને પાંચ કરોડની સહાય

THANK YOU

Annexure – 3

IN THE HIGH COURT OF GUJARAT AT AHMEDABAD

R/SPECIAL CIVIL APPLICATION NO. 5509 of 2019

[On note for speaking to minutes of order dated 06/02/2023 in R/SCA/5509/2019]

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JUSAB KASAM MANJALIYA
Versus
UNION OF INDIA

==========

Appearance:
MR AJ YAGNIK(1372) for the Petitioner(s) No. 1,3,4,5,6
AISHVARYA(8018) for the Respondent(s) No. 3
GOVERNMENT PLEADER for the Respondent(s) No. 2
MR DEVANG VYAS(2794) for the Respondent(s) No. 1
MR RUTVIJ S OZA(5594) for the Respondent(s) No. 7
MR. PARTH H BHATT(6381) for the Respondent(s) No. 1
NOTICE SERVED BY DS for the Respondent(s) No. 4,5
SINGHI & CO(2725) for the Respondent(s) No. 6

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CORAM:HONOURABLE THE CHIEF JUSTICE MR. JUSTICE ARAVIND KUMAR
and
HONOURABLE MR. JUSTICE ASHUTOSH SHASTRI

Date : 09/02/2023

ORAL ORDER

(PER : HONOURABLE THE CHIEF JUSTICE MR. JUSTICE ARAVIND KUMAR)

It is stated that third respondent was represented by Sr. Advocate Ms. Manisha Lavkumar Shah. Hence, registry is directed to print the name of Ms. Manisha Lavkumar Shah learned Senior Advocate representing respondent no. 3 in the cause title of CAV Judgment dated 06.02.2023.

The note for Speaking to Minutes stands disposed of.

(ARAVIND KUMAR,CJ)

(ASHUTOSH SHASTRI, J)

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IN THE HIGH COURT OF GUJARAT AT AHMEDABAD

R/SPECIAL CIVIL APPLICATION NO. 5509 of 2019

==========

JUSAB KASAM MANJALIYA

Versus

UNION OF INDIA

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Appearance:
MR AJ YAGNIK(1372) for the Petitioner(s) No. 1,3,4,5,6
AISHVARYA(8018) for the Respondent(s) No. 3
GOVERNMENT PLEADER for the Respondent(s) No. 2
MR DEVANG VYAS(2794), ASG with MR PARTH BHATT for Respondent- 1
MR RUTVIJ S OZA(5594) for the Respondent(s) No. 7
MR. PARTH H BHATT(6381) for the Respondent(s) No. 1
NOTICE SERVED BY DS for the Respondent(s) No. 4,5
MR MIHIR JOSHI, SENIOR ADVOCATE for SINGHI & CO(2725) for the Respondent(s) No. 6

==========

CORAM:**HONOURABLE THE CHIEF JUSTICE MR. JUSTICE ARAVIND KUMAR**
and
HONOURABLE MR. JUSTICE ASHUTOSH SHASTRI

Date : 06/02/2023

CAV JUDGMENT
(PER : HONOURABLE MR. JUSTICE ASHUTOSH SHASTRI)

1. Present petition under Article 226 of the Constitution of India is filed for the purpose of seeking following reliefs:-

A Be pleased to direct respondents and respondent MoEF in particular to place on record of this Hon'ble Court the steps taken towards implementation of Order dated 18/09/2015 and be further pleased to direct the respondent MoEF to place it on record reports, plans and schemes submitted by respective respondent and expert body pursuant to the order dated 18/09/2015 and the consequential preventive, protective, corrective and remedial environmental measures and steps initiated and implemented upon;

B. In the event of non-implementation or partial implementation of the Order dated 18/09/2015 and the consequential measures taken towards protection and prevention of the environment, Be

Pleased to direct Respondent and respondent MoEF to implement the Order dated 18/09/2015 at Annexure-A in its true spirit and entirety and take all consequential preventive, protective, remedial and corrective environmental measures based on the reports, plans and schemes given by the respondent respective agencies and expert body as directed in the Order dated 18/09/2015;

C. Be pleased to Direct respondents and respondent Ministry of Environment, Forest and Climate Change in particular to provide petitioners with the Action Taken Report along with all the documents including report submitted by respective respondents and other agencies and expert body with regard and respect to every directions given in para. 15 of the Order dated 18/09/2015 passed by respondent MoEF at Annexure-A;

D. During the pendency and/or final disposal of this petition, be pleased to grant interim or ad- interim relief in terms of para. 11(A) and/or 11(B) and/or 11(C);

E. To pass any other and further reliefs that may be deemed fit and proper and in the interest of Justice and Equity.

2. The background of facts which has given rise to filing of present proceedings is that petitioners are stated to be permanent residents of Mundra Taluka in District Kutchh- Bhuj. Petitioner Nos.1 to 3 are fishermen of village Luni, whereas petitioner Nos.5 and 6 are farmers and businessmen residing in Mundra within geographical area of respondent No.6. Petitioners have stated that majority of them have attended public hearing for environmental clearance of the project of Waterfront Development and/or for Special Economic Zone. Petitioners as such are not only concerned but also adversely

affected by any industrial growth in the area, especially on account of respondent M/s. APSEZL undertaking certain industrial activity which are stated to be hazardous to the environment and antithetic to the sustainable development principle. According to petitioners, the basic grievance is that order dated 18.9.2015 appears to have not been implemented in true letter and spirit to protect the environment against hazardous activities of respondent M/s. APSEZL.

3. It is the case of the petitioners they are fishermen and are unable to carryout fishing activity even if they possess licenses because of the activities undertaken by 6th respondent M/s. APSEZL which is hazardous to the environment. Project in question is for developing Waterfront Development which includes North Port, South Port, West Port and East Port at Mundra, District Kutchh and authority has extended the Environmental Clearance initially to M/s. Mundra Port and SEZ Ltd. (now, M/s. Adani Port and SEZ Ltd.). Same was extended by issuance of notification of Environmental Impact Assessment and under Coastal Regulation Zone Notification, 1991 for Waterfront Development Project on 12.1.2009. Said clearance

was extended to the respondent with specific conditions which are stipulated in it and narrated by petitioners in paragraph 4.3 of the petition. In addition to such conditions, on 19.1.2009, an Addendum was issued by respondent MoEF, Government of India with respect to EIA and CRZ clearance accorded on 12.1.2009.

4. On account of such situation, initially petitioners were constrained to file proceedings in the form of Special Civil Application No.9309 of 2008 *inter alia* praying to appoint a committee of eminent environmentalists of public spirited persons to ascertain the damage done to the Coastal zone of Mundra Taluka villages including farmers and fishermen and to waterfront area on the basis of plants available and also to take satellite photos of the area which was also taken by ISRO and sought for consequential reliefs which are narrated in paragraph 4.5 of the petition memorandum. Said petition, i.e. Special Civil Application No.9309 of 2008 was disposed of vide order dated 2.7.2010 and while disposing of the said petition, certain observations have been made by the Court which are extracted in paragraph 4.5 of the present petition and same is

reproduced hereunder:-

> *"(i) It is understood and undertaken by Respondent No.9 that no creeks will be filled-up and bio-diversity present along the coastal area will not be permitted to be destroyed by their action. Thus the first grievance of the petitioners stand redressed.*
>
> *(ii) It is undertaken by the respondents that licensed fishermen for their fishing activities, as is permissible by the authorities, no impediment will ever be created by the respondent no.9 company. Therefore, the second grievance of the petitioners are also redressed.*
>
> *iii) We are informed that by order of the Government, Ministry of Environment & Forests dated 12/1/2009 and 31/3/2009 requisite permissions have already been granted and it is agreed and confirmed by the counsels for the petitioners and learned counsel for the Union of India and counsel for the State. Learned counsel for the respondent no. 9 company states that this can be adhered to in its true letter & spirit.*

5. It is the case of petitioners that a very renowned environmental activist Mr. Bharat Patel, General Secretary of Machchhi Mar Adhikar Sangharsh Sangathan has raised an issue about violation of conditions of Environmental Clearance and CRZ clearance by respondent, on account of which according to petitioners, a site visit was made on 15.12.2010, resulted in submission of a report by Dr. Senthilvel, Additional Director of MoEF, who in turn issued a show cause notice with direction to respondent M/s. Mundra Port and SEZ Ltd. (now M/s. Adani Port and SEZ Ltd.). The show cause notice has pointed out alleged violation of conditions whereby 6th

respondent was directed vide communication dated 23.2.2011 not to take any reclamation activity and not to initiate any construction activity in CRZ area and according to petitioners, afore-mentioned notice dated 15.12.2010 was issued upon physical and spot verification. However, respondent M/s. Mundra Port and SEZ Ltd. was consciously violating every undertaking given to this Court which came to be recorded in an order dated 2.7.2010. A Writ Petition (PIL) No.194 of 2011 was constrained to be filed before this Court alleging development within the area of respondent M/s. Mundra Port and SEZ Ltd. in particular and in abject violation of Environmental Impart Assessment Notification, 2006. Hon'ble Court in its judgment has indicated that without environmental clearance granted to SEZ, no individual industrial unit can start the work of developing the area being one of sub-leasees of the developer of SEZ.

6. It is the case of the petitioners that violation of the conditions was continued to be an act of the respondent, on account of breach of the environmental norms and conditions of environmental clearance, it has resulted in blockage of creeks,

large scale destruction of mangroves, unprecedented reclamation of land and bundling within the CRZ area besides violation of directions issued by respondent MoEF, Government of India. In the backdrop of such situation, a committee came to be constituted under the chairmanship of Ms. Sunita Narain with certain broad terms to be examined which are stated in paragraph 4.9 in the later part. The Committee so appointed submitted its report on 18.4.2013 and said report was received based upon inspection which was undertaken of M/s. Adani Port and SEZ Ltd., Mundra dated 18.4.2013. After inspection based on satellite images and with help of the reports prepared by the department of Forest and Environment, Government of Gujarat as well as respondent- MoEF, Government of India and after hearing the villagers and residents of the area within SEZ at Mundra and also based upon the representatives and experts of respondent M/s. Adani Port and SEZ Ltd., a categorical finding was given to the effect that there has been a large scale blocking of creeks including Kotdi creek. It has also resulted into rampant destruction of Mangroves and also mismanagement of fly ash utilization and its disposal and it was

also observed that there is a serious lack of commitments in adhering to the terms of environmental and CRZ clearance.

7. It is further case of petitioners that on account of such situation, a show cause notice with a direction came to be issued by the Ministry of Environment, Forest and Climate Change on 30.9.2013. But, according to petitioners, in the form of show cause notice, an order came to be passed by respondent MoEF, Government of India after accepting the report of Ms. Sunita Narain Committee. Directions came to be issued under Section 5 of the Environmental Protection Act, 1986 to respondent M/s. Adani Port and SEZ Ltd. to comply. Same are stated in bracketed portion in paragraph 4.11 of the petition. On account of this clearance granted, North Pole was kept in abeyance since there appears to be a violation of conditions. Since this was the situation, according to petitioner, Writ Petition (PIL) No.21 of 2013 came to be filed seeking complete prohibition of any development activity within SEZ at Mundra by the developer and sub-leasee holding individual plots for industrial plants in the absence of Environmental Clearance accorded to respondent M/s. Adani Port and SEZ Ltd. By virtue

of judgment dated 13.1.2014 in Writ Petition (PIL) No.21 of 2013, Hon'ble Court indicated a complete apprehension on any development activities by developers or sub-lessee within SEZ Mundra till environmental clearance is granted by respondent MoEF, Government of India, i.e. respondent No.1. It is further case of the petitioners that M/s. Adani Port and SEZ Ltd. had already an independent environmental clearance granted way back in 2009, even though respondent M/s. M/s. Adani Port and SEZ Ltd. is one and the same entity. The judgment as such was confined to the area of SEZ. Said judgment passed by the Court in Writ Petition (PIL) No.21 of 2013 was challenged by individual plot holders, who had already established their industrial plots since long, and respondent M/s. Adani Port and SEZ Ltd. Hon'ble Court was pleased to pass an interim order permitting the individual industrial units which were in operation since long to continue with their activity. Said order passed in SLP (Civil) No.1526 of 2014 dated 27.1.2014 is attached to the petition memorandum. Later on, according to the petitioners, Hon'ble Supreme Court passed a further order on 14.7.2014 calling upon respondent MoEF, Government of

India to take decision on the issue of grant of environmental clearance or rejection of the application made for the said purpose of respondent M/s. APSEZL. In between Lok Sabha election was scheduled somewhere in the month of May 2014 and pursuant to which, change of Government took place at the Center and then according to petitioners, issues related to environmental clearance have been altered and then, petitioners have allegedly stated that environmental clearance is a matter of course granted environmental clearance on 14.7.2014 to SEZ section of respondent M/s. APSEZL. In the process of such grant of environmental clearance to respondent M/s. APSEZL for SEZ section, all violations committed earlier in point of time have been kept aside and ignored and environmental clearance was granted on 14.7.2014 subject to decision of Hon'ble Supreme Court in pending petition arising out of judgment and order passed by the Court on 13.1.2014 in Writ Petition (PIL) No.21 of 2013.

8. It is further case of the petitioners that environmental and CRZ clearance to M/s. APSEZL was granted for desalination, seawater intact, outflow facility and pipeline for the proposed

multi-product SEZ to the extent of area of 6641.2784 Hectare of land. Specific conditions have been stipulated in the environmental clearance granted on 15.7.2014 which are enumerated in paragraph 4.16 of the petition memorandum.

9. Petitioners appear to have reverted back then to submit that earlier show cause notices together with inspection report, whether can be brushed aside or not and based upon such material, whether environmental and CRZ clearance can be granted or not. In fact, according to petitioners, all the authorities, including MoEF, are closing their eyes towards violation and have accorded clearance since respondent was a influential entity in the new Government and as such has alleged violations and decisions in the grant of environmental clearance is based upon extraordinary exercise of power. According to petitioners, decisions are in violation of the provisions of Environmental (Protection) Act, 1986 read with CRZ Notification 2011 and EIL Notification, 2006. Even on 18.9.2015, further directions were issued to undertake an inquiry and investigation and report besides implementation of conditions of the Environmental Clearance and to ensure that

extent of damage allegedly caused by M/s. Adani Port and SEZ Ltd. be assessed again and remedial measures be taken and by referring to said order dated 18.9.2015, a reference has also been made to the provisions contained in communications dated 15.12.2010 as well as 30.9.2013. Petitioners have stated that on account of this situation, effect at the ground level is that respondent M/s. APSEZL is horizontally and vertically expanding its activities at the cost of environment and people and at the same time, respondent is appointing committee after committee and just not taking any stringent steps and have remained mute spectators.

10. According to the petitioners, even though three years have lapsed, it appears that nothing is placed on the website of respondent MoEF, Government of India nor any information is provided with regard to implementation of the directions given in the order in question and its compliance by 6th respondent and as such, petitioners were constrained to serve a legal notice seeking further information and providing particulars related to compliance of the directions contained in the order dated 18.9.2015, but no response of whatsoever nature was given

despite reminders having been sent from time to time and as such lastly, on 21.11.2018, legal notice was issued. Even an independent application was also submitted under the provisions of the Right to Information Act about seeking information relating to compliance of the directions issued by order dated 18.9.2015. Said application was submitted on 22.11.2018. According to petitioners, there was no response by the respondents, as indicated above and it was found that there is lack of will on the part of the authority to implement the directions in true letter and spirit. This has also resulted in couple of writ petitions being filed before this Court on the ground of violation of Environmental Law involving different subject matters, particulars whereof having been provided as indicated by petitioners, and hence in this factual situation, left with no alternate, petitioners have approached this Court by way of present petition under Article 226 of the Constitution of India.

11. From record, it appears that petition has been entertained by issuance of notice on 18.4.2009 and then after hearing on 22.8.2019, a detailed order came to be passed by the Coordinate

Bench of this Court and after narrating the submissions and perusal of the record, Coordinate Bench was of the opinion that keeping aside the issue of maintainability of writ petition, Union of India has to submit a fresh site inspection report in this regard and also directed to submit reply since it was found that all other respondents were ready with the matter, except Union of India. Based upon such specific order, it appears that reply has been filed by Union of India and during passage of time, an order came to be passed by the Coordinate Bench on 18.6.2021 in Special Civil Application 21189 of 2018 and as such, learned advocate Mr. A.J. Yagnik representing the petitioners was asked to go through the same by order dated 2.7.2021. Then, matter has come up for consideration before this Court, in which learned advocate Mr. A.J. Yagnik has represented the petitioners, whereas Mr. Devang Vyas, learned Additional Solicitor General, with Mr. Parth Bhatt learned counsel represented Union of India- respondent No.1, Rutvij S. Oza, learned counsel has represented respondent No.7, whereas learned senior advocate Mr. Mihir Joshi has represented respondent No.6 with assistance from Singhi & Company.

12. Learned senior advocate Mr. Mihir Joshi appearing on behalf of respondent No.6 has raised at the outset a preliminary objection with regard to maintainability of present petition itself and has requested to consider and deal with such preliminary objection at first instance. Mr. Joshi has submitted that present petition is not in the form of Public Interest Litigation and as such in what manner, petitioners are prejudiciously affected is not spelt out in the petition. How and in what manner their personal right or legal right is infringed is not indicated at all and to that effect, there are no averments in the petition. It has been further contended that apart from that, petition is not maintainable in view of the fact that there is an alternative and efficacious remedy available under the Statute if there is any violation of the order as alleged and as such, in view of this statutory alternative remedy being available, petition may not be entertained and apart from that, learned senior advocate has further contended that respondent No.6 has not violated any of the conditions, on the contrary substantially complied with the same and if that fact is being disputed, petition is in the realm of disputed questions of fact which may not be adjudicated in writ

jurisdiction and as such, Mr. Joshi has requested to examine and decide the preliminary issue first. To substantiate his contentions, Mr. Joshi has referred to certain judgments and it has been further contended that petitioners have no *locus standi* to bring this petition in the present form in the absence of proper pleadings, hence, exercise of extraordinary jurisdiction is not called for and petitioners cannot be allowed to conduct roving inquiry which otherwise is the domain of authority created under the Statute.

13. Learned advocate Mr. A.J. Yagnik appearing on behalf of petitioners has vehemently contended that respondent has violated the terms and conditions not only of environmental clearance but also has violated the conditions engrafted in the order dated 18.09.2015. According to him, the major issues related to right of fishermen as well as the grazing land have been utterly not taken care of and no specific action plan to protect livelihood of fisherman is also framed. Apart from that though there was an agreement of returning grazing land, same has also not been acted upon by respondent No.6 and as such when the activity of respondent No.6 is in utter violation of

interest of environment in the area, the reliefs prayed for deserves to be granted.

14. By pointing out the particulars from the chart which has been prepared by him, a contention is raised that bocha island is ecologically sensitive having geomorphological features and areas in island and creeks around the island will have to be declared as conservation zone and action plan for its conservation must be prepared and for that purpose M/s APSEZ should provide necessary financial assistance.

15. Mr. Yagnik, learned advocate has further submitted that there are certain violations of specific condition of all environmental clearance and CRZ clearances and as such stringent steps deserves to be taken. On the contrary, a comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks / mangrove area including buffer zone, mapping of coordinates, running length, HTL, CRZ boundary will have to be put in place and preservation of entire area is the need of hour so as to see that proper environmental protection can be maintained.

16. In addition to this, Mr. Yagnik, learned advocate has further submitted that there should not be any development area when restricted by the High Court of Gujarat and for that purpose APSEZ shall abide by the outcome of earlier public interest litigations and the orders passed thereupon and APSEZ will have to submit a specific action plan to protect the livelihood of fisherman along with a budgetary provision. By raising multiple contentions touching the core issue of environment, Mr. Yagnik, learned advocate has tried to submit at length on controversies reflecting on the record and thereby has submitted that reliefs prayed for deserves to be granted as same is in essence for implementation of the order dated 18.09.2015. Hence, he has submitted that relief as prayed for be granted. Several other contentions canvassed before us but since the issue involved in the present proceeding is at stage of the preliminary objection raised by Mr. Mihir Joshi, learned senior counsel, without entering into merit of other contentions, the Court would be examining the preliminary issue about maintainability of petition. Hence, without discussing much on merits of contentions raised by Mr. Yagnik, learned advocate

the preliminary issue is being dealt with.

17. At this stage, we must mention that learned senior advocate appearing on behalf of respondent No.6 has categorically and vehemently submitted that two major issues which have been raised by Mr. Yagnik, learned advocate about the availability of gauchar land and for taking interest of fisherman in the area, according to Mr. Joshi, learned senior advocate the same have been taken care of adequately and said fact has also be taken note of by MOEF Committee in the month of April, 2013. The gist of the same is pointed out from page 221 onwards of petition compilation and has submitted that respondent No.6 has not violated the conditions stipulated but on the contrary has substantially complied with almost all terms of the clearance granted to them and as such this issue of violation is a seriously disputed version which requires detail adjudication. But apart from that, Mr. Mihir Joshi, learned senior advocate has emphasized on maintainability of the petition issue in view of the fact that ultimate controversy and the grievance is relating to the environmental protection and for that purpose, a specific statutory remedy is available to the

petitioners. Hence, the petition may not be entertained. Further, this being not a public interest litigations, the petitioners are under an obligation to justify their remote right if any being violated but since the core issue is relating to the environment and its ill-effect on account of project Mr. Joshi, learned senior advocate has submitted that in view of settled position of law when a specific statute is taking care of such issues the petitioners must approach the said forum created by the statute and not to invoke extraordinary jurisdiction to adjudicate the issues which are seriously in dispute.

18. To this stand of Mr. Mihir Joshi, learned senior advocate, Mr. A. J. Yagnik, learned advocate appearing for the petitioners has submitted that there is no embargo on exercise of jurisdiction under Article 226 of the Constitution of India, even if there being a statutory remedy available and has further submitted that here is the case where the background of the fact demands the exercise of jurisdiction. Hence, has requested that petition deserves to be entertained.

19. To justify this stand, Mr. Yagnik, learned advocate has

referred to and relied upon few decisions delivered by the Hon'ble Apex Court, which are reported in :-

(i) In the case of ***Whirlpool Corporation versus Registrar of Trade Marks, Mumbai and others*** reported in ***(1998) 8 SCC 1***.

(ii) In the case of ***Harbanslal Sahnia and another versus Indian Oil Corpn. Ltd. and others*** reported in ***(2003) 2 SCC 107***.

(iii) In the case of ***Hanuman Laxman Aroskar versus Union of India*** reported in ***(2019) 15 SCC 401***.

(iv) In the case of ***BDA versus Sudhakar Hegde*** reported in ***(2020) 15 SCC 63***.

(v) In the case of ***Himachal Pradesh Bus Stand Management and Development Authority versus Central Empowered Committee and others*** reported in ***(2021) 4 SCC 309***.

(vi) In the case of ***The Assistant Commissioner of State Tax and Others versus M/s Commercial Steel Limited*** reported in ***(2021) SCC OnLine SC 884***.

20. On careful consideration of the background of present facts on hand and keeping in view of the proposition aforesaid, we have examined the issue of alternative remedy whether available to the petitioners or not. Perusal of record indicates that respondent No.6 was issued with a show-cause notice under Section 5 of the Environment (Protection) Act, 1986 for violating certain terms of the notification. Said notice right from 15.12.2010 is reflecting on page 99 of the petition compilation.

21. In addition to this, a further fact is also reflecting from the record that based upon response by respondent No.6 there was a constitution of committee for inspection of M/s. Adani Port and SEZ Ltd. i.e. respondent No.6. But this exercise appears to be basically from the initial step of Section 5 of Environmental Protection Act, 1986. Even from communication dated 18.09.2015 reflecting at page 45, said order is also passed in connection with a notice issued under Section 5 of the Act, 1986 and as such the grievance involved in this petition is around environmental issue and the steps taken in view of Section 5 of

the Act. Section 5 of the Act, 1986 postulates to give directions whereas Section 5A which has been incorporated by virtue of amendment with effect from 18.10.2010 envisaged an appeal to the Nation Green Tribunal. Since these sections are relevant to the controversy, we deem it proper to extract them. It reads:

> "*5. **Power to give directions**.-Notwithstanding anything contained in any other law but subject to the provisions of this Act, the Central Government may, in the exercise of its powers and performance of its functions under this Act, issue directions in writing to any person, officer or any authority and such person, officer or authority shall be bound to comply with such directions. Explanation. For the avoidance of doubts, it is hereby declared that the power to issue directions under this section includes the power to direct.*
>
> *(a) the closure, prohibition or regulation of any industry, operation or process; or*
> *(b) stoppage or regulation of the supply of electricity or water or any other service.*
>
> ***COMMENTS***
>
> ***Prohibition to establish industry***
>
> *Where total prohibition against establishment of industries in an area is in force, the State Government cannot grant exemption to a specified industry located within or attempting to locate itself within such area. Neither can the State direct the State Pollution Control Board to prescribe conditions for grant of No Objection*

Certificate; A.P. Pollution Control Board v. Prof. M.V. Nayudu, (2001) 2 SCC 62.

Void lease of land

(i) The grant of lease of land belonging to forest area to be used for setting up beneficiation plant which involve dust and water pollution and consequent destruction of adjoining forest and subsequently affecting the environment and ecology of the area and right to life, was declared void; Goa Foundation v. State of Goa, AIR 2001 Bom 318.

(ii) If the Central Government has issued certain directions and notified certain industries as hazardous and stone crushers have not been included then the Board would not be forbidden from exercising its power under provisions of Air Act or Water Act; Bihar State Pollution Control Board v. Hiranand Stone Works, AIR 2005 Pat 62.

5A. Appeal to National Green Tribunal. Any person aggrieved by any directions issued under section 5, on or after the commencement of the National Green Tribunal Act, 2010, may file an appeal to the National Green Tribunal established under section 3 of the National Green Tribunal Act, 2010, in accordance with the provisions of that Act."

22. This Act has invested a clear and sufficient power to the Tribunal to go into violations related to environment issue and

can safeguard the same by issuance of appropriate direction and to effectively implement. Even rules have been framed in this connection and as such bare reading of the aforesaid provision indicates that petitioners are not remediless but are having adequate statutory remedy available where the grievance can be effectively adjudicated upon. Hence, we are of the opinion that contention raised by Mr. Mihir Joshi, learned senior counsel for 6th respondent with regard to maintainability of petition is justified in the background of facts which are complex for which exercise of writ jurisdiction would not be an answer. Hence, on the issue of maintainability of petition, we are inclined to accept the contention.

23. At this stage, we may quote with benefit the judgment delivered by co-ordinate Bench of this Court on the issue of alternative remedy where Court has examined the provisions at length and keeping in view the proposition of such issue has opined that this kind of issue relating to environment deserves to be appropriately dealt with in the forum which is created for that very purpose under the Act. The said decision is delivered by Division Bench of this Court on 18.06.2021 in Special Civil

Application No. 21189 of 2018 with Special Civil Application No. 6432 of 2020. Since we have considered the same, we deem it proper to extract hereunder the relevant observations from the said decision which reads as under:-

> "*13. The National Green Tribunal Act has been enacted to provide for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including the enforcement of any legal right relating to the environment and giving relief and compensation for damages to the persons and property and for matters connected therewith or incidental thereto and which Act came into force on18th October 2010. It provides for the establishment of a Tribunal, its composition and more particularly in terms of Section 16 that it shall have the appellate jurisdiction in respect of any direction issued on or after the commencement of the said Act under Section 5 of the Environment (Protection) Act, 1986 in terms of clause (g) thereof. This read with the Schedule I and Section 29 would clearly indicate that it is the National Green Tribunal alone which would have the jurisdiction to deal with and decide the matters in connection with any order or direction passed under Section 5 of the Environment (Protection) Act, 1986.*"

24. The point regarding preliminary objection deserves to be considered first in point of time not only on account of aforesaid proposition of law but on account of the observation made by

the earlier Division Bench in the present proceeding itself wherein Mr. Yagnik, learned advocate appearing for the petitioners was requested to go through the aforementioned decision. The said order dated 02.07.2021 passed in the instant petition reads as under:-

> "*Mr. Yagnik, the learned counsel appearing for the writ applicants prays for some time in this matter. Post it on 30th July 2021. In the meantime, we request Mr. Yagnik to go through a recent order passed by this very Bench in the Special Civil Application No.21189 of 2018 decided on 18th June 20201.*"

25. A conjoint reading of aforementioned situation which is prevailing on record in juxtaposition of sound proposition of law laid down by the Hon'ble Apex Court, we are of the clear opinion that preliminary objection raised by the learned senior counsel appearing for the respondent No.6 is justified in peculiar background of present facts where all minute details deserve attention which disputed version cannot be gone into in exercise of extraordinary jurisdiction.

26. At this stage, Mr. Yagnik, learned advocate has referred to several decisions right from the case of ***Whirlpool Corporation (supra)*** to in the case of ***The Assistant***

Commissioner of State Tax and Others (supra) but upon careful considerations of aforesaid decisions, we are of the opinion that facts in the present background are distinct from those which are reflecting in the said decision and as such applying the principle on proposition of precedent, we are of the view that the said decisions are of no assistance to the petitioners. The law on the precedent is aptly clear by proposition of Hon'ble Apex Court that if the facts are different even one additional fact may make a world of difference in applying the principle and as such keeping in mind such salutary proposition, we are of the firm opinion that without entering into controversy on merits on other issues, we may deem it proper to relegate the petitioners to an appropriate alternative authority created under the statute.

27. At this stage, we may also refer to one further proposition laid down by the Hon'ble Apex Court that no doubt Article 226 is wide enough to exercise extraordinary jurisdiction but it depends upon the principle of self restraint and same may be exercised only when the courts comes to a conclusion that authority created under the statute may not take either

impartial decision or unable to adjudicate the view. In such circumstances, in a given case the Court may take up the issue under Article 226 of the Constitution of India. Otherwise the High Court by exercising such jurisdiction cannot usurp the discretion and statutory function of an authority which is created for that purpose. Following is the relevant observations, we may deem it proper to quote hereunder which is in the case of ***D. N. Jeevaraj versus Chief Secretary, Government of Karnataka and others*** reported in ***(2016) 2 SCC 653***:-

> *"41. This Court has repeatedly held that where discretion is required to be exercised by a statutory authority, it must be permitted to do so. It is not for the courts to take over the discretion available to a statutory authority and render a decision. In the present case, the High Court has virtually taken over the function of the BDA by requiring it to take action against Sadananda Gowda and Jeevaraj. Clause 10 of the lease-cum-sale agreement gives discretion to the BDA to take action against the lessee in the event of a default in payment of rent or committing breach of the conditions of the lease-cum-sale agreement or the provisions of law.[8] This will, of course, require a notice being given to the alleged defaulter followed by a hearing and then a decision in the matter. By taking over the functions of the BDA in this regard, the High Court has given a complete go-bye to the procedural requirements and has mandated a particular course of action to be taken by the BDA. It is quite possible that if the BDA is allowed to exercise its discretion it may not necessarily direct forfeiture of the lease but that was sought to be pre-empted by the direction given by the High Court which, in our opinion, acted beyond its jurisdiction in this regard.*
>
> *43. To this we may add that if a court is of the opinion that a statutory authority cannot take an independent or impartial*

decision due to some external or internal pressure, it must give its reasons for coming to that conclusion. The reasons given by the court for disabling the statutory authority from taking a decision can always be tested and if the reasons are found to be inadequate, the decision of the court to by-pass the statutory authority can always be set aside. If the reasons are cogent, then in an exceptional case, the court may take a decision without leaving it to the statutory authority to do so. However, we must caution that if the court were to take over the decision taking power of the statutory authority it must only be in exceptional circumstances and not as a routine. Insofar as the present case is concerned, the High Court has not given any reason why it virtually took over the decision taking function of the authorities and for this reason alone the mandamus issued by the High Court deserves to be set aside, apart from the merits of the case which we have already adverted to."

28. So from aforesaid clear proposition of law and more particularly, the issues involved in the present litigation, we may deem it proper to dismiss the writ petition with a liberty to the writ applicant to initiate appropriate proceedings before the National Green Tribunal under the provisions of the Act.

29. Since the present writ petition appears to have been pending since 2019, the issue of limitation if at all arises before the Tribunal, we expect that same may be looked into appropriately in the interest of justice. Hence, petition stands dismissed with a liberty to the petitioners to avail an alternative efficacious remedy created under the statute, i.e., National Green Tribunal under the provisions of National Green Tribunal

Act, 2010 and/or under the Environment (Protection) Act, 1986 which may be availed of. It is made clear that this Court has not examined nor expressed any opinion on merits and on other contentions raised in the petition and it goes without saying that it is always available to the petitioner to raise the same in appropriate forum. Accordingly, petition stands dismissed with no order as to cost. Notice is discharged.

Sd/-
(ARAVIND KUMAR, C.J.)

Sd/-
(ASHUTOSH J. SHASTRI, J.)

(OMKAR/ DHARMENDRA KUMAR)

Annexure – 4

Status of Legal Cases of APSEZ, Mundra:

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on……)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
Mundra							
1	SLP 28788 of 2016 Pravinsinh Bhurabhai Chauhan Vs State of Gujarat & Others Petitioner 1. PRAVINSINGH BHURABHA CHAUHAN Respondent 2. State of Gujarat 3. APSEZ 4. MoEF&CC, New Delhi	• Public Interest Litigation was filed before the Hon'ble Gujarat High Court by Mr. Pravinsingh Bhurubha Chauhan alleging, presence of Sand dunes	**Lastly it was heard on 14th Sept 2018**	Matter pending Hon'ble at Supreme Court.		• APSEZ has already submitted as part of their submission to the Committee that there are no presence of "Sand dunes", in APSEZ area, inline to the authenticated maps & report available for this area. • The Committee visited Mundra on	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on……)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
	5. MOC&I, New Delhi 6. Collector, Bhuj 7. Principal Secretary, Gujarat	in the APSEZ project area. • APSEZ has submitted its representation that no Sand dunes are present in the project area and same was also verified during the site visit carried out by the Committee, constituted by Collector,				January 3 & 4, 2018 and the core issues to be examined by the Committee were (i) whether sand dunes are allotted in the forest land and whether APSEZL has destroyed/disturbed them and (ii) whether measurement of land was wrongly done? The Sunita Narain committee filed its report in the Hon'ble Supreme	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		Kutch on 25.07.2014 and by Regional Office of MoEF&CC, Bhopal on 25.09.2014. • Hon'ble High Court of Gujarat had dismissed the PIL filed by the Petitioner, vide their order dtd. 18.02.2015 stating that,				Court of India on 14.9.2018. • The Committee heard representations from both the parties and concluded that the term "Dhuva" is not synonymous with shifting sand dune. The Committee concluded that there is no incontrovertible evidence that Mor Dhuva was a sand dune and it cannot be said that M/s.	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on……)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		"There is no need of constituting a new committee to look into the alleged violations as there is already a committee constituted by the ministry and a report by the same committee has also been submitted"				APSEZL violated any conditions of the Environmental Clearance. With regards to the issue of measurement of land, the Committee stated that there was no credible evidence to show that Mor Dhuva was not part of the allotment to APSEZ and all measurements were done appropriately.	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on……)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		• Later on Special Leave Petition was filed in Supreme Court by the Petitioner vide dated 26.10.2015 against the above said order of the Hon'ble High Court of Gujarat • In view of above, Hon'ble Supreme					

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		Court vide their order dated 23.08.2017, had requested the earlier formed Sunita Narayan Committee to relook in to this matter and submit their report. • Committee had visited the site on 3/4.01.2018					

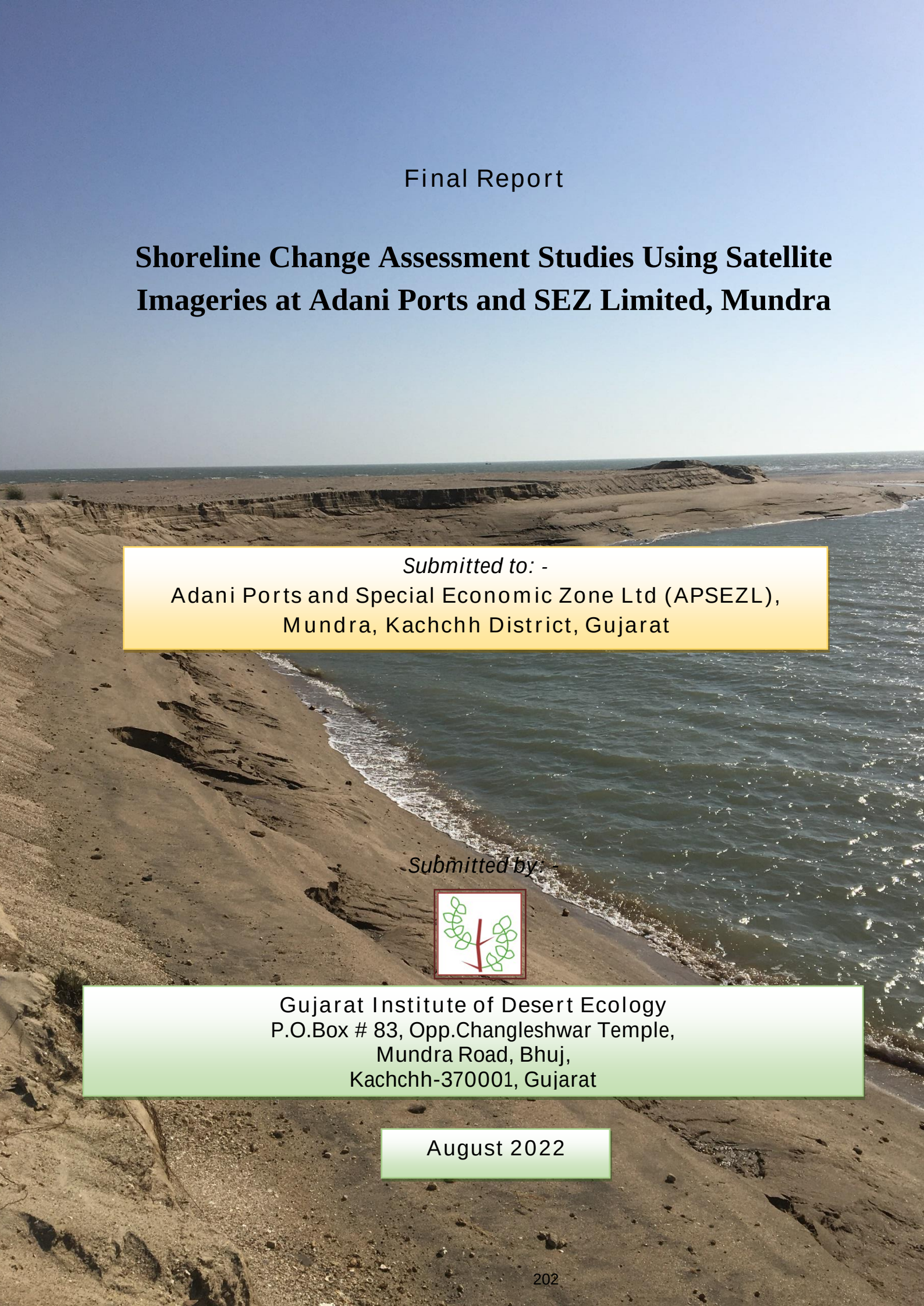
S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on……)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		and has submitted their detailed report to Hon'ble Supreme Court. • Further, based on the findings of the report, the subject land is not classified as Sand dune and therefore allegations are not correct.					

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
2.	Kheti Vikas Seva Trust Vs UoI & Others CA 9124 of 2011	• The writ petition has been dismissed by the Gujarat High Court on 17th April 2015. • The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court.	**The matter was listed on 10.3.2022. Next date is awaited**	**Matter pending at High Court**		**•The committee of Mr. Claude Alvaris, Mr. Subrata Maity and Deputy Conservator of Forest, kachchh was appointed and the committee submitted its report on 7.6.2016. The committee suggested various measures like replanting of mangroves in 5333 ha area, GCZMA to re-examine the entire proposal of APSEZL in line with**	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		• However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state				**CRZ notification, measures to safeguard Bocha Island and annual uploading of satellite images by APSEZL.** **•APSEZL has challenged the recommendations of the committee stating that it has exceeded its terms of reference and APSEZL has already done mangrove reforestation and is in compliance with the Environment**	

S. No.	Case Detail (No., Parties to the Case, Filed at and on)	Case Brief (Matter)	Last Status (As on.....)	Current Status as on 31st Mar-23	Obligation (if any)	Action Taken/Proposed	Remarks (Here we can mention the updates that happened during the intervening period. Depending upon what you need to disclose i.e Comprehensively/ brief))
		forest and environment department in relation to the writ petition is still pending.				**Clearance dated 18.9.2015. the Sunita Narain Committee recommendations have already been captured in the EC conditions and the company is in compliance of the same.**	

Annexure – 5



Final Report

Shoreline Change Assessment Studies Using Satellite Imageries at Adani Ports and SEZ Limited, Mundra

Submitted to: -

Adani Ports and Special Economic Zone Ltd (APSEZL),
Mundra, Kachchh District, Gujarat

Submitted by: -

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August 2022

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The shoreline is the zone where large bodies like an ocean or lake meet the land. The coastal shoreline is a dynamic interface between the land and the sea water which gets altered due to various coastal processes that govern it such as wave characteristics, near-shore circulation, sediment characteristics, beach forms, etc. Shoreline changes are the result of a process called littoral transport, which is responsible for moving eroded materials along the coasts utilizing waves and currents in the nearshore zone (Misra and Ramakrishnan, 2015). The developmental and maintenance activities such as the construction of the port, mining of beach sand, industrialization, garbage dump, urbanization, recreational activities, discharge of domestic sewage and industrial effluent, and reduction in sediment supply from rivers have amplified the processes of modifications, including changes in the shoreline (Kannan and Malarvannan, 2016).

An important aspect of the shoreline is the sustainable development and protection of the coastal environment. Therefore, monitoring coastline areas is a crucial subject since shorelines are the most important and dynamic natural phenomenon (Tamassoki *et al.*, 2014), where changes in one part subsequently affect the other parts, which will be a chain of reactions.

1.1. Gujarat

Gujarat is situated on the western coast of India, in the Arabian Sea. Among the maritime states of India, Gujarat has the longest coastline of around 1650 km, which supports a wide diversity of marine flora and fauna. The state has two gulfs, the Gulf of Khambat and the Gulf of Kachchh, and the coast is differentiated between high rainfall area (2500 mm in south Gujarat) and low rainfall area (250 mm in the northwest part of Kachchh). The coast experiences a different range of tides, waves, cyclones, and currents in the sea, affecting the physical as well as the biological conditions of the whole marine ecosystem.

1.1.1. Gulf of Kachchh

The Gulf of Kachchh is situated along the west coast of Gujarat in India. It is about 170 Km in length. The coastal stretch of Kachchh district constitutes the entire northern coast of the Gulf of Kachchh (GoK) which is one of the three major Gulf systems of India endowed with very high biological richness and physical and chemical peculiarities. Despite its high aridity (4 on a scale of 1- 4) and poor mean rainfall (340 mm), the Kachchh coast has diverse ecological habitats and ecosystems like mangroves, sandy coasts, mudflats, creeks, and other tidal incursions which enhance manifold its coastal landscape diversity and natural resources.

In the late 1990s, industrial development was promoted aggressively because of its very rich mineral deposits, the short sea routes to Gulf countries, and easy availability of land which were considered best than the other coastal regions of the state. The announcement of tax holidays during the post-earthquake in 2001 by the state government provided further impetus for coastal industrial development. Many of these developments are beginning to have implications for ecological, social, and economic spheres. Kachchh coast faces threats from climate change, pollution, and habitat changes which are crucial for understanding the impacts on the shoreline.

Morphological change is responsible for the change in coastal structure or shape. Morphological change occurs due to tidal patterns. It can be estimated by different methods like Aerial photography, Field survey using GPS, Satellite remote sensing, LIDAR, etc.

The shoreline changes occurring due to processes like accumulation and erosion of substratum can be analysed in a Geographic Information System (GIS) by examining differences between the shoreline of different years. Shoreline proxies include the high-water line, vegetation line and dunes among many others. (Jodhani *et al.,* 2020)

1.2. About Adani Ports and Special Economic Zone Ltd. (APSEZL)

The former Gujarat Adani Port Ltd., now named as Adani Ports and Special Economic Zone Ltd. (APSEZL) started its operations in Mundra in 1998 with an all-weather, open-sea jetty and port backup at Navinal Island. The Port has since then undergone four expansions, namely a railway line and container terminal in 2000, Single Point Mooring and Pipeline for crude oil terminal in 2004, a Multipurpose wharf Terminal-II in 2007, and a Waterfront development project in 2009 which includes the development of North Port, South Port, East Port & West Port. In addition to these, port-based special economic zone and two thermal power plants exist which form a major industrial cluster of this coast.

1.3. Origin of the Study

APSEZ has obtained Environmental and CRZ Clearance for a waterfront development project at Mundra District, Kachchh, Gujarat, and as a part of EC/CRZ Clearance condition, APSEZ shall undertake "The shoreline changes in the area shall be monitored periodically and the reports to be submitted every 6 months to RO, Bhopal".

Also, APSEZ had undertaken a Cumulative Impact Assessment (CIA) through NABET accredited consultant namely M/s. Chola MS Risk Services Limited, Chennai in the year 2015-16 in line with the MoEF&CC Order dated 18th September, 2015 for the projects already granted Environmental Clearance and CRZ Clearance in the region so that future developments can be assessed for providing necessary approvals at a later stage. As a part of the Environmental Management Plan (EMP) compliance with the CIA study, APSEZ shall undertake a study "To map the coastal morphology (Shoreline) at least once in three years". Therefore, Adani Ports and Special Economic Zone Ltd. (APSEZL) has approached M/s. Gujarat Institute of Desert Ecology (GUIDE) to study the intensive monitoring of shoreline changes through high-resolution satellite imageries (LISS-IV). The present report compiles the results of shoreline change analysis by using satellite imageries and beach profile analysis of a 55 km coastline stretch of Adani Ports and Special Economic

Zone Ltd. (APSEZL). Due to the dynamic nature of shoreline boundary, it is essential to understand the long and short-term rate of shoreline changes from a coastal vulnerabilities point of view.

1.4. Objectives of the Study

1. To map and monitor shoreline behavior (changes) of 13 km (16 km on west side and 27 km on east side of Adani main port) coastline stretch of Adani Ports and Special Economic Zone Ltd. (APSEZL) using LISS-IV high-resolution satellite imageries during the years 2015 and 2022 after construction of port activities.
2. To identify the zones of high erosion and accretion using LISS-IV, high-resolution satellite imageries.
3. Collection of shoreline information and cross-sectional profiles using DGPS, at 20.00-meter interval along the route & offset between high tide line to low tide line, along the 10km stretch around the project site.
4. Shoreline change analysis by superimposing DGPS Survey data with satellite data.
5. Superimposing current shoreline changes data on approved CZMP in line with CRZ Notification, 2011 prepared by National Centre for Coastal Management (NCSCM).

2. STUDY AREA

2.1. Location

Kachchh coast constitutes the entire northern shore of the Gulf of Kachchh marked by narrow beaches and wide mudflats. The coastal stretch of the Mundra is dissected by extensive mudflats and creek systems. Major creek systems in the area are Navinal, Bocha, Baradi mata, and Kotadi creek. These creeks are again divided into minor creek complexes. The present study is about the shoreline changes on the coastal stretch of Mundra between the western side of Modhva to the eastern side of Luni which forms the study area (Fig.1.1) earmarked on the map.

The study site is 43 km long coastline stretch (16 km on the western side and 27 km on the eastern of Adani main port) of Adani Ports and Special Economic Zone Ltd. (APSEZL), located on the western coordinates of site 22°47'37.289"N, 69°25'18.078"E to eastern coordinates of site 22°50'56.604"N, 69°54'8.115"E, which is given in Figure 2.1.

2.2. Climate

As per the Indian Meteorological Department, Govt. of India, the highest monthly mean of daily maximum temperature of the study area is 36^0C. The dry bulb temperature goes up to 47.8^0C, considering max Humidity of 95%. The wind is predominantly from the south-west as well as from the west to some extent. The wind velocity is 65 km/hr.

Due to its arid nature, annual rainfall in Kachchh is poor, ranging from 250-350 mm which is often irregular. However, the mean annual rainfall during 1932 to 2021 was higher at Mundra (478 mm) comparing to other coastal talukas of Kachchh district. Rain during monsoon is confined to only 12-16 days and occurs as an instant downpour. Freshwater input into the near coastal waters is quite meagre and appears to influence the coastal erosion. Annual temperature fluctuation in the district is extreme, ranging from 7- 47 ^{0}C with a yearly average humidity of 60% which increases to 80% during the southwest monsoon and decreases to 50%

during November-December. The phenomenon of drought is common, with 2 drought years in a cycle of 5 years(Thivakaran *et al.*, 2015).

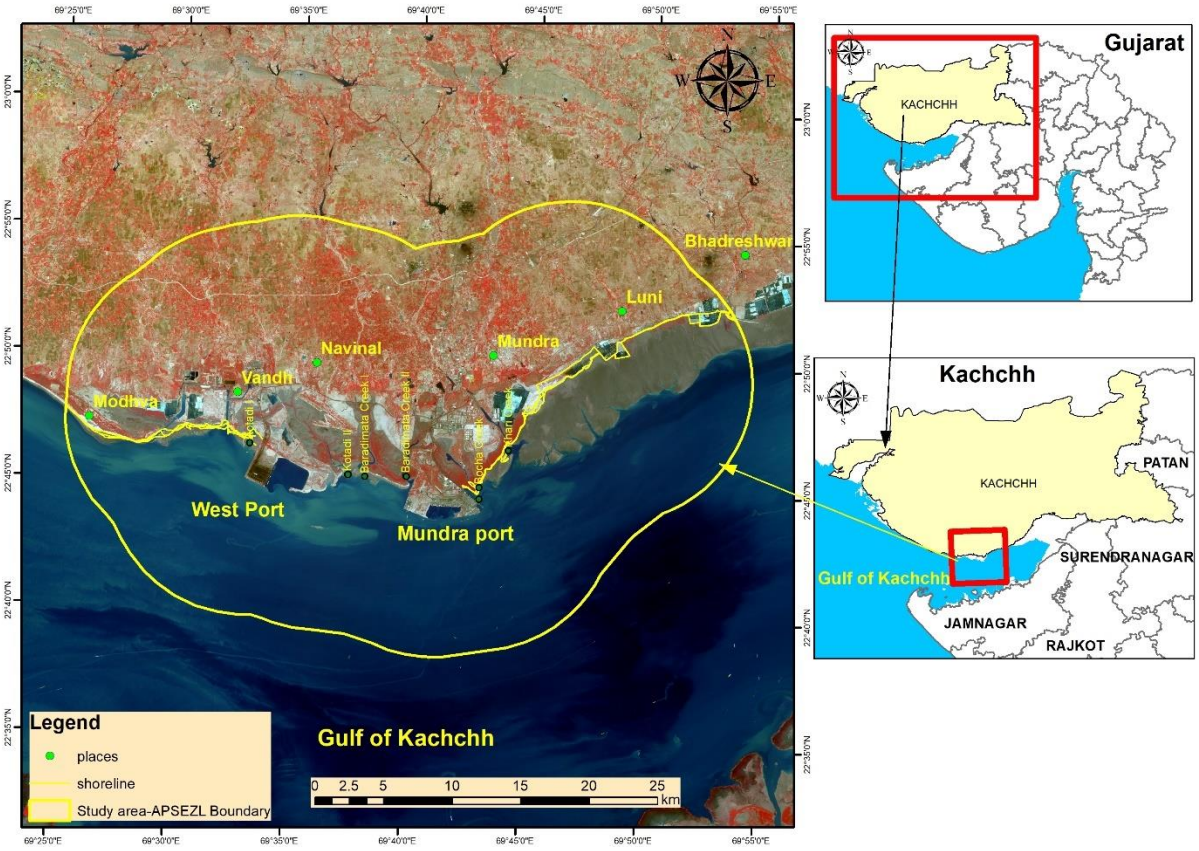

Figure 2.1: Location Map of The Study Area

2.2.1. Tidal Regime

Tides at Mundra are the mixed type, predominantly semidiurnal type with a Mean High-Water Spring (MHWS) of 6.66 m and Mean High water Neap (MHWN) of 5.17 m. The phase difference is not uniform for successive tides in the Gulf and it varies as per tidal conditions ((ICMAM 2004).

2.2.2. Currents

The currents in the Gulf and associated creeks are largely tide induced and oscillations are mostly bimodal reversing in direction with the change in the tidal phase. The influence of wind on variations in current is minor. The current reversals are quite sharp occurring within 30 - 60 min. The maximum current

speed varied from 0.5 to 1.2 m/s. The predominant direction of the current is 45^0 during flood and 220^0 during ebb.

The circulation is generally elliptical with the major axis in the east-west direction. These trajectories suggest that the excursion lengths are in the range of 10 to 15 km depending on the tidal phase (neap or spring)(NIO, 2009).

2.2.3. Salinity

Salinity is an indicator of freshwater intrusion in nearshore coastal waters as well as the excursion of salinity in inland water bodies such as estuaries, creeks, and bays. Normally seawater salinity is 35.5 ppt but may vary depending on evaporation, precipitation, and freshwater addition. Salinity largely influences several processes such as dissolution, dispersion, dilution, etc in seawater due to high dissolved salt content and high density. In the absence of freshwater inflow, the salinity varies from 35.9 to 38.0 ppt.

3. METHODOLOGY AND DATA USED

The shoreline change analysis has been carried out using multi-date satellite images to estimate the rate of change in terms of distance of the shore eroded or accreted using a cross-shore profile in terms of area and volume. From the satellite images, the shoreline has been extracted after rectification and co-registration. The rate of shoreline changes from 2015 to 2022 has been analysed and compared with the DGPS survey and ground truthing data for which Digital shoreline change analysis system (DSAS) software that works within the Geographic Information System (ArcGIS) software was applied. DSAS computes rate-of-change statistics for a time series of shoreline vector data. It is also useful for computing rates of change for other boundary change conditions that incorporate a clearly-identified feature position at discrete times (Himmelstoss *et al.,* 2018). The methodology flowchart of the present study on the shoreline change is shown in (Figure 3.1)

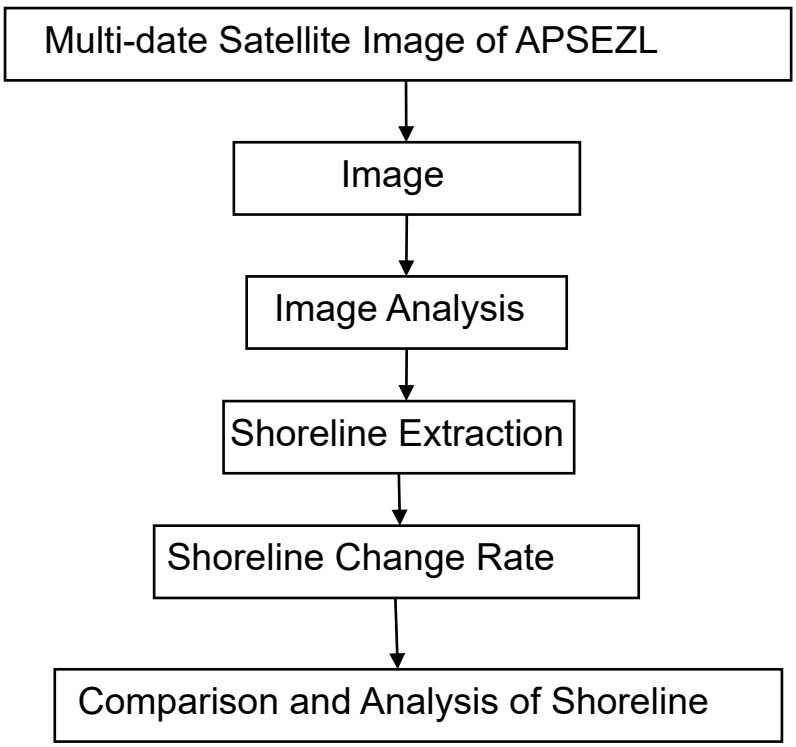

Figure 3.1: Flowchart of the Methodology Adopted

3.1. Short Term Shoreline Change Analysis

The end point rate (EPR) is calculated by dividing the distance of shoreline movement by the time elapsed between the oldest and the most recent shoreline (Figure 3.2). The major advantages of the EPR are the ease of computation and the minimal requirement of only two shoreline dates. The major disadvantage is that in cases where more data are available, the additional information is ignored.

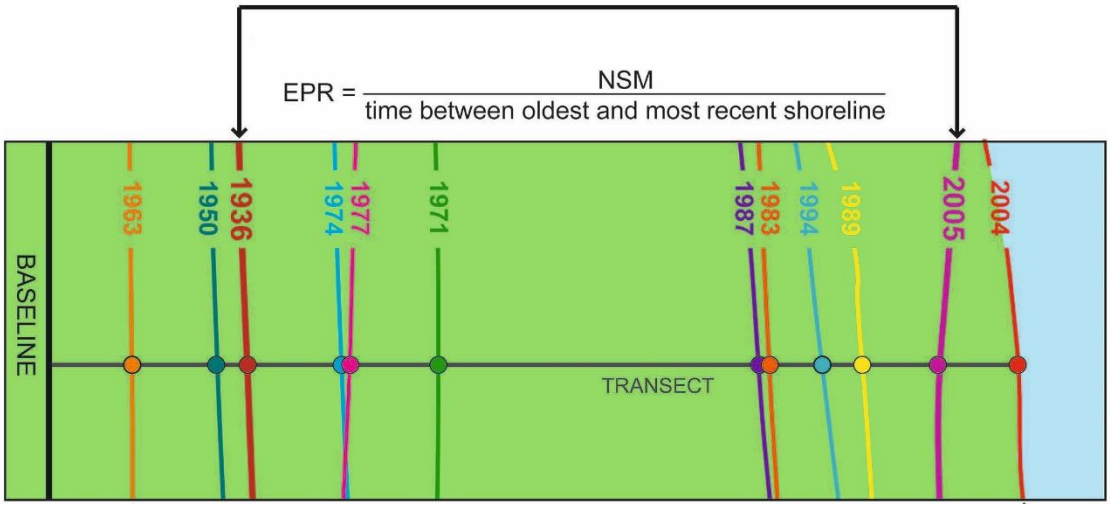

Figure 3.2:Calculation of Short-Term Shoreline change analysis

(Sample image source:(Sweet *et al.* 2017))

3.2. Long Term Shoreline Change Analysis

A linear regression rate-of-change (LRR) statistic is determined by fitting a least-squares regression line to all shoreline points for a particular transect (Figure **3.3**). The regression line is placed so that the sum of the squared residuals (determined by squaring the offset distance of each data point from the regression line and adding the squared residuals together) is minimized. The linear regression rate is the slope of the line. However, the linear regression method is susceptible to outlier effects and also tends to underestimate the rate of change relative to other statistics (Sutikno *et al.*, 2017).

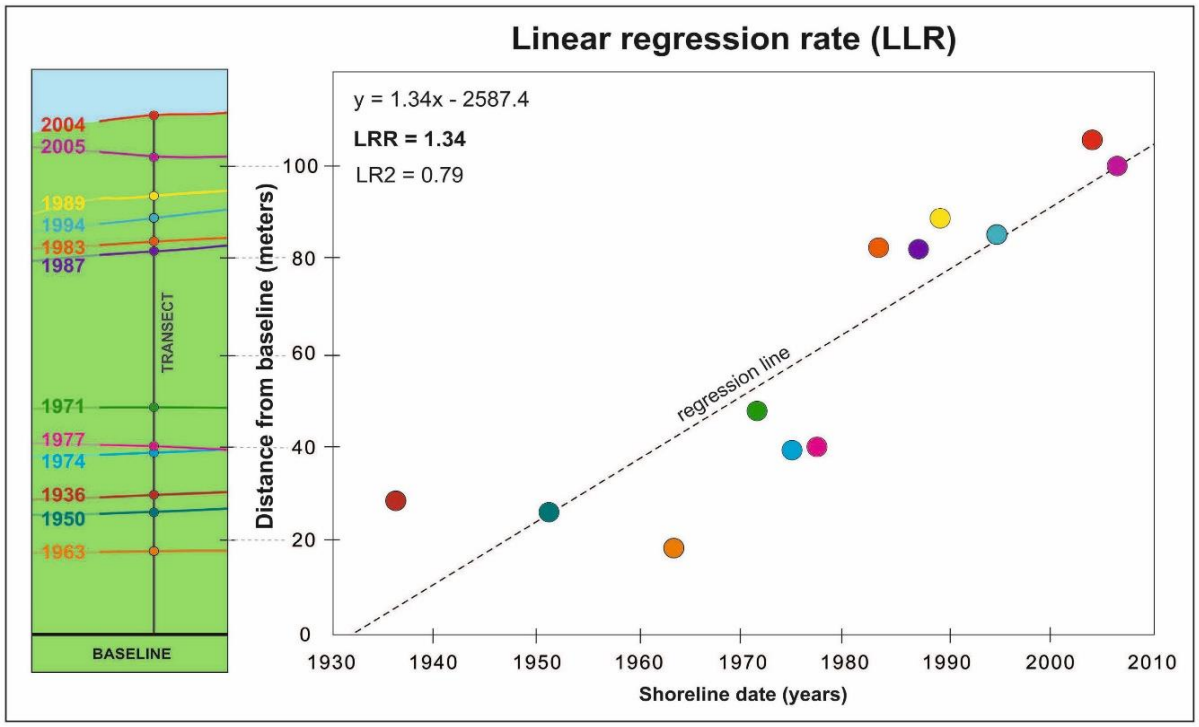

Figure 3.3: Calculation of Long Term (LRR) Shoreline Change Analysis

(Sample image source:(Sweet *et al.* 2017))

3.3. Data Used

The Multi-date satellite imageries, LISS-III and LISS-IV were procured from NRSC, Hyderabad was used for the analysis of the present study. The details of the satellite imagery used for the present study are given below (Figure 4.8, Figure 4.9 and Table 3.1).

Table 3.1: High-resolution Satellite Data for Shoreline Procured From NRSC

Satellite	Date	Sensor	Resolution (m)
IRS-R2	03th March 2015	LISS-III	23.5
IRS-R2	12th April 2022 and 24th April 2022	LISS -IV	5.8

3.3.1. Pre-processing

Pre-processing of satellite data includes correction of geometric, atmospheric, and radiometric aspects and clipping of the area to obtain the exact imagery of the project sites. The rectification operation aims to correct distorted images to create

a more faithful representation of the original scene. It typically involves the initial processing of raw image data to correct geometric distortions.

Radiometric Correction: Radiometric correction addresses variations in the pixel intensities (DNs) that have not been caused by the object or scene scanned. These variations include differing sensitivities or malfunctioning of the detectors, topographic effects and atmospheric effects.

Geometric Correction: Geometric correction addresses errors in the relative positions of pixels. These errors are induced by sensor viewing geometry or terrain variations. A geometric correction was done based on Ground Control Points (GCPs) and the image was re-sampled using the nearest neighbourhood interpolation method.

Shoreline Extraction: Continuous shoreline positions were extracted automatically and digitized manually for two different periods i.e., 2015 and 2022. Digital Shoreline Analysis System (DSAS) version 5.1, an extension of ESRI ArcGIS software was used to calculate shoreline rate of change statistics from a time series of multiple shoreline positions. The shoreline positions were compiled in ArcGIS with 5 attribute fields that included Object ID (a unique number assigned to each transect), shape, shape length, ID, date (original survey year), and uncertainty values. All different shoreline features were then merged within a single line on the attribute table, which enabled the multiple coastline files to be appended together into a single shape file. The Shoreline change rate was calculated by Endpoint rate (EPR) for the short term and Linear Regression Rate (LRR) for the long-term period. DSAS is purely a statistical approach. A baseline was digitized onshore by closely digitizing the direction and shape of the outer shoreline, which was used as the starting point for all transects.

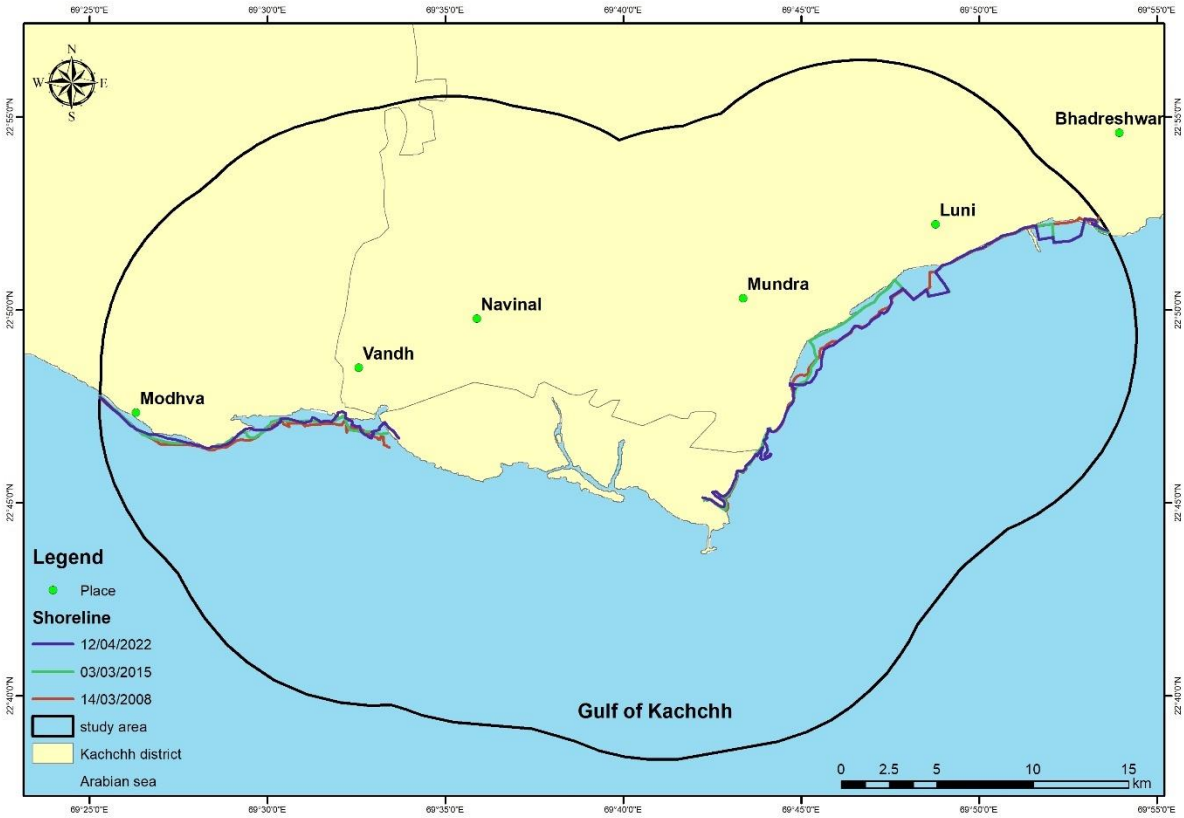

Figure 3.4: Shoreline Digitization for Different Years Using Multi Date Satellite Imageries.

3.4. Field Work

Field investigation is a vital part of the project. Fieldwork helps to check and collect most of the ground information required for shoreline mapping. The fieldwork was conducted during the period between 26th to 30th April 2022 and 21st to 23rd June 2022 for the DGPS survey and collecting ground truthing data.

Figure 3.5: Establishing DGPS Base Station (A) And Collecting Survey and Ground Truthing Data(B), (C), (D) Using Rover.

4. RESULTS AND ANALYSIS

In the present study, the rate of shoreline changes statistics on a time series of multiple shoreline positions of a totally 43 km coastline stretches (16 km on the west side and 27 km on the east side of Adani main port) on either side of Adani Ports and Special Economic Zone Ltd (APSEZL) has been taken in to account for the calculation by using satellite images. A total of 4254 transects were generated with 10m spacing along the shoreline. The length of each transect (Cross shore) was between 500 to 3000m. The variations in the rate of shoreline change were re-coded as N – S coast configuration. The shoreline change analysis was carried out for 2015-2022, the short-term shoreline change analysis method EPR was carried out using medium resolution (LISS III) and high-resolution images such as LISS-IV.

As a part of the NGT direction, the shoreline change analysis has been carried out out for the years 2015-2022 to study the immediate changes after the commissioning of the port and initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out.

Based on the rate of change over the period, shoreline change has been categorized into seven classes National shoreline Assessment system (N-SAS, 2022). They are; high accretion (>5m/year), moderate accretion (3.0 to 5.0 m/year), low accretion (0.5 to 3.0 m/year), stable coast (0.5 to -0.5m/year), low accretion (-3.0 to -0.5 m/year), moderate erosion (-3.0 to -5 m/year) and high erosion (>-5m/year).

4.1. Results For Shoreline Change Analysis From Satellite Images

The erosion and accretion are highlighted with red and green colour respectively for better understanding. The study area is divided into two major blocks (1) West port and (2) Eastern side block for accurate analysis as shown in Figure 4.1.

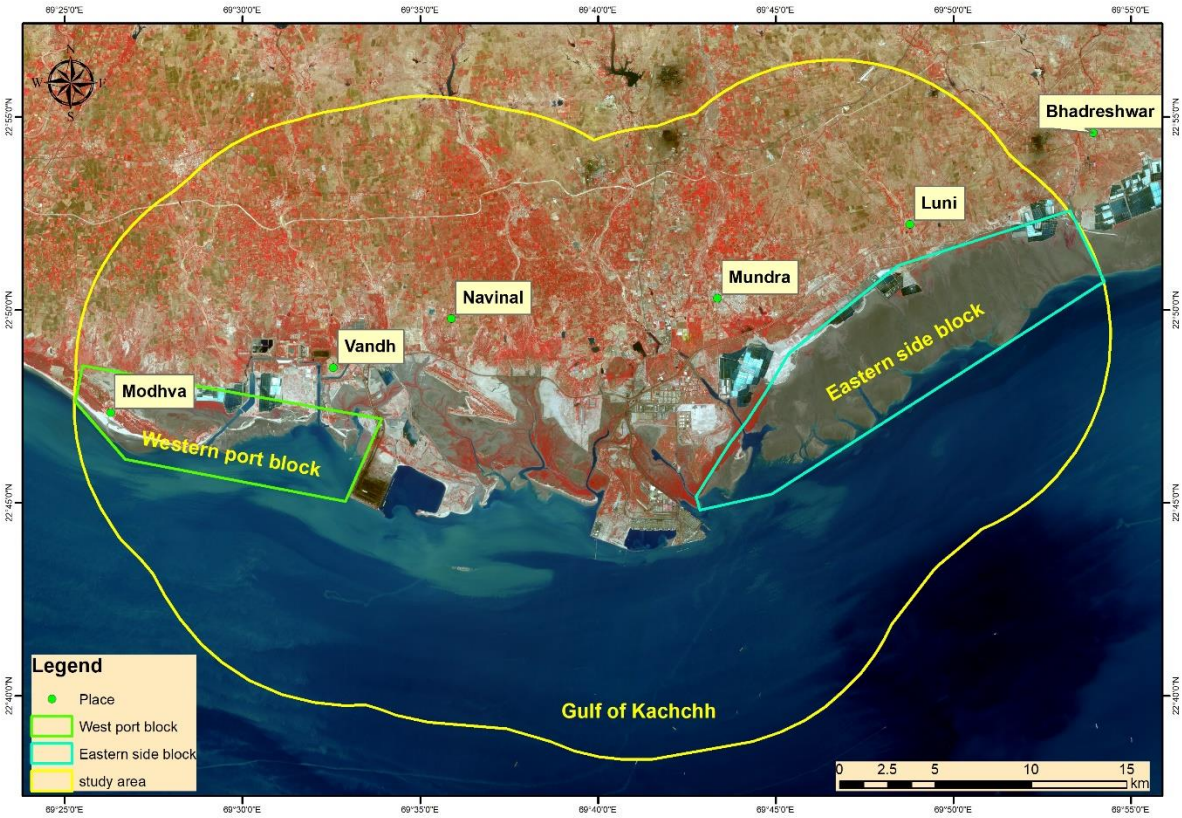

Figure 4.1: Study area in two blocks.

4.1.1. Results for Overall Shoreline Change From 2015 to 2022

The results of the imagery data analysed before the port activity using medium to high resolution of (LISS-III (23.5m) and LISS-IV (5.8m)) satellite images, processed for the period 2015 to 2022 have shown a high rate of accretion (5 to 191 m/year) to stable coast along the eastern side block except for a few pockets where there was low to moderate erosion on the shore has seen. In contrast on the western side of the port, most of the area are highly eroded (Figure 4.2) at has been observed. The details of the instantaneous rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarised in Table 4.1. The data indicated that shoreline changes were very much dynamic and no regular pattern was evident at all in the study sites. However, the rate of change was comparatively high on the eastern side of the port during the last 7 years.

Table 4.1: Details of Average and Maximum Short term Shoreline Changes

Period	Name of the block	Average Shoreline Change(M/Year)	Shoreline Change(M)	
			Maximum Accretion	Maximum Erosion
2015-2022	West Port	-11.43	39.86	-78.68
	Eastern	-26.60	191.32	-165.19

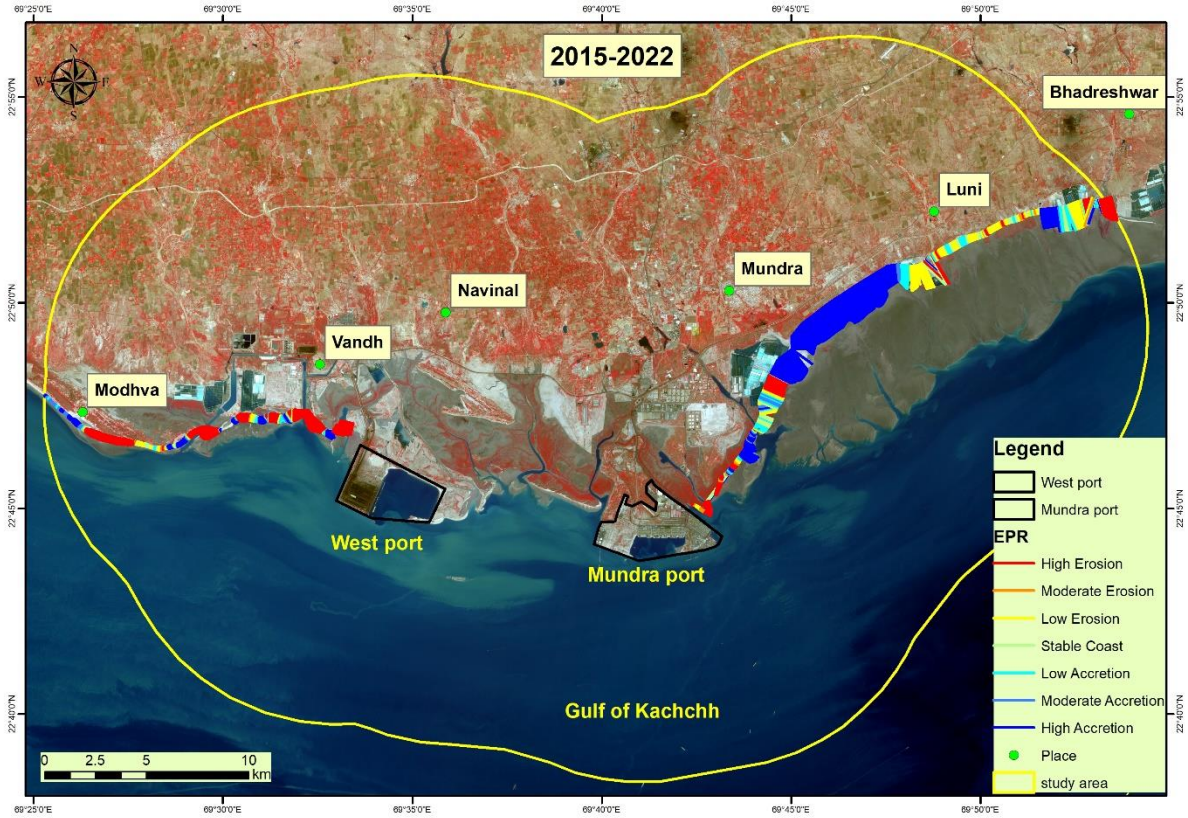

Figure 4.2: Shoreline Changes During March 2015 to April 2022

4.1.2. Zones of High Erosion and High Accretion

For the present study on shoreline changes evaluation, one sets of data were considered. They are the moderate to high resolution (23.5m and 5.8m) images for 2015-2022 and overall shoreline changes delineate in high erosion and high accretion zone, and the results are presented in Figure 4.3.

Based on the analysis of the imageries it is possible to delineate the study areas into zones for the ease of classification into high erosion and high accretion within the study limits. The images have indicated that a total distance of 23.6 km showed

high accretion zone, around 1.9 km high erosion zone near Bocha island on the eastern side of Mundra port, however on the western side of west port 11 km identified as a zone of high erosion whereas approximately 5 km patches between west port to Modhva comes under the high accretion zones (Figure 4.3).

Shoreline change analysis for the present study has been carried out over 7 years ranging from 2015 to 2022. Change detection analysis of the study area indicated that the shoreline has undergone both accretion and erosion processes in the last 7 years. Transects demarcated for accretion and erosion rates indicate that almost 51.4% of the area has undergone accretion for the entire study period (2015 to 2022). Even though it was observed that 48.6% of the area had experienced erosion, the rate of removal of the substratum was relatively lower than the rate of accretion.

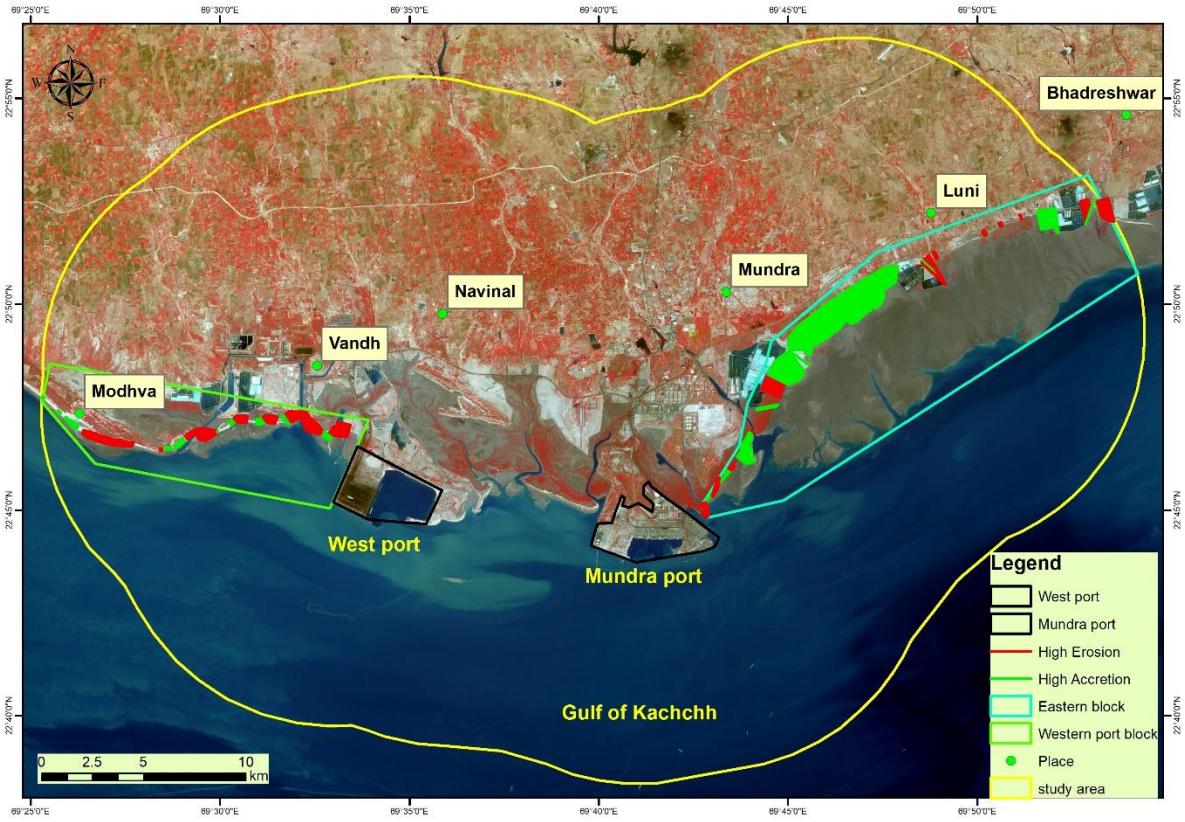

Figure 4.3: Zones of High Erosion and High Accretion

Validation of the shoreline data of the 43 km (16 km on west side and 27 km on east side of Adani main port) stretch of Adani Ports and Special Economic Zone Ltd

(APSEZL), using Differential GPS (DGPS)has been carried out for the period 26th to 30th April 2022 and 21st to 23rd June 2022 (Figure 4.4). The results obtained with the higher resolution satellite images of the field match the shoreline details derived from the satellite images.

The shoreline data derived from high-resolution satellite imagery obtained during 2018 has been compared with NCSCM (National Centre for Coastal Management) approved CRZ map (Figure 4.5) is quite similar to the shoreline configuration derived from the NCSCM (National Centre for Coastal Management) approved CRZ map of 2017-18.

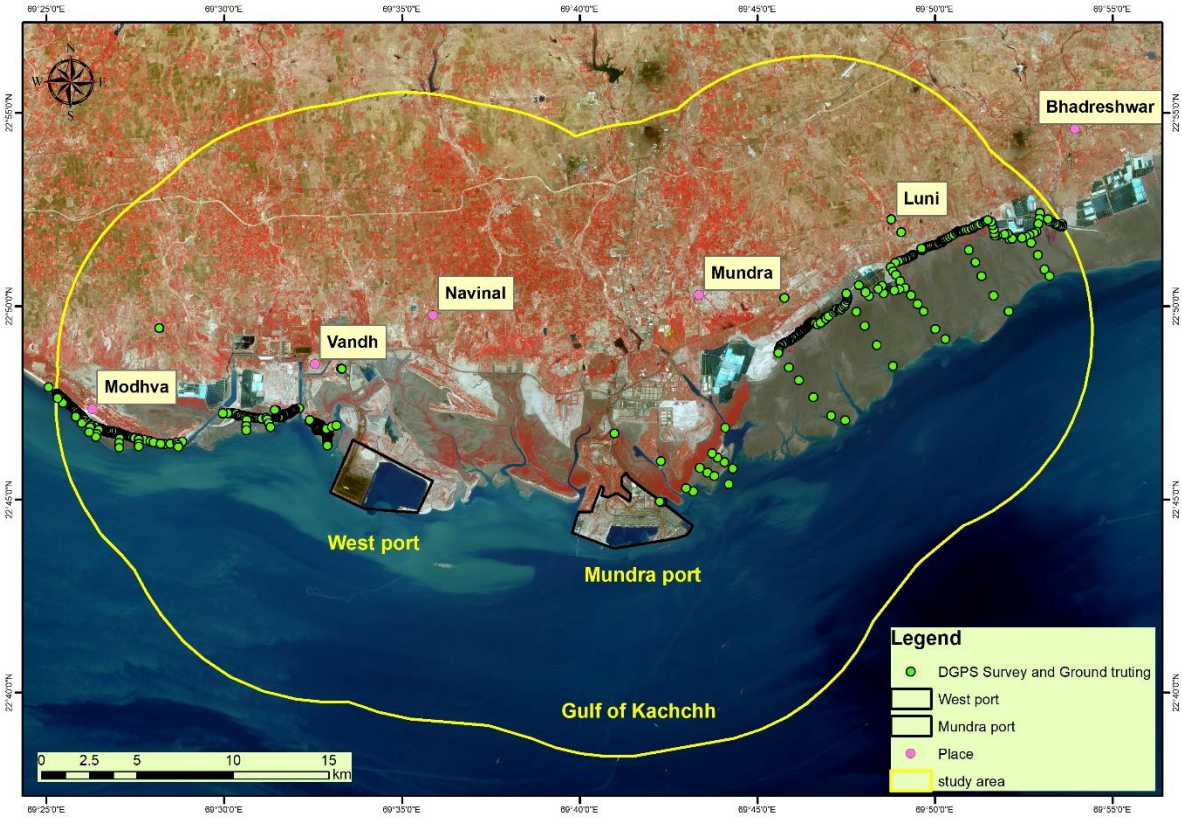

Figure 4.4: Shoreline Data of the Study Sites Using DGPS

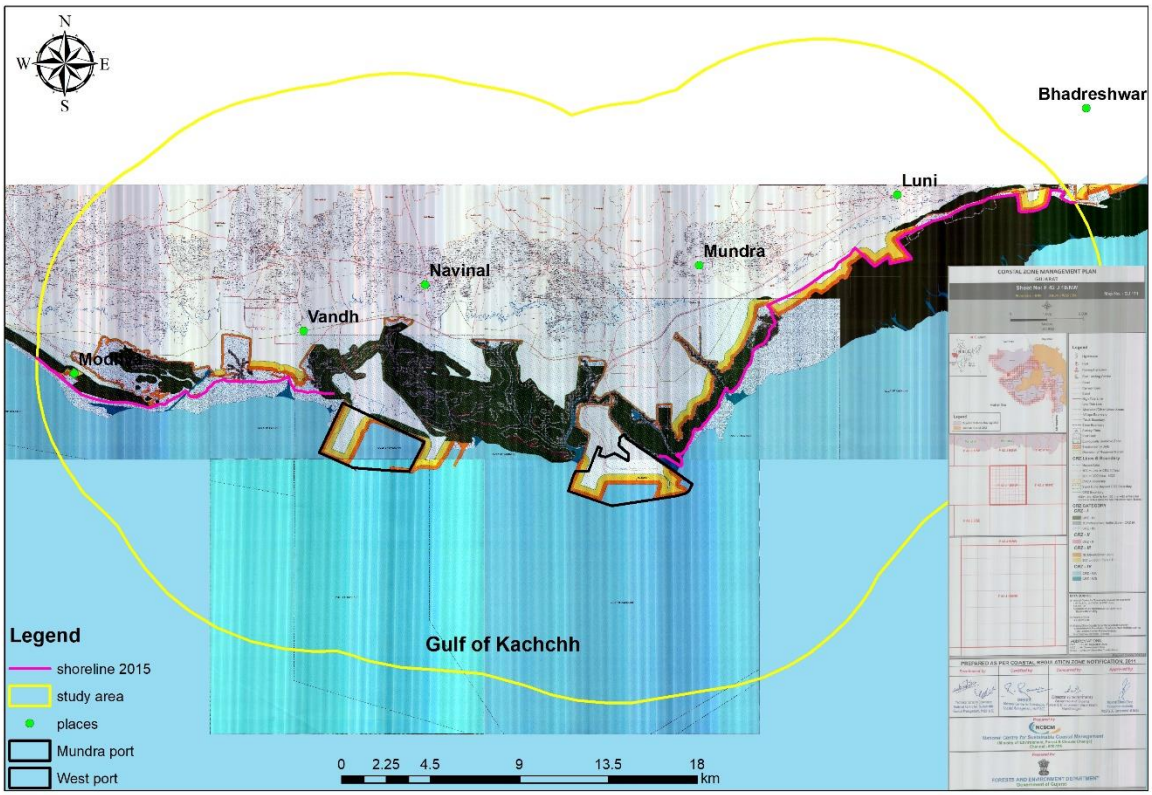

Figure 4.5: Approved CZMP in line with CRZ Notification, 2011 prepared by National Centre for Coastal Management (NCSCM)

4.1.3. Beach Profile

Shoreline Change analysis using Cross Section Profile (CSP) has been carried out using DGPS Survey. CSP data has been collected from 20 different locations along the Mundra Coast. The total profile line stretches of 50 km covering the area of approximately 30 km west and 25 km east of the existing port site was conducted during the period 26th to 30th April 2022 and 21st to 23rd June 2022 (Figure 4.6).

This analysis was done to create a baseline data for comparison in the future with beach profile data from the same location for different seasons. Beach profiles were plotted location-wise. The trends of beach profiles were assessed qualitatively (Figure 4.6). The difference, if any, shall be investigated further to understand the impact due to port activities on the shoreline evolution.

A beach profile is defined as a set of beach levels taken at a uniform distance in a straight line (Figure 4.7). Beach profiles can only be meaningful if surveys are undertaken over a stipulated period at the same place and the same directions.

Further, the beach profile also suggests that there are regions of high-rate accretion and erosion on an average of 3.05 m (Figure 4.7), and also there are vertical changes as seen along the eastern of Mundra coast which could be the reason for the high rate of sediment deposition along the Luni and Bhadreshwar coast in the recent times. The rate of shoreline changes may be also depended on the inflow of fresh water into the estuarine.

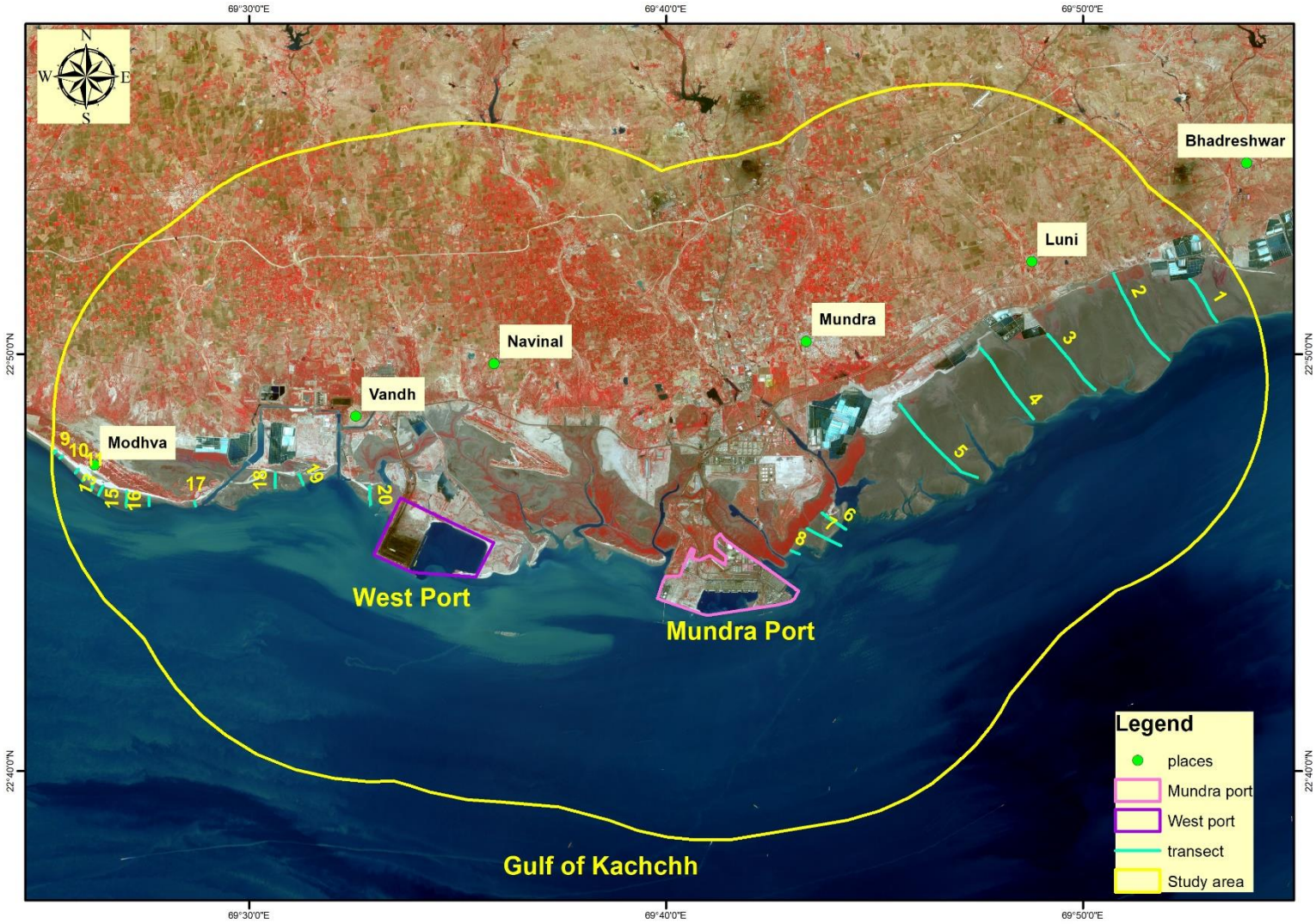

Figure 4.6: Beach Profile of the study area

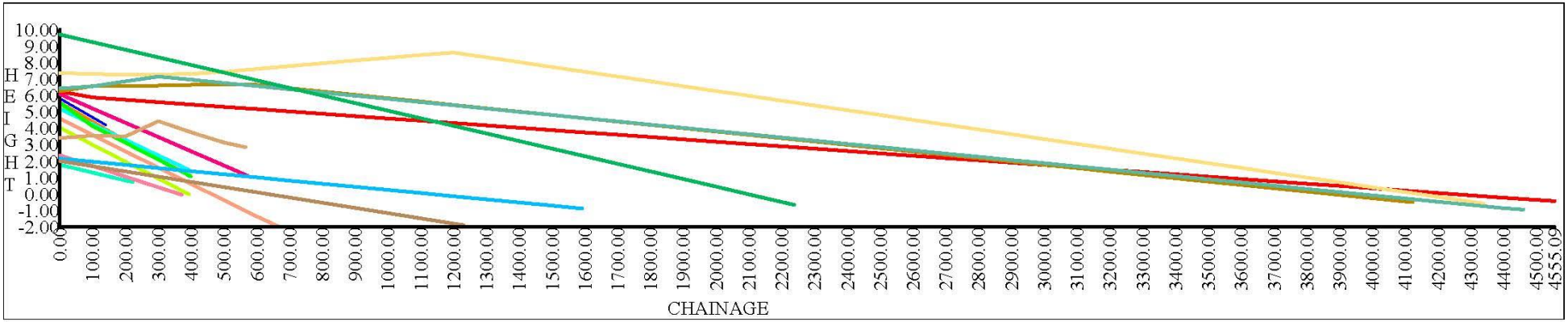

Figure 4.7: Beach Profile at Different Locations

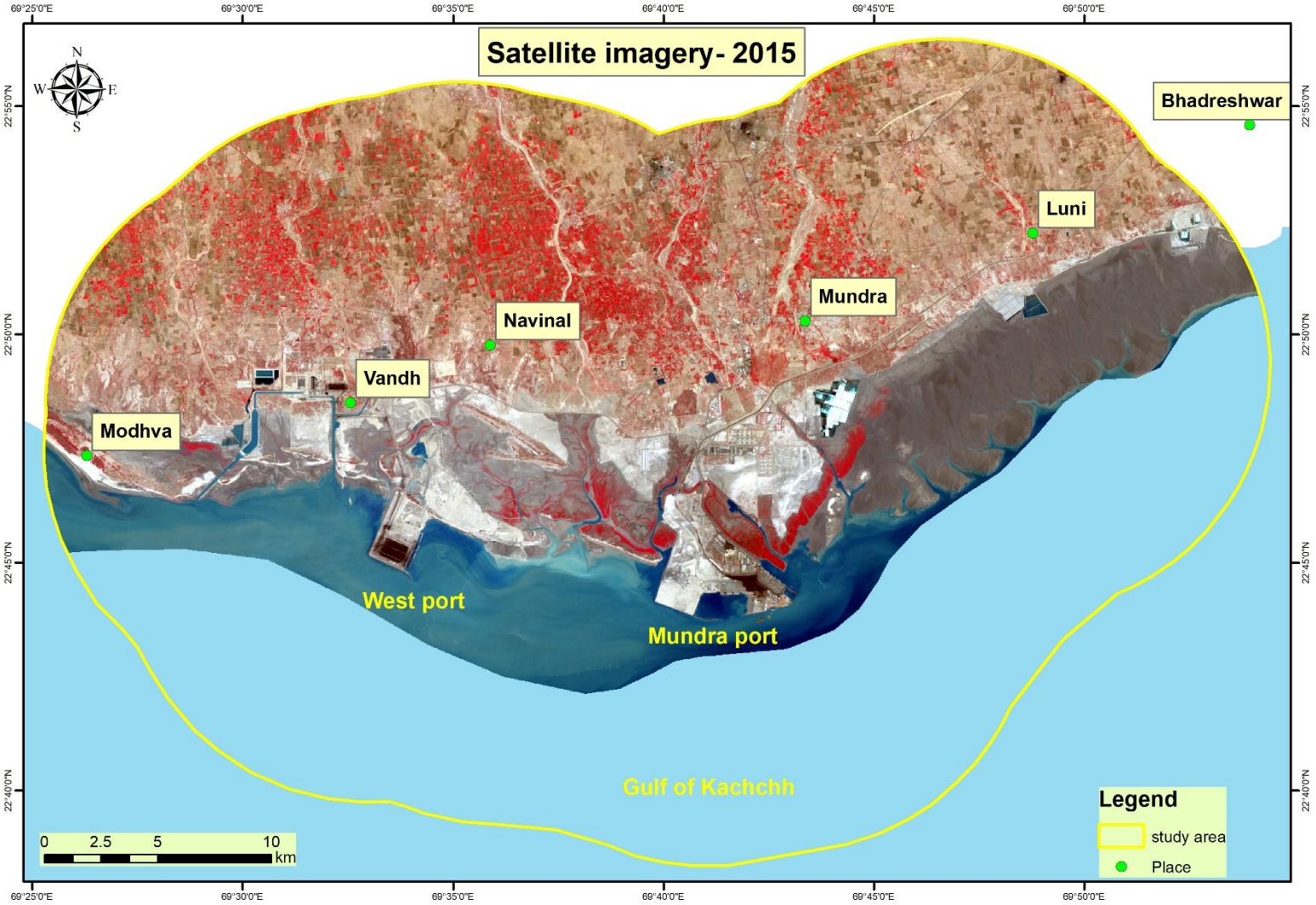

Figure 4.8: Satellite image of the Study area during May 2015

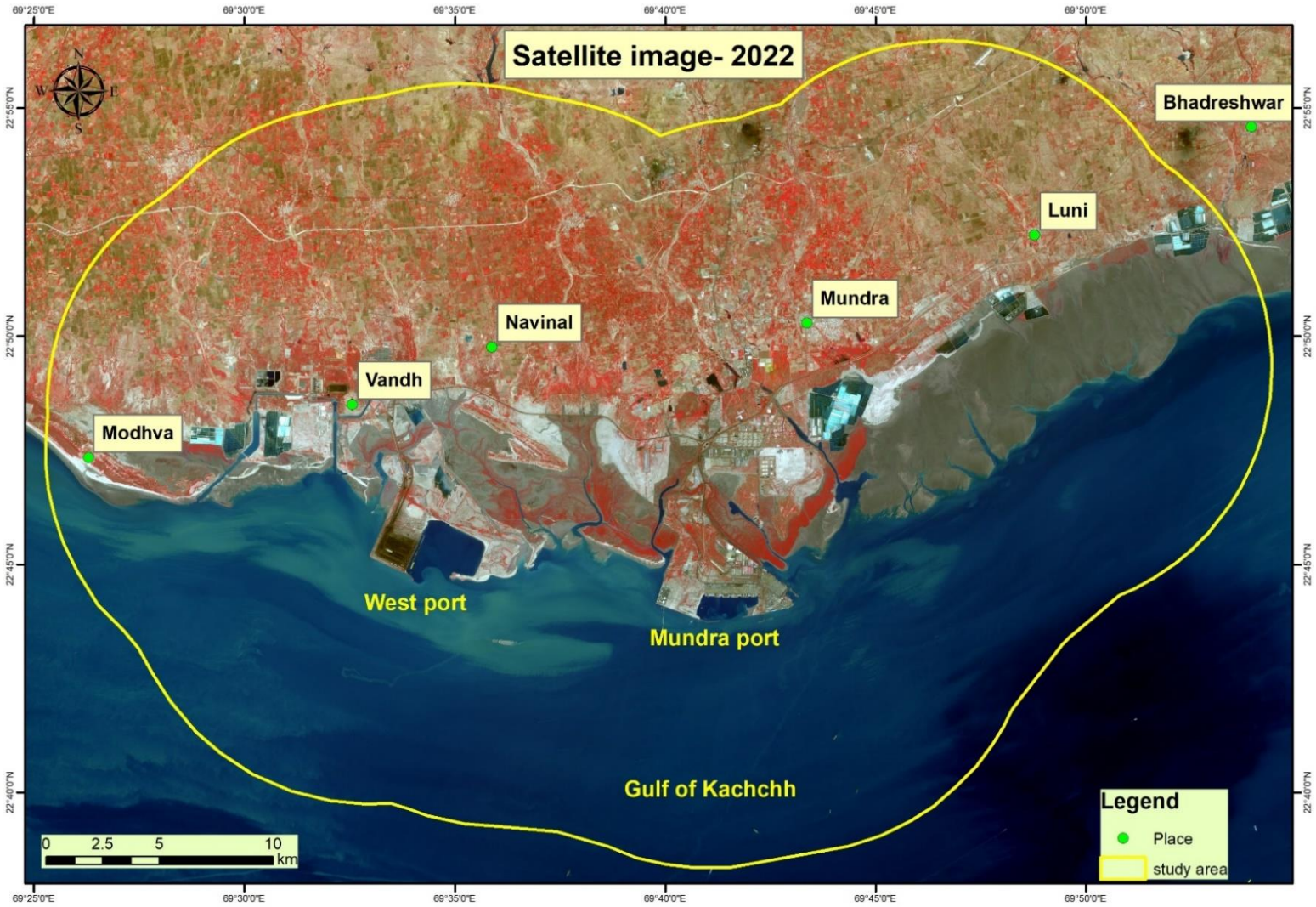

Figure 4.9: Satelliteimage of the Study area during May 2022

Figure 4.10: :(a) Modhava Coast, (b) and (c) and (d) Western Coast (e) & (f) Eastern Coast of Adani Port.

5. CONCLUSION

5.1. Shoreline Changes

The present study confirms the expediency of the image processing techniques and GIS tools applied on multi-temporal and multi-spectral images of different satellite sensors for assessment of the changes along the shoreline. As deduced from the results of both short-term and long-term shoreline assessment that the results are in conformity with that of the data obtained through in-situ measurements, DGPS survey and ground truthing for the shore profile along the Mundra coast. The Mundra coast has been subjected to several significant changes during the last one and half decades (2015–2022) within this 43-km coastal strip particularly from Modhva (west) to Luni (east), ranging from high accretion of 191.32 m/year to severe erosion of up to -165.19 m/year, at few parts of the coast, however, remained stable. Above value for both erosion and accretion may vary ±5m depending upon the time of the satellite imageries taken during high tide and low tide time.

The present study concludes that the shoreline at Mundra coastal region is under the impact of shoreline change with processes of accretion and erosion varying from time to time (Hitesh Patel, 2018). Process of erosion increased which includes some patches at Modhva coastal stretches, near the west port and some patches near mouth of Bocha Island on eastern side of Mundra port area whereas rest of the area observed accretion.

The predominant causes of shoreline changes are both natural as well as anthropogenic. Natural processes include wind and wave forces whereas man-made effects or artificial processes include the construction of marine structures and water control structures. It is revealed from the study that the setting of shorelines and the supply of sediments determines how the shoreline changes at a particular location (Jodhani *et. al.,* 2020). The conservation and management plan is indicated below:

5.2. Recommendations

- The process of erosion is highest along the edges (close to the waterfront) it could be controlled only by physical means by constructing appropriate civil engineering structures. Erosion control structures or constructing embankments of stones or any suitable material along the erosion site is strongly recommended if the problem is too heavy. The proposed embankment should be an eco-engineering design with a gentle slope of appropriate angle to the tidal action that will allow natural flushing while controlling erosion.

- Erosion, either man-made or natural is a major threat to intertidal habitats in the Gulf environment due to altered hydrological regimes and other natural causes. Observations carried out during the field surveys revealed those estuarine environments as well as many coastal stretches are facing erosion mainly due to high tidal amplitude. Hence, extensive surveys should be carried out to recommend suitable mitigation measures and to update the status of the biodiversity as well in order to estimate the level of physiographical impacts on the shoreline.

- Artificial coastal structures help in controlling coastal erosion and thereby enhance intertidal and sub-tidal biodiversity as they accelerate the reef-building process. Artificial reefs tend to last for decades supporting faunal components. Since such structures are built using natural materials (for example dead gastropods and bivalves) they are environment-friendly and in due course become natural. They attract diverse marine fauna within a short period with a high potential to enhance biodiversity. The same could be implemented in Adani Ports and Special Economic Zone Ltd (APSEZL) jurisdiction in consultation with the experts.

- Plantation of suitable saline tolerant plant species (shrubs and trees) also helps in controlling the soil erosion along the coastal area.

- The establishment of facilities and the expansion of infrastructure over the coming years will bring about notable changes in the landscape and seascape in and around the Adani Ports and Special Economic Zone Ltd (APSEZL). Long-

term human-centred/induced activity of this magnitude in any coastal belt will have repercussions on its natural resources and ecosystems. As mangroves, mudflats and tidal creeks are the major ecological entities within the Adani Ports and Special Economic Zone Ltd (APSEZL), their conservation and management warrants priority and calls for a holistic approach. Thus, measures should be taken to conserve and preserve the mudflats and mangroves within the Adani Ports and Special Economic Zone Ltd (APSEZL) to retain their tangible and intangible ecological benefits. The conservation and management plan presented in the proceeding section has the following broad aspects and different activities under each aspect are dealt with.

- The creation of baseline information to track subsequent changes in natural shoreline formation within the Adani Ports and Special Economic Zone Ltd (APSEZL) observations through GIS and RS tools have to be adopted. The GIS maps may be utilized for the purpose and could serve as a base map. Changes in creek systems, shoreline configuration and other land use categories could be monitored through this exercise once in two or three years.

- Periodical monitoring, preferably once in 3 years, and comparison of results with baseline data to underline changes will pave way for the formulation of mitigation and conservation efforts. Periodical monitoring of shoreline configuration and mudflats will help to assess their health and detect shoreline changes. Assessment and earlier generated data could be used to check shoreline configuration in terms of short and long-term changes and its succession patterns.

- Mudflats and mangrove conservation and restoration measures could subsequently be undertaken based on the results of the monitoring programs.

- Research needs to be undertaken to assess the economic and ecological benefits of sustainable development of shoreline configuration.

- Awareness should be generated among local people about the shoreline configuration changes in the surrounding areas and the consequences, particularly to the fishermen community.

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Annexure – 6

Details of Greenbelt Development at APSEZ, Mundra

	Total Green Zone Detail till Up to March 2023				
LOCATION	**Area (In Ha.)**	**Trees (Nos.)**	**Palm (Nos.)**	**Shrubs (SQM)**	**Lawn (SQM)**
SV COLONY	72.29	34920.00	7962.00	69696.00	100646.00
PORT & NON SEZ	81.61	149359.00	19220.00	75061.78	62966.38
SEZ	115.70	226120.00	20489.00	220583.60	28162.03
MITAP	2.47	8113.00	33.00	3340.00	4036.00
WEST PORT	104.29	248074.00	66816.00	24112.00	16369.00
AGRI PARK	8.94	17244.00	1332.00	5400.00	2121.44
SOUTH PORT	14.45	27530.00	3470.00	3882.00	3327.26
Samundra Township	58.26	63722.00	11834.00	23908.89	47520.07
Productive Farming (Vadala Farm)	0.00	0.00	0.00	0.00	0.00
TOTAL (APSEZL)	**457.99**	**775082.00**	**131156.00**	**425984.27**	**265148.18**
		906238.00			

Details of Mangrove Afforestation done by APSEZ

Sl. no.	Location	District	Area (Ha)	Duration	Species	Implementation agency
1	Mundra Port	Kutch	24	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	Kutch	25	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
3	Luni/Hamirmora (Mundra,)	Kutch	160.8	2007 - 2015	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
4	Kukadsar (Mundra)	Kutch	66.5	2012 - 2014	Avicennia marina	GUIDE, Bhuj
5	Forest Area (Mundra)	Kutch	298	2011 - 2013	Avicennia marina	Forest Dept, Bhuj
6	Jangi Village (Bhachau)	Kutch	50	2012 - 2014	Avicennia marina	GUIDE, Bhuj
7	Jakhau Village (Abdasa)	Kutch	310.6	2007-08 & 2011-13	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GUIDE, Bhuj
8	Sat Saida Bet	Kutch	255	2014-15 & 2016-17	Avicennia marina & Biodiversity	GUIDE, Bhuj
9	Dandi Village	Navsari	800	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	GEC, Gandhinagar
10	Talaja Village	Bhavnagar	50	2011-12	Avicennia marina	Forest Dept, Talaja
11	Narmada Village	Bhavnagar	250	2014 - 2015	Avicennia marina	GEC, Gandhinagar
12	Malpur Village	Bharuch	200	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village	Bharuch	50	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village	Bharuch	150	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat)	Anand	100	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat)	Anand	38	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot)	Bharuch	62	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
18	Kukadsar-(Bhadeswar-Mundra)	Kutch	250	2021-22	Avicennia marina	Shreeji Enterprise, Amreli
19	Kukadsar-(Bhadeswar-Mundra)	Kutch	750	2022-23	Avicennia marina	Shreeji Enterprise, Amreli
Total			**3890**			

Annexure – 7

"Half Yearly Environmental Monitoring Reports "

For,

adani
Ports and Logistics

M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD. (WFDP-West Port)

PLOT NO: - NAVINAL ISLAND, Village - MUNDRA, Tal. – Bhuj, DIST. - KUTCH - 370421.

Monitoring Period: October – 2022 to March - 2023

Submitted By

UniStar
Environment and Research Labs Pvt. Ltd.

UniStar Environment & Research Labs Pvt. Ltd.

White House, Near GIDC Office, Char Rasta, Vapi, Gujarat, India – 396195

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MoEF&CC (GOI) Recognized Environmental Laboratory under the EPA-1986 (12.01.2020 to17.03.2023) | QCI-NABET Accredited EIA Consultant Organization | GPCB Recognized Environmental Auditor (Schedule-II) | ISO 9001:2015 Certified Company | ISO 45001:2018 Certified Company

RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Oct-22		Nov-22		Dec-22			
			10-10-2022	21-10-2022	7-11-2022	17-11-2022	12-12-2022	30-12-2022		
1.	pH @ 25 ° C	--	7.28	7.33	7.38	7.42	7.38	7.39	6.5 to 9	APHA 23rd Ed.,2017,4500-H^+B
2.	Total Suspended Solids	mg/L	26	22	24	24	28	22	100	APHA 23rd Ed.,2017,2540 - D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	15	16	18	14	15	16	30	APHA 23rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.72	0.84	0.7	0.74	0.72	0.84	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	50	23	33	40	50	34	1000	IS 1622: 1981

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CIN:U73100GJ2007PTC051463

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RESULTS OF STP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	WFDP WEST PORT STP OUTLET						GPCB Permissible Limit	TEST METHOD
			Jan-23		Feb-23		Mar-23			
			10-01-2023	30-01-2023	11-02-2023	28-02-2023	13-03-2023	28-03-2023		
1.	pH @ 25 ° C	--	7.41	7.35	7.22	7.21	7.28	7.24	6.5 to 9	APHA 23rd Ed.,2017,4500-H^+B
2.	Total Suspended Solids	mg/L	24	26	22	24	26	24	100	APHA 23rd Ed.,2017,2540 -D
3.	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	17	19	18	19	17	18	30	APHA 23rd Ed,2017,5210-B 5-6
4.	Residual chlorine	mg/L	0.82	0.88	0.82	0.88	0.92	0.94	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
5.	Fecal Coliform	MPN Index/100ml	50	60	40	80	60	50	1000	IS 1622: 1981

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CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	87.36	42.26	21.68	33.36	0.95	NOT DETECTED	NOT DETECTED
2.	06-10-2022	76.04	37.83	29.32	37.88	1.00	NOT DETECTED	NOT DETECTED
3.	10-10-2022	84.38	32.76	24.35	31.79	1.15	NOT DETECTED	NOT DETECTED
4.	13-10-2022	82.47	33.08	21.16	27.21	1.12	NOT DETECTED	NOT DETECTED
5.	17-10-2022	77.63	29.61	23.63	28.44	1.00	NOT DETECTED	NOT DETECTED
6.	20-10-2022	80.64	39.17	26.84	32.24	1.00	NOT DETECTED	NOT DETECTED
7.	27-10-2022	78.47	38.27	32.02	41.78	1.15	NOT DETECTED	NOT DETECTED
8.	28-10-2022	86.69	31.93	18.52	26.35	1.07	NOT DETECTED	NOT DETECTED
9.	31-10-2022	84.28	28.46	29.59	37.58	1.00	NOT DETECTED	NOT DETECTED
10.	03-11-2022	85.45	42.45	21.87	27.85	1.15	3.57	NOT DETECTED
11.	07-11-2022	89.12	45.28	29.65	35.67	1.00	4.29	NOT DETECTED
12.	10-11-2022	82.56	36	16.57	28.52	1.00	2.39	NOT DETECTED
13.	14-11-2022	87.59	42.15	24.53	32.88	1.13	6.31	NOT DETECTED
14.	17-11-2022	89.15	44.56	28.78	33.18	1.0	3.84	NOT DETECTED
15.	21-11-2022	83.56	37.8	30.15	33.45	1.15	2.97	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	81.3	37.89	29.45	34.55	0.92	3.68	NOT DETECTED
17.	28-11-2022	73.26	30.15	27.59	32.41	1.20	6.14	NOT DETECTED
18.	01-12-2022	87.68	32.39	26.18	36.87	1.18	2.69	NOT DETECTED
19.	05-12-2022	78.36	36.83	34.68	42.24	0.94	3.27	NOT DETECTED
20.	08-12-2022	73.27	42.59	27.93	33.37	1.00	4.32	NOT DETECTED
21.	12-12-2022	83.59	31.29	21.78	29.24	1.16	3.47	NOT DETECTED
22.	15-12-2022	84.19	38.55	31.36	43.63	1.00	4.23	NOT DETECTED
23.	19-12-2022	87.35	33.04	27.35	41.29	1.00	4.83	NOT DETECTED
24.	22-12-2022	79.15	45.18	34.52	38.64	1.13	2.14	NOT DETECTED
25.	26-12-2022	84.38	37.26	32.69	37.13	1.00	2.59	NOT DETECTED
26.	29-12-2022	82.38	31.82	29.36	36.49	0.95	3.57	NOT DETECTED
27.	02-01-2023	67.39	37.73	18.26	27.38	1.00	4.28	NOT DETECTED
28.	05-01-2023	84.27	32.88	26.42	33.75	1.15	3.14	NOT DETECTED
29.	09-01-2023	66.24	31.17	32.57	43.29	1.12	3.96	NOT DETECTED
30.	12-01-2023	86.17	39.86	27.61	34.17	1.00	2.68	NOT DETECTED
31.	16-01-2023	70.32	43.97	33.78	38.86	1.14	3.52	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	79.28	31.05	34.5	42.39	1.00	3.97	NOT DETECTED
33.	23-01-2023	61.84	34.43	26.38	31.26	0.95	3.12	NOT DETECTED
34.	26-01-2023	67.14	32.68	28.73	36.29	1.15	3.68	NOT DETECTED
35.	30-01-2023	81.24	37.29	19.94	31.47	1.00	4.29	NOT DETECTED
36.	02-02-2023	86.11	42.48	14.33	23.67	0.95	4.12	NOT DETECTED
37.	06-02-2023	75.37	39.58	18.74	26.27	1.00	2.57	NOT DETECTED
38.	09-02-2023	81.59	36.64	23.19	36.58	1.15	4.27	NOT DETECTED
39.	13-02-2023	72.31	29.06	24.9	28.51	1.00	3.26	NOT DETECTED
40.	16-02-2023	89.85	35.89	27.64	32.85	1.12	3.96	NOT DETECTED
41.	20-02-2023	84.36	36.27	31.63	37.48	1.16	3.38	NOT DETECTED
42.	23-02-2023	86.42	38.61	29.26	36.72	1.00	4.73	NOT DETECTED
43.	27-02-2023	68.17	39.85	31.73	39.25	1.00	2.38	NOT DETECTED
44.	02-03-2023	87.22	45.83	21.43	29.82	1.00	3.96	NOT DETECTED
45.	06-03-2023	74.89	41.54	19.87	24.14	1.14	2.76	NOT DETECTED
46.	09-03-2023	89.13	39.79	21.36	28.59	1.12	3.58	NOT DETECTED
47.	13-03-2023	71.6	36.58	19.31	25.64	0.98	4.12	NOT DETECTED

Continue…

Name of Location		West Port – West Basin Main Gate						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	87.49	39.51	24.53	31.72	1.11	4.77	NOT DETECTED
49.	20-03-2023	76.12	38.64	27.55	34.89	1.17	4.82	NOT DETECTED
50.	23-03-2023	85.42	41.26	29.64	37.41	1.13	3.12	NOT DETECTED
51.	27-03-2023	84.26	36.65	27.48	35.99	1.15	3.07	NOT DETECTED
52.	30-03-2023	81.78	39.88	24.94	31.26	1.12	4.27	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	78.36	42.69	27.37	32.68	1.00	NOT DETECTED	NOT DETECTED
2.	06-10-2022	72.63	36.72	28.48	39.17	1.15	NOT DETECTED	NOT DETECTED
3.	10-10-2022	79.73	29.16	24.31	34.52	1.05	NOT DETECTED	NOT DETECTED
4.	13-10-2022	76.93	33.26	21.42	34.5	1.15	NOT DETECTED	NOT DETECTED
5.	17-10-2022	86.48	39.04	28.63	37.71	0.95	NOT DETECTED	NOT DETECTED
6.	20-10-2022	81.53	36.34	30.47	36.94	1.00	NOT DETECTED	NOT DETECTED
7.	27-10-2022	85.21	34.92	29.03	34.82	1.15	NOT DETECTED	NOT DETECTED
8.	28-10-2022	84.15	32.71	23.83	36.26	1.00	NOT DETECTED	NOT DETECTED
9.	31-10-2022	89.29	42.37	31.79	41.26	0.92	NOT DETECTED	NOT DETECTED
10.	03-11-2022	89.13	29.56	17.68	23.45	1.00	3.68	NOT DETECTED
11.	07-11-2022	84.34	35.67	21.45	28.76	1.20	6.21	NOT DETECTED
12.	10-11-2022	78.95	33.12	23.68	30.15	1.14	4.75	NOT DETECTED
13.	14-11-2022	68.92	29.12	13.45	24.51	1.20	3.39	NOT DETECTED
14.	17-11-2022	76.54	35.67	23.17	30.15	1.00	4.57	NOT DETECTED
15.	21-11-2022	88.15	36.93	22.67	28.17	1.10	2.16	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	82.45	32.45	23.45	31.25	1.10	5.32	NOT DETECTED
17.	28-11-2022	87.15	43.45	24.53	30.16	1.00	3.14	NOT DETECTED
18.	01-12-2022	73.28	34.14	14.37	27.42	0.97	2.14	NOT DETECTED
19.	05-12-2022	86.14	31.72	16.63	34.42	1.00	3.74	NOT DETECTED
20.	08-12-2022	69.38	28.54	19.79	26.13	1.20	2.68	NOT DETECTED
21.	12-12-2022	85.17	36.81	24.64	36.79	0.95	2.41	NOT DETECTED
22.	15-12-2022	81.29	27.18	18.57	23.34	1.15	3.29	NOT DETECTED
23.	19-12-2022	78.59	32.86	26.73	34.88	1.00	4.14	NOT DETECTED
24.	22-12-2022	81.96	28.47	17.04	27.38	1.15	3.82	NOT DETECTED
25.	26-12-2022	73.64	36.27	19.23	26.15	1.00	4.77	NOT DETECTED
26.	29-12-2022	85.4	39.83	24.76	31.48	0.96	2.26	NOT DETECTED
27.	02-01-2023	87.36	27.64	19.59	22.48	1.15	3.69	NOT DETECTED
28.	05-01-2023	62.89	42.47	24.51	28.75	1.18	2.94	NOT DETECTED
29.	09-01-2023	71.64	36.72	27.39	34.68	1.15	4.37	NOT DETECTED
30.	12-01-2023	80.27	41.97	21.85	34.71	1.00	3.94	NOT DETECTED
31.	16-01-2023	86.34	38.57	29.47	38.39	1.07	2.68	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	71.42	38.16	17.35	28.18	1.15	3.88	NOT DETECTED
33.	23-01-2023	68.79	34.62	23.94	29.72	1.14	2.58	NOT DETECTED
34.	26-01-2023	71.29	39.56	27.48	36.87	1.00	3.50	NOT DETECTED
35.	30-01-2023	78.57	31.72	18.28	26.36	1.15	3.48	NOT DETECTED
36.	02-02-2023	72.49	36.71	25.89	31.27	1.00	2.17	NOT DETECTED
37.	06-02-2023	87.73	33.47	27.3	36.91	1.16	3.62	NOT DETECTED
38.	09-02-2023	89.62	41.59	21.42	28.82	1.00	3.98	NOT DETECTED
39.	13-02-2023	76.38	44.68	34.99	38.74	0.95	4.03	NOT DETECTED
40.	16-02-2023	68.45	35.04	23.61	32.38	1.13	3.52	NOT DETECTED
41.	20-02-2023	89.61	32.16	24.48	31.36	1.00	4.17	NOT DETECTED
42.	23-02-2023	74.19	39.37	29.53	37.26	0.97	3.83	NOT DETECTED
43.	27-02-2023	79.53	36.83	22.79	33.17	1.19	2.48	NOT DETECTED
44.	02-03-2023	83.65	41.36	32.75	39.14	1.16	2.78	NOT DETECTED
45.	06-03-2023	80.36	36.86	34.13	41.74	1.12	4.15	NOT DETECTED
46.	09-03-2023	73.48	32.16	28.27	35.63	1.15	4.37	NOT DETECTED
47.	13-03-2023	85.49	34.68	29.23	32.79	1.12	4.86	NOT DETECTED

Continue…

Name of Location		West Port – Horti Culture						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	81.38	31.43	23.86	28.67	1.00	3.7	NOT DETECTED
49.	20-03-2023	89.29	40.56	36.63	42.05	1.17	3.53	NOT DETECTED
50.	23-03-2023	83.25	36.27	32.94	38.52	1.00	4.19	NOT DETECTED
51.	27-03-2023	73.59	33.64	29.58	36.19	1.11	2.88	NOT DETECTED
52.	30-03-2023	76.46	37.29	31.44	37.98	1.13	3.65	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	82.56	39.85	26.91	34.25	1.06	4.12	NOT DETECTED
2.	06-10-2022	84.83	35.76	21.24	28.96	0.90	NOT DETECTED	NOT DETECTED
3.	10-10-2022	88.51	37.14	28.53	33.05	1.12	NOT DETECTED	NOT DETECTED
4.	13-10-2022	89.2	41.86	17.36	24.17	1.00	NOT DETECTED	NOT DETECTED
5.	17-10-2022	89.73	28.62	24.12	34.63	1.15	NOT DETECTED	NOT DETECTED
6.	20-10-2022	79.28	31.38	31.16	37.34	1.09	NOT DETECTED	NOT DETECTED
7.	27-10-2022	78.13	34.93	19.68	28.63	1.10	NOT DETECTED	NOT DETECTED
8.	28-10-2022	83.63	36.03	24.36	31.24	1.00	NOT DETECTED	NOT DETECTED
9.	31-10-2022	81.64	32.48	23.82	28.83	1.17	NOT DETECTED	NOT DETECTED
10.	03-11-2022	89.12	45.67	21.32	27.1	1.10	4.74	NOT DETECTED
11.	07-11-2022	87.15	37.25	17.89	24.56	1.00	3.28	NOT DETECTED
12.	10-11-2022	88.24	34.56	22.86	28.92	0.92	4.71	NOT DETECTED
13.	14-11-2022	84.34	42.78	24.38	30.15	0.95	3.58	NOT DETECTED
14.	17-11-2022	86.77	39.83	14.56	27.84	1.00	2.81	NOT DETECTED
15.	21-11-2022	89.54	48.25	25.13	31.24	1.12	5.63	NOT DETECTED

Continue…

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	79.14	37.72	21.35	27.85	1.00	3.79	NOT DETECTED
17.	28-11-2022	84.56	41.35	23.94	29.36	1.15	2.37	NOT DETECTED
18.	01-12-2022	82.39	36.26	14.63	32.18	1.95	2.38	NOT DETECTED
19.	05-12-2022	73.49	32.49	19.47	27.36	1.15	4.71	NOT DETECTED
20.	08-12-2022	83.48	37.81	24.32	31.88	1.00	2.89	NOT DETECTED
21.	12-12-2022	76.49	34.68	18.75	24.17	1.00	2.38	NOT DETECTED
22.	15-12-2022	88.46	32.53	17.93	29.49	1.00	3.46	NOT DETECTED
23.	19-12-2022	84.27	43.26	21.53	34.06	1.15	3.18	NOT DETECTED
24.	22-12-2022	89.64	34.07	26.93	37.38	0.95	4.69	NOT DETECTED
25.	26-12-2022	72.79	39.86	16.32	32.5	1.00	4.72	NOT DETECTED
26.	29-12-2022	79.84	41.55	22.87	29.13	1.14	2.42	NOT DETECTED
27.	02-01-2023	89.42	45.26	24.79	26.46	2.01	3.28	NOT DETECTED
28.	05-01-2023	76.31	37.48	26.31	34.63	1.17	2.47	NOT DETECTED
29.	09-01-2023	83.47	31.28	29.36	37.51	1.00	4.39	NOT DETECTED
30.	12-01-2023	63.88	39.74	26.22	34.75	1.15	4.19	NOT DETECTED
31.	16-01-2023	73.59	26.63	28.15	32.19	1.12	2.47	NOT DETECTED

Continue...

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	78.36	32.4	28.62	39.57	1.00	2.98	NOT DETECTED
33.	23-01-2023	82.18	38.51	32.44	36.14	1.12	4.15	NOT DETECTED
34.	26-01-2023	89.86	46.72	23.67	28.49	0.95	3.78	NOT DETECTED
35.	30-01-2023	72.47	33.56	29.83	37.53	1.04	3.27	NOT DETECTED
36.	02-02-2023	86.34	38.22	29.47	38.82	1.16	4.17	NOT DETECTED
37.	06-02-2023	89.21	42.96	31.63	39.71	1.00	3.63	NOT DETECTED
38.	09-02-2023	71.48	38.62	34.59	41.26	1.18	2.47	NOT DETECTED
39.	13-02-2023	87.63	36.84	28.91	37.63	1.12	3.61	NOT DETECTED
40.	16-02-2023	70.16	41.39	32.17	39.83	1.00	3.89	NOT DETECTED
41.	20-02-2023	81.93	38.17	34.49	43.16	1.23	3.16	NOT DETECTED
42.	23-02-2023	88.57	44.18	28.93	34.75	0.94	2.98	NOT DETECTED
43.	27-02-2023	73.64	37.51	31.26	38.91	1.00	4.13	NOT DETECTED
44.	02-03-2023	85.77	43.71	34.86	42.65	1.29	3.96	NOT DETECTED
45.	06-03-2023	78.21	37.64	29.15	35.79	1.17	2.79	NOT DETECTED
46.	09-03-2023	75.97	36.56	27.63	32.17	1.05	3.14	NOT DETECTED
47.	13-03-2023	84.1	39.27	31.59	39.26	1.13	3.78	NOT DETECTED

Continue…

Name of Location		WEST PORT - PMC OFFICE						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	87.43	34.75	26.66	32.41	0.09	4.13	NOT DETECTED
49.	20-03-2023	70.63	41.49	32.53	38.86	1.15	3.57	NOT DETECTED
50.	23-03-2023	79.42	36.64	34.38	37.94	1.00	3.04	NOT DETECTED
51.	27-03-2023	88.75	44.59	36.16	43.29	1.23	3.98	NOT DETECTED
52.	30-03-2023	72.37	38.74	31.28	38.43	1.15	4.17	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

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Results of Ambient Air Quality Monitoring

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2023	82.19	32.27	19.28	32.6	1.15	NOT DETECTED	NOT DETECTED
2.	06-10-2022	77.29	36.25	27.36	34.74	1.00	NOT DETECTED	NOT DETECTED
3.	10-10-2022	87.79	33.94	31.15	38.67	1.12	NOT DETECTED	NOT DETECTED
4.	13-10-2022	89.52	41.37	28.71	34.29	1.00	NOT DETECTED	NOT DETECTED
5.	17-10-2022	72.64	29.28	33.57	42.69	1.17	NOT DETECTED	NOT DETECTED
6.	20-10-2022	86.38	35.31	27.89	34.72	1.00	NOT DETECTED	NOT DETECTED
7.	27-10-2022	84.82	36.86	21.42	27.49	1.00	NOT DETECTED	NOT DETECTED
8.	28-10-2022	72.64	36.88	29.47	34.63	0.95	NOT DETECTED	NOT DETECTED
9.	31-10-2022	83.94	31.19	26.75	34.28	1.00	NOT DETECTED	NOT DETECTED
10.	03-11-2022	75.34	24.56	15.67	21.38	1.00	5.83	NOT DETECTED
11.	07-11-2022	80.12	34.12	17.89	23.45	1.15	5.72	NOT DETECTED
12.	10-11-2022	84.56	37.15	21.34	29.25	1.00	4.29	NOT DETECTED
13.	14-11-2022	80.23	31.25	18.76	25.45	1.13	6.38	NOT DETECTED
14.	17-11-2022	75.67	27.89	23.75	31.2	1.24	5.13	NOT DETECTED
15.	21-11-2022	86.39	31.25	19.47	27.58	1.12	3.83	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	84.77	36.57	24.56	32.45	0.94	4.93	NOT DETECTED
17.	28-11-2022	70.23	23.44	26.84	33.21	1.18	5.83	NOT DETECTED
18.	01-12-2022	86.64	28.17	18.34	27.59	1.15	3.6	NOT DETECTED
19.	05-12-2022	71.28	26.53	23.19	32.27	1.17	2.86	NOT DETECTED
20.	08-12-2022	82.74	32.16	16.87	24.26	1.12	4.27	NOT DETECTED
21.	12-12-2022	75.38	36.94	14.49	27.83	1.00	3.66	NOT DETECTED
22.	15-12-2022	86.96	34.46	16.03	23.19	0.92	2.71	NOT DETECTED
23.	19-12-2022	73.48	37.52	24.71	32.68	1.00	5.24	NOT DETECTED
24.	22-12-2022	81.87	28.75	17.49	26.96	1.12	3.19	NOT DETECTED
25.	26-12-2022	76.19	32.71	21.27	29.14	1.00	3.84	NOT DETECTED
26.	29-12-2022	84.47	28.28	19.37	23.59	1.16	4.26	NOT DETECTED
27.	02-01-2023	73.47	34.28	19.63	31.24	1.00	5.12	NOT DETECTED
28.	05-01-2023	58.61	29.74	32.48	38.67	1.15	4.38	NOT DETECTED
29.	09-01-2023	78.46	42.74	26.62	37.74	1.15	3.72	NOT DETECTED
30.	12-01-2023	63.42	32.43	23.59	32.1	1.12	4.19	NOT DETECTED
31.	16-01-2023	76.68	26.51	24.93	32.85	1.00	3.53	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	71.39	29.86	16.85	29.83	1.15	4.72	NOT DETECTED
33.	23-01-2023	85.47	37.85	19.66	28.73	1.00	2.95	NOT DETECTED
34.	26-01-2023	71.59	34.28	28.42	37.27	1.17	2.48	NOT DETECTED
35.	30-01-2023	82.46	36.18	26.37	36.93	1.00	3.79	NOT DETECTED
36.	02-02-2023	69.73	39.14	26.79	37.18	0.93	2.79	NOT DETECTED
37.	06-02-2023	82.19	36.58	23.63	32.58	1.00	3.62	NOT DETECTED
38.	09-02-2023	88.74	27.26	29.18	43.55	1.17	4.58	NOT DETECTED
39.	13-02-2023	73.49	37.55	34.79	38.73	0.95	3.38	NOT DETECTED
40.	16-02-2023	68.27	34.08	31.53	36.39	1.14	4.68	NOT DETECTED
41.	20-02-2023	89.81	36.17	26.48	34.89	1.00	3.86	NOT DETECTED
42.	23-02-2023	85.25	31.49	23.17	26.42	1.15	3.51	NOT DETECTED
43.	27-02-2023	78.58	37.33	26.84	33.39	1.00	3.27	NOT DETECTED
44.	02-03-2023	72.77	43.61	21.36	27.65	1.00	3.09	NOT DETECTED
45.	06-03-2023	87.27	34.16	27.52	36.18	1.14	4.15	NOT DETECTED
46.	09-03-2023	85.89	41.59	32.18	38.45	1.00	3.51	NOT DETECTED
47.	13-03-2023	81.21	34.76	25.48	34.19	1.00	4.17	NOT DETECTED

Continue…

Name of Location		LPG Terminal Substation						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	89.62	38.58	28.74	31.69	1.12	3.27	NOT DETECTED
49.	20-03-2023	70.51	41.92	29.26	37.36	1.15	3.16	NOT DETECTED
50.	23-03-2023	85.41	37.48	23.59	28.24	1.12	4.52	NOT DETECTED
51.	27-03-2023	74.37	40.14	29.75	36.92	0.95	3.73	NOT DETECTED
52.	30-03-2023	82.87	34.48	23.61	29.37	1.14	3.27	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
1.	03-10-2022	79.7	32.63	18.34	27.84	NOT DETECTED
2.	06-10-2022	76.58	39.09	19.73	23.69	--
3.	10-10-2022	89.47	32.53	21.24	28.72	--
4.	13-10-2022	82.64	29.85	23.96	34.28	--
5.	17-10-2022	84.38	38.66	21.47	36.94	--
6.	20-10-2022	78.36	39.54	18.75	26.14	--
7.	27-10-2022	80.72	42.96	26.45	36.58	--
8.	28-10-2022	87.16	39.28	19.38	28.73	--
9.	31-10-2022	86.34	37.16	24.84	31.46	--
10.	03-11-2022	65.77	31.25	15.67	21.44	--
11.	07-11-2022	72.34	33.45	12.34	18.75	--
12.	10-11-2022	68.93	24.54	17.84	23.84	--
13.	14-11-2022	72.34	35.12	21.45	29.46	--
14.	17-11-2022	68.12	25.67	20.16	26.78	--
15.	21-11-2022	84.56	35.12	23.45	29.15	--

Continue…

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
16.	24-11-2022	86.57	32.15	21.18	28.1	--
17.	28-11-2022	66.15	25.89	17.36	24.39	--
18.	01-12-2022	73.38	36.72	11.25	16.63	--
19.	05-12-2022	68.38	31.44	13.52	15.47	--
20.	08-12-2022	78.17	29.52	14.73	18.29	--
21.	12-12-2022	82.36	38.19	10.46	17.61	--
22.	15-12-2022	73.26	34.64	9.36	12.75	--
23.	19-12-2022	76.22	39.81	13.58	16.53	--
24.	22-12-2022	64.68	33.79	11.31	19.63	--
25.	26-12-2022	82.38	28.15	14.27	17.26	--
26.	29-12-2022	78.46	26.39	9.62	14.63	--
27.	02-01-2023	62.38	26.79	10.58	19.73	NOT DETECTED
28.	05-01-2023	84.57	39.32	16.42	22.53	--
29.	09-01-2023	73.62	36.69	11.28	16.36	--
30.	12-01-2023	83.77	31.52	14.79	21.68	--
31.	16-01-2023	82.49	42.09	17.63	24.73	--

Continue…

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Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
32.	19-01-2023	74.18	31.52	9.61	13.28	--
33.	23-01-2023	78.51	26.36	10.83	16.97	--
34.	26-01-2023	76.42	36.58	13.67	19.05	--
35.	30-01-2023	87.28	33.83	13.17	17.36	--
36.	02-02-2023	78.62	32.16	12.47	21.28	--
37.	06-02-2023	61.89	34.86	14.19	17.63	--
38.	09-02-2023	74.38	29.69	9.84	14.89	--
39.	13-02-2023	84.27	27.81	11.27	18.36	--
40.	16-02-2023	73.14	37.88	14.34	19.49	--
41.	20-02-2023	85.39	29.84	10.28	16.81	--
42.	23-02-2023	71.29	34.16	16.69	23.48	--
43.	27-02-2023	89.17	29.96	12.37	16.69	--
44.	02-03-2023	89.13	37.52	14.26	17.72	--
45.	06-03-2023	73.91	35.16	18.53	23.38	--
46.	09-03-2023	78.64	33.48	13.76	18.55	--
47.	13-03-2023	88.24	29.85	15.31	21.43	--

Continue…

Name of Location		Adani Guest House				
Sr. No.	Date of Monitoring	Parameter with Results				
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
48.	16-03-2023	82.83	32.18	11.28	18.64	--
49.	20-03-2023	79.12	35.63	14.19	19.61	--
50.	23-03-2023	85.26	26.19	13.84	17.19	--
51.	27-03-2023	80.84	32.74	15.95	21.63	--
52.	30-03-2023	87.42	27.79	12.64	16.29	--
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**
Test Method		**IS - 5182, Part- 23**	**UERL/AIR/ SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

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Results of Noise Level Monitoring

Location Name		West Port – West Basin Main Gate					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		20-10-2022	21-11-2022	19-12-2022	19-01-2023	20-02-2023	20-03-2023
1	06:00 to 07:00	63.8	67.6	63.3	62.6	62.4	61.4
2	07:00 to 08:00	63.5	66.3	61.7	63.7	64.3	63.8
3	08:00 to 09:00	66.9	62.5	64.8	63.9	62.5	62.6
4	09:00 to 10:00	64.8	68.1	63.5	64.8	68.1	64.8
5	10:00 to 11:00	68.6	65.9	66.2	66.2	67.8	62.7
6	11:00 to 12:00	61.5	67.7	61.3	65.2	67.7	68.4
7	12:00 to 13:00	68.6	58.8	65.4	66.4	60.3	64.7
8	13:00 to 14:00	66.2	64.2	64.3	67.9	62.7	69
9	14:00 to 15:00	66.7	69.4	68.9	68.9	69.4	65.8
10	15:00 to 16:00	67.1	69.5	68.3	66.3	67.8	67.4
11	16:00 to 17:00	67.4	63.8	67.8	62.5	65.3	65.2
12	17:00 to 18:00	68.5	66.5	65.2	65.2	68.2	64.1
13	18:00 to 19:00	66.9	62.6	63.8	62.4	62.6	67.4
14	19:00 to 20:00	60.3	65.9	63.9	63.9	68.3	64.8
15	20:00 to 21:00	63.3	63.5	62.3	61.5	63.5	63.2
16	21:00 to 22:00	57.9	63.2	62.6	64.9	64.6	60.3
Day Time		<75 dB (A)					

Continue...

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Location Name		West Port – West Basin Main Gate					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		20-10-2022	21-11-2022	19-12-2022	19-01-2023	20-02-2023	20-03-2023
1	22:00 to 23:00	57.8	61.9	60.7	59.6	61.9	61.5
2	23:00 to 24:00	56.5	61.3	64.8	61.7	58.4	56.9
3	24:00 to 01:00	57.2	57.8	63.9	62.5	56.8	58.3
4	01:00 to 02:00	54.2	62.5	62.4	60.2	59.4	61.1
5	02:00 to 03:00	55.2	56.3	63.8	63.8	57.7	56.3
6	03:00 to 04:00	53.6	58.2	64.1	64.1	60.6	57.9
7	04:00 to 05:00	60.8	61.5	59.6	59.4	59	60.7
8	05:00 to 06:00	57.6	63.2	61.6	61.6	61.3	58.4
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

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Results of Noise Level Monitoring

Location Name		West Port – Horti Culture					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		27-10-2022	24-11-2022	22-12-2022	23-01-2023	23-02-2023	23-03-2023
1	06:00 to 07:00	62.6	63.5	61.8	61.2	64.7	60.7
2	07:00 to 08:00	69.2	68.4	67.8	63.5	68.4	65.7
3	08:00 to 09:00	67.8	68.2	63.7	62.3	64.3	67.4
4	09:00 to 10:00	69.5	68.9	64.8	63.2	67.5	65.3
5	10:00 to 11:00	61.7	63.2	64.1	67.4	63.2	62.8
6	11:00 to 12:00	61.4	67.4	68.5	68.5	64.9	67.1
7	12:00 to 13:00	65.5	69.9	69.9	64.7	62.1	64.8
8	13:00 to 14:00	67.2	67.5	63.2	63.2	67.5	62.8
9	14:00 to 15:00	69.5	64.3	67.5	63.1	63.8	67.5
10	15:00 to 16:00	66.5	68.3	67.4	68.3	65.9	62.1
11	16:00 to 17:00	65.5	67.1	64.3	67.5	67.1	63.9
12	17:00 to 18:00	64.1	64.8	66.7	66.7	62.4	64.9
13	18:00 to 19:00	67.2	68.2	68.2	69.2	67.5	69.4
14	19:00 to 20:00	67.2	64.8	64.4	65.2	69.8	61
15	20:00 to 21:00	65.4	61.3	67.2	68.4	62.6	65.8
16	21:00 to 22:00	64.8	63.9	63	62.8	62.1	63.2
Day Time		<75 dB (A)					

Continue…

Location Name		West Port – Horti Culture					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		27-10-2022	24-11-2022	22-12-2022	23-01-2023	23-02-2023	23-03-2023
1	22:00 to 23:00	62.8	59.3	58.5	58.1	56.6	58.2
2	23:00 to 24:00	62.5	63.9	60.3	61.2	58.4	59.4
3	24:00 to 01:00	61.9	63.2	61.7	63.5	54.6	54.6
4	01:00 to 02:00	62.8	62.8	58.6	59.8	59.4	59.4
5	02:00 to 03:00	61.3	61.8	60.7	61.9	60.2	61.8
6	03:00 to 04:00	59.6	61.3	61.2	61.2	56	56
7	04:00 to 05:00	58.5	62	60.8	61.2	57.5	55.9
8	05:00 to 06:00	58.4	58.9	59.4	60.3	58.9	57.2
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
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Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		28-10-2022	28-11-2022	26-12-2022	26-01-2023	27-02-2023	27-03-2023
1	06:00 to 07:00	64.1	62.4	59.1	60.7	60.8	64.1
2	07:00 to 08:00	64.2	64.3	68.5	68.5	63.6	62.3
3	08:00 to 09:00	61.4	67.4	67.4	67.4	68.2	64.3
4	09:00 to 10:00	64.5	68.8	68.2	63.6	68.8	65.2
5	10:00 to 11:00	63.7	66.5	69.5	67.3	69.1	68.9
6	11:00 to 12:00	67.5	68.2	66.3	61.4	67.4	64.3
7	12:00 to 13:00	60.4	69.3	68.4	64.8	69.3	62.8
8	13:00 to 14:00	64.8	68.5	64.1	67.5	65.4	65.1
9	14:00 to 15:00	65.1	67.4	69.4	68.6	67.4	63.8
10	15:00 to 16:00	65.5	61.2	64.6	62.4	63.2	65.2
11	16:00 to 17:00	63.5	65.5	67.2	62.1	66.3	67.9
12	17:00 to 18:00	64.8	68.6	64	67.8	68.6	68.6
13	18:00 to 19:00	61.7	67.2	63.5	64.3	69.9	69.9
14	19:00 to 20:00	61.3	64.9	67.8	67.8	67.2	63.1
15	20:00 to 21:00	59.5	68.2	68.2	67.2	64.1	65.8
16	21:00 to 22:00	58.9	67.8	65.7	64.9	64.6	63.8
Day Time		<75 dB (A)					

Continue…

Location Name		WEST PORT - PMC OFFICE					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		28-10-2022	28-11-2022	26-12-2022	26-01-2023	27-02-2023	27-03-2023
1	22:00 to 23:00	58.8	60.5	59.6	60.7	59.4	59.4
2	23:00 to 24:00	62.5	63.6	59.4	59.4	62.1	57.6
3	24:00 to 01:00	61.2	62.1	62.4	62.1	57.4	57.4
4	01:00 to 02:00	62.3	58.9	62.4	63.9	58.5	59.8
5	02:00 to 03:00	60.3	62.7	60.2	63.7	57.1	57.1
6	03:00 to 04:00	58.6	63.7	63.8	62.5	60.3	61.2
7	04:00 to 05:00	63.5	61.9	58.1	59	56.7	58.5
8	05:00 to 06:00	61.8	59.5	61.6	60.2	59.5	58
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

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Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		17-10-2022	17-11-2022	15-12-2022	16-01-2023	16-02-2023	16-03-2023
1	06:00 to 07:00	61.7	64.2	58.8	60.3	63.2	63.2
2	07:00 to 08:00	63.8	68.7	63.4	62.8	67.7	67.7
3	08:00 to 09:00	64.7	68.4	66.2	68.1	68.5	68.5
4	09:00 to 10:00	65.3	64.6	68.1	63.7	62.9	62.9
5	10:00 to 11:00	66.7	67.7	62.5	62.5	68.6	68.6
6	11:00 to 12:00	62.4	64.3	64.9	64.9	62.4	62.4
7	12:00 to 13:00	64.2	62.3	61.3	63.5	63.8	63.8
8	13:00 to 14:00	61.3	68.4	63.7	63.7	67.1	67.1
9	14:00 to 15:00	64.3	66.8	65.5	66.3	64.8	64.8
10	15:00 to 16:00	60.6	63.1	68.5	68.5	67.5	67.5
11	16:00 to 17:00	63.5	64.8	65.8	64.2	61.2	61.2
12	17:00 to 18:00	60.5	68.7	67.0	67.3	68.7	68.1
13	18:00 to 19:00	58.5	64.8	62.2	62.2	64.8	64.8
14	19:00 to 20:00	59.1	65.3	65.8	66.4	63.2	63.2
15	20:00 to 21:00	59.5	62.7	63.2	65.8	62.7	62.7
16	21:00 to 22:00	58.1	62.7	62.3	61.3	62.9	62.9
Day Time		<75 dB (A)					

Continue...

Location Name		LPG Terminal Substation					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		17-10-2022	17-11-2022	15-12-2022	16-01-2023	16-02-2023	16-03-2023
1	22:00 to 23:00	58.6	57.5	61.4	60.3	59.4	58.2
2	23:00 to 24:00	61.3	56.3	60.7	63.6	56.3	57.4
3	24:00 to 01:00	60.1	58.7	62.5	62.5	59.5	60.1
4	01:00 to 02:00	57.4	59.5	61.8	61.4	60.3	61.8
5	02:00 to 03:00	61.2	56.9	62.7	63.0	58.4	57.5
6	03:00 to 04:00	54.2	61.2	62.2	63.1	61.2	60.2
7	04:00 to 05:00	56.2	55.4	61.3	63.9	56.7	57.4
8	05:00 to 06:00	61.0	60.3	59.9	60.2	61.8	59.0
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

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Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		31-10-2022	29-11-2022	31-12-2022	31-01-2023	28-02-2023	31-03-2023
1	06:00 to 07:00	61.2	61.6	59.8	61.8	62.2	61.3
2	07:00 to 08:00	65.4	63.8	61.3	63.2	61.8	63.8
3	08:00 to 09:00	64.2	64.9	62.7	62.7	63.2	67.3
4	09:00 to 10:00	63.4	63.7	64.4	64.2	65.9	64.3
5	10:00 to 11:00	69.6	62.1	63.8	63.8	64.2	62.1
6	11:00 to 12:00	65.2	64.5	62.9	63.8	67.8	63.8
7	12:00 to 13:00	61.8	64.7	64.5	64.5	65.3	61.4
8	13:00 to 14:00	65.5	62.8	64.8	65.8	64.7	66.9
9	14:00 to 15:00	60.7	61.1	63.5	62.1	63.9	62.7
10	15:00 to 16:00	64.1	64.8	66.1	68.5	65.9	64.3
11	16:00 to 17:00	61.4	63.9	64.7	67.2	64.2	65.7
12	17:00 to 18:00	68.3	63.6	65.5	65.5	63.6	68.2
13	18:00 to 19:00	68.9	62.1	62.6	64.9	61.7	63.8
14	19:00 to 20:00	65.2	62.8	61.8	63.4	62.8	61.3
15	20:00 to 21:00	64.3	60.2	59.3	59.3	63.2	65.4
16	21:00 to 22:00	59.1	59.9	60.3	63.7	61.7	61.8
Day Time		<75 dB (A)					

Continue...

Location Name		Adani Guest House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		31-10-2022	29-11-2022	31-12-2022	31-01-2023	28-02-2023	31-03-2023
1	22:00 to 23:00	60.9	58.6	57.8	59.2	59.7	57.4
2	23:00 to 24:00	61.2	56.2	59.6	60.7	56.3	59.3
3	24:00 to 01:00	60.3	56.8	61.4	57.4	58.5	56.2
4	01:00 to 02:00	60.8	54.3	60.8	61.3	54.9	56.9
5	02:00 to 03:00	61.8	58.4	60.5	60.2	57.4	59.5
6	03:00 to 04:00	61.2	59.5	58.1	59.4	56.2	59.2
7	04:00 to 05:00	62.8	56.9	59.5	60.6	56.9	58.1
8	05:00 to 06:00	62.4	58.2	60.9	60.8	57.1	56.7
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

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Results of Stack Monitoring

Sr. No.	Parameter	Unit	Jan – 2023		GPCB LIMIT	Method of Test
			D.G.Set No. S-1 (1500 KVA)	D.G.Set No. S-2 (1500 KVA)		
			31-01-2023	31-01-2023		
1	Particulate Matter	mg/Nm^3	20.83	20.12	**150**	**IS 11255 (Part - 1)**
2	Sulfur Dioxide as SO_2	ppm	17.36	15.69	**100**	**IS 11255 (Part - 2)**
3	Oxides of Nitrogen as NO_X	ppm	23.47	21.26	**50**	**IS 11255 (Part - 7)**

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Sr. No.	Parameter	Unit	Mar-23	GPCB LIMIT	Method of Test
			D.G. Set-1 (2000 KVA)		
			29-03-2023		
1	Particulate Matter	mg/Nm3	25.16	**150**	**IS 11255 (Part - 1)**
2	Sulphur Dioxide	ppm	10.58	**100**	**IS 11255 (Part - 2)**
3	Oxide of Nitrogen	ppm	20.36	**50**	**IS 11255 (Part - 7)**
4	Carbon Monoxide	mg/Nm3	3.57	--	**UERL/AIR/SOP/18**
5	Non Methyl Hydro Carbon	ppm	Not Detected	--	**UERL/AIR/SOP/27**

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Minimum Detection Limit

Ambient Air Quality Monitoring			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Particulate Matter (PM10)	µg/m3	5 µg/m3
2	Particulate Matter (PM10)	µg/m3	5 µg/m3
3	Sulphur Dioxide (SO2)	µg/m3	4 µg/m3
4	Nitrogen Dioxide (NO2)	µg/m3	5 µg/m3
5	Carbon Monoxide (CO)	mg/m3	0.01 mg/m3
6	Ammonia (NH3)	µg/m3	5 µg/m3
7	Ozone (O3)	µg/m3	5 µg/m3
8	Lead (Pb)	µg/m3	0.5 µg/m3
9	Nickle (Ni)	ng/m3	1 ng/m3
10	Arsenic (As)	ng/m3	1 ng/m3
11	Benzene	µg/m3	1µg/m3
12	Benzo(o)Pyrene	ng/m3	0.1 ng/m3
14	Hydro Carbon	µg/m3	1 µg/m3
Stack Emission Monitoring			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Suspended particulate matter	mg/Nm3	2 mg/Nm3
2	Sulphur Dioxide SOX	mg/Nm3	4 mg/Nm3
3	Oxides of Nitrogen NOX	mg/Nm3	5 mg/Nm3

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STP Outlet			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	pH @ 25 ° C	--	2
2	Total Suspended Solids	mg/L	4
3	Biochemical Oxygen Demand (BOD) (5 days at 20 ° C)	mg/L	1
4	Residual chlorine	mg/L	0.1
5	Fecal Coliform	mg/L	<2

ETP Outlet			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Colour	Pt. Co. Scale	5
2	pH @ 27 ° C	--	2
3	Temperature	0c	5
4	Total Suspended Solids	mg/L	4
5	Total Dissolved Solids	mg/L	4
6	COD	mg/L	2
7	BOD (3 days at 27 ^{0}C)	mg/L	1
8	Chloride (as Cl)	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate (as SO_4)	mg/L	1
11	Ammonical Nitrogen	mg/L	2

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12	Phenolic Compound	mg/L	0.1
13	Copper as Cu	mg/L	0.05
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.05
16	Cadmium as Cd	mg/L	0.003
17	Fluoride as F	mg/L	0.2
18	Residual Chlorine	mg/L	0.1
19	Percent Sodium	%	--
20	Sodium Absorption ratio	--	--

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Monitoring Period: October – 2022 to March - 2023

Submitted By

UniStar
Environment and Research Labs Pvt. Ltd.

UniStar Environment & Research Labs Pvt. Ltd.

White House, Near GIDC Office, Char Rasta, Vapi, Gujarat, India – 396195

MARINE WATER MONITORING SUMMARY REPORT

RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.12	8.02	8.14	8.06	8.17	8.02	8.14	7.98	8.16	8.02	8.28	7.94	IS 3025 (Part11)1983
2.	Temperature	°C	30.3	30.2	30	29.9	29.8	29.7	29.7	29.6	29.8	29.7	30	29.9	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	146	126	138	122	126	114	146	118	104	94	144	112	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.9	BDL	2.8	BDL	2.9	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.22	6.02	6.1	5.9	6.2	6	6.2	5.99	6.09	5.88	6.13	5.83	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.36	35.88	35.32	36.12	36.02	36.44	35.86	36.12	35.46	36.11	36.12	36.84	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.33	2.24	2.93	2.76	3.45	3.02	2.93	2.76	2.67	2.76	3.45	2.8	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.379	0.362	0.3	0.235	0.302	0.276	0.3	0.235	0.198	0.379	0.345	0.276	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.4	3.36	2.54	2.45	3.19	2.84	2.54	2.45	2.24	2.32	3.28	3.1	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	0.47	BDL	0.65	0.47	0.78	0.6	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.109	5.962	5.77	5.445	6.942	6.136	5.77	5.445	5.108	5.459	7.075	6.176	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35912	36114	35864	36108	36086	36474	35864	36410	35108	35686	36640	37400	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	36.07	28.06	16.62	12.47	32.13	24.1	32.16	24.12	24.19	24.12	28.2	12.08	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-22		Nov-22		Dec-22		Jan-23		Feb-23		Mar-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	2.4	2.36	2.51	3.25	3.21	2.56	3.15	2.51	2.8	3.14	2.45	3.24	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.02	1.23	0.98	2.1	1.3	1.65	1.11	1.6	1.23	2.11	0.96	1.36	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	90	78	140	87	152	120	162	118	128	129	142	142	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Odentella*	*Diploneis*	*Nitzschia*	*Navicula*	*Pinnularia*	*Grammatophora*	*Pinnularia*	*Grammatophora*	*Diploneis*	*Rhizosolenia*	*Navicula*	*Nitzschia*	APHA (23rd Ed. 2017)10200 F
			Cyclotella	*Rhizosolenia*	*Pinnularia*	*Cyclotella*	*Surirella*	*Rhizosolenia*	*Surirella*	*Rhizosolenia*	*Rhizosolenia*	*Pinnularia*	*Cyclotella*	*Pinnularia*	
			Pinnularia	*Nitzschia*	*Odontella*	*Pinnularia*	*Odentella*	*Nitzschia*	*Odentella*	*Nitzschia*	*Nitzschia*	*Thalassiothrix*	*Pinnularia*	*Odontella*	
			Biddulphia	*Thalassiothrix*	*Dinophysis*	*Skeletonema*	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Thallassiosira*	*Cyclotella*	*Grammatophora*	*Skeletonema*	*Dinophysis*	
			Thallassiosira	*Pleurosigma*	*Surirella*	*Thallassiosira*	*Melosira*	*Pleurosigma*	*Melosira*	*Pleurosigma*	*Pleurosigma*	*Ceratium*	*Thallassiosira*	*Surirella*	

B	Zooplankton								
1	Abudance(Population)	noX103/ 100 m3	52	69	87	92	69	53	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Copepods nauplii*	
			Crustacean Larvae	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Crustacean Larvae*	
			Oikoplura	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Oikoplura*	
			Bivalve Larvae	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	
			Oikoplura	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	
3	Total Biomass	ml/100 m³	15.36	14.35	15.74	15.74	16.32	16.33	

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RESULTS OF MARINE WATER [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-22		Nov-22		Dec-22		Jan-23		Feb-23		Mar-23		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	210		140		152		150		168		148		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	32		58		44		42		40		41		APHA 23rd Ed.2017,9222-B
3	Ecoli	/100ml	14		32		23		22		20		35		IS :15185:2016
4	Enterococcus	/100ml	12		20		12		14		11		20		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.59	0.62	0.52	0.48	0.52	0.56	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	534.2	542.4	590.2	520.4	562.2	548.6	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.52	3.64	3.82	3.88	3.97	3.86	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	102.4	111.2	118.4	126.7	142.2	124.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	592.5	582.4	610.2	580.4	590.2	602.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.21	4.26	4.31	4.21	3.88	3.94	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	54.23	55.34	49.82	44.46	52.24	52.22	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.59	44.64	38.25	42.42	40.15	44.36	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	88.54	84.26	94.21	90.2	82.9	104.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.84	2.82	2.54	2.62	2.86	2.36	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M1 LEFT SIDE OF BOCHA CREEK - N 22°45'183" E 069°43'241"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Isopods*	*Isopods*	*Amphipods*	*Amphipods*	*Amphipods*	*Isopods*	APHA (23rd Ed. 2017)10500 C
			Polychates	*Polychates*	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Polychates*	
			Sipunculids	*Sipunculids*	*Isopods*	*Isopods*	*Isopods*	*Sipunculids*	
			Amphipods	*Amphipods*	*Gastropods*	*Gastropods*	*Gastropods*	*Amphipods*	
2	MeioBenthos	--	*Polychates*	*Polychates*	Decapods Larvae	Decapods Larvae	*Polychates*	*Polychates*	
			Foraminiferan	*Foraminiferan*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Foraminiferan*	
3	Population	no/m²	312	300	245	242	263	236	

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RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.18	8.11	8.16	8.04	8.21	8.09	8.18	8.11	8.22	8.14	8.06	7.72	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30	30.1	30	29.7	29.6	29.7	29.6	29.8	29.7	30	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	132	108	128	112	134	114	154	124	148	118	160	134	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3	BDL	3.1	BDL	3	BDL	3.1	BDL	3	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.12	5.92	6	5.8	5.9	5.8	6.1	5.89	6.19	5.99	5.93	5.73	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.34	35.92	36.14	36.58	35.98	36.51	35.46	36.24	35.52	36.14	36.18	36.9	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.54	2.5	3.45	2.76	3.23	2.59	3.45	2.76	2.93	2.67	2.16	2.59	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.431	0.414	0.431	0.345	0.413	0.379	0.431	0.345	0.241	0.198	0.189	0.241	APHA 23rd Ed.,2017,4500NO_2 B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.53	3.4	2.84	2.49	3.66	2.93	2.84	2.49	2.41	2.24	3.84	3.36	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.6	BDL	BDL	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.501	6.314	6.721	5.595	7.303	5.899	6.721	5.595	5.581	5.108	6.189	6.191	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35844	36452	35746	36312	35988	36370	35280	35860	35188	35722	35940	36500	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	32.06	24.05	24.94	20.78	28.11	20.08	36.18	28.14	24.19	12.1	32.22	16.11	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	2.95	2.05	3.12	3.62	2.63	2.87	3.01	3.01	3.21	2.45	2.96	2.78	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.9	0.87	0.87	0.65	0.96	1.47	0.86	1.5	1.65	1.29	1.36	2.01	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	100	102	105	98	125	114	132	116	147	98	123	112	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Diploneis*	*Pinnularia*	*Odontella*	*Surirella*	*Nitzschia*	*Coscinodiscus*	*Nitzschia*	*Coscinodiscus*	*Ceratium*	*Diploneis*	*Surirella*	*Odontella*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Surirella*	*Rhizosolenia*	*Rhizosolenia*	*Pinnularia*	*Diploneis*	*Pinnularia*	*Diploneis*	*Coscinodiscus*	*Rhizosolenia*	*Rhizosolenia*	*Rhizosolenia*	
			Nitzschia	*Navicula*	*Coscinodiscus*	*Nitzschia*	*Odontella*	*Rhizosolenia*	*Odontella*	*Rhizosolenia*	*Odentella*	*Nitzschia*	*Nitzschia*	*Coscinodiscus*	
			Cyclotella	*Thallassiosira*	*Grammatophora*	*Thalassionema*	*Dinophysis*	*Dinophysis*	*Dinophysis*	*Dinophysis*	*Grammatophora*	*Thalassiothrix*	*Thalassionema*	*Grammatophora*	
			Pleurosigma	*Skeletonema*	*Thallassiosira*	*Pleurosigma*	*Surirella*	*Thalassionema*	*Surirella*	*Thalassionema*	*Melosira*	*Pleurosigma*	*Pleurosigma*	*Thallassiosira*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	47	58	69	72	88	90	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods*	*Decapoda*	*Decapoda*	*Decapoda*	*Decapoda*	*Copepods*	
			Oikoplura	*Copepods*	*Copepods*	*Copepods*	*Copepods*	*Oikoplura*	
			Crustacean Larvae	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Crustacean	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	
			Bivalve Larvae	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	14.89	15.98	17.69	17.69	18.52	17.44	

Continue…

RESULTS OF MARINE WATER [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	200		200		220		218		236		230		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	44		44		68		65		37		44		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	22		22		41		42		29		31		IS :15185:2016
4	Enterococcus	/100ml	14		14		21		22		21		20		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.53	0.58	0.51	0.46	0.51	0.62	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	512.5	516.8	528.9	544.1	560.4	546.5	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.64	3.72	3.81	3.89	3.94	4.02	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	102.6	111.8	124.2	134.2	138.6	144.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	582.4	574.6	602.1	624.5	629.3	594.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.74	3.82	3.91	3.94	3.96	4.08	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	48.9	52.2	48.62	44.52	46.44	42.35	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	44.58	46.58	41.28	42.22	42.9	44.05	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	84.25	84.11	90.8	88.46	86.5	88.29	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.26	2.34	2.29	2.24	2.31	2.38	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M2 MOUTH OF BOCHA & NAVINAL CREEK - N 22°44'239" E 069°43'757"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Amphipods*	*Foraminiferan*	*Polychates*	*Polychates*	*Polychates*	*Foraminiferan*	APHA (23rd Ed. 2017)10500 C
			Decapod Larvae	Decapods Larvae	*Gastropods*	*Gastropods*	*Gastropods*	Decapods Larvae	
			Isopods	*Amphipods*	*Isopods*	*Isopods*	*Isopods*	*Amphipods*	
			Gastropods	*Polychates*	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Polychates*	
2	MeioBenthos	--	*Foraminiferan*	*Turbellarians*	*Herpectacoids*	*Herpectacoids*	*Foraminiferan*	*Turbellarians*	
			Herpectacoids	*Foraminiferan*	*Polychates*	*Polychates*	*Polychates*	*Foraminiferan*	
3	Population	no/m²	290	325	312	318	300	286	

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RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.22	8.06	8.19	8.11	8.14	7.98	8.19	8.06	8.16	8.02	7.96	7.68	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	30	29.9	29.8	29.7	29.7	29.6	29.8	29.7	30	29.9	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	94	78	86	80	98	82	118	94	104	94	128	114	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.6	BDL	2.9	BDL	2.8	BDL	2.9	BDL	2.9	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.02	5.81	6	5.9	5.9	5.7	5.99	5.79	6.09	5.88	5.83	5.63	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.39	36.05	35.4	36.14	35.64	36.22	35.72	35.98	35.46	36.11	36.23	37.02	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.41	2.37	2.76	2.59	2.49	2.15	2.84	2.59	2.67	2.76	2.93	2.76	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.465	0.448	0.379	0.276	0.259	0.13	0.474	0.31	0.198	0.379	0.3	0.235	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.45	3.4	2.32	1.56	2.28	1.81	2.41	1.89	2.24	2.32	3.1	2.93	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.65	0.47	BDL	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.325	6.218	5.459	4.426	5.029	4.09	5.724	4.79	5.108	5.459	6.33	5.925	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36110	36714	35890	36670	36112	36642	35240	35940	35108	35686	35860	36480	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	28.06	20.04	24.94	16.62	32.13	24.1	32.16	24.12	24.19	24.12	28.2	16.11	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.49	3.11	3.1	3.25	2.87	3.21	3.11	3.2	2.95	2.58	3.11	3.65	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.2	2.1	1.41	1.87	1.45	1.84	1.34	1.9	1.56	1.36	2.31	2.03	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	102	120	112	109	135	152	140	160	138	143	178	148	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Ceratium*	*Coscinodiscus*	*Pinnularia*	*Coscinodiscus*	*Odontella*	*Rhizosolenia*	*Odontella*	*Rhizosolenia*	*Odontella*	*Surirella*	*Coscinodiscus*	*Pinnularia*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Thalassionema*	*Biddulphia*	*Thalassionema*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Rhizosolenia*	*Thalassionema*	*Biddulphia*	
			Odontella	*Rhizosolenia*	*Navicula*	*Rhizosolenia*	*Coscinodiscus*	*Thalassiothrix*	*Coscinodiscus*	*Thalassiothrix*	*Coscinodiscus*	*Nitzschia*	*Rhizosolenia*	*Navicula*	
			Gramma tophora	*Dinophysis*	*Thallassiosira*	*Dinophysis*	*Gramma tophora*	*Gramma tophora*	*Gramma tophora*	*Gramma tophora*	*Gramma tophora*	*Thalassionema*	*Dinophysis*	*Thallassiosira*	
			Melosira	*Skeletonema*	*Skeletonema*	*Skeletonema*	*Thallassiosira*	*Ceratium*	*Thallassiosira*	*Ceratium*	*Thallassiosira*	*Pleurosigma*	*Skeletonema*	*Skeletonema*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	46		50		48		51		59		60		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Oikoplura*		
			Oikoplura		*Oikoplura*		*Oikoplura*		*Oikoplura*		*Oikoplura*		*Copepods nauplii*		
			Copepods nauplii		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		*Crustacean Larvae*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	17.54		16.74		15.89		15.89		14.23		15.63		

Continue…

RESULTS OF MARINE WATER [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	186		186		124		126		180		186		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		49		36		40		60		43		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	32		30		25		30		38		26		IS :15185:2016
4	Enterococcus	/100ml	20		25		15		18		23		17		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.64	0.62	0.54	0.58	0.52	0.58	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	562.4	542.2	569.8	542.2	562.2	574.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.72	3.78	3.82	3.91	3.97	3.78	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	124.6	132.2	124.6	134.2	142.2	154.6	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	542.2	564.2	576.2	586.2	590.2	602.8	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.66	3.74	3.79	3.84	3.88	4.11	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	48.25	51.32	48.64	49.24	52.24	55.35	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	38.69	40.25	38.42	39.25	40.15	38.24	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	74.28	72.24	79.81	80.4	82.9	80.38	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	3.12	2.98	2.84	2.81	2.86	2.75	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	Decapods Larvae	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Isopods*	*Amphipods*	APHA (23rd Ed. 2017)10500 C
			Isopods	*Polychates*	*Polychates*	*Polychates*	*Sipunculids*	*Decapod Larvae*	
			Amphipods	*Gastropods*	*Gastropods*	*Gastropods*	*Gastropods*	*Isopods*	
			Sipunculids	*Isopods*	*Isopods*	*Isopods*	*Isopods*	*Gastropods*	
2	MeioBenthos	--	*Foraminiferan*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Foraminiferan*	
			Herpectacoids	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	*Herpectacoids*	
3	Population	no/m²	326	365	326	322	268	263	

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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.21	8.06	8.18	8.09	8.17	8.05	8.14	8.02	8.19	8.05	8.24	8.01	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30	29.9	29.8	29.7	29.6	29.6	29.5	29.8	29.7	30	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	134	114	118	102	126	112	160	114	142	108	118	110	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.5	BDL	2.8	BDL	3.1	BDL	3.3	BDL	3.1	BDL	3.2	BDL	IS 3025(Part 4)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.32	6.22	6.1	6	6	5.8	6.3	6.2	6.3	5.88	6.13	6.03	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.48	36.11	35.94	36.28	36.11	36.37	35.74	36.12	35.81	36.17	36.24	36.68	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd.2
8.	Nitrate as NO_3	µmol/L	2.72	2.67	3.66	3.44	2.72	2.67	2.16	2.59	2.59	2.32	3.23	2.8	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.5	0.483	0.413	0.379	0.5	0.483	0.189	0.241	0.56	0.431	0.379	0.344	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.36	3.32	3.96	3.62	3.36	3.32	2.62	3.84	2.49	2.24	3.96	3.36	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	0.82	BDL	1.38	1.25	0.47	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.58	6.473	8.033	7.439	6.58	6.473	4.969	6.671	5.64	4.991	7.569	6.504	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36118	35624	35812	36214	35864	36354	35120	35862	35244	36124	36350	37110	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24.05	32.06	20.78	12.47	20.08	8.03	28.14	20.1	20.16	16.13	32.22	20.14	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	2.69	2.78	3.65	2.78	3.2	3.11	2.98	2.87	3.01	2.96	2.58	2.48	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.32	0.69	1.25	0.89	0.99	1.56	0.87	1.45	1.23	1.84	1.47	1.86	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	111	110	125	128	127	149	124	152	146	169	123	176	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Pinnularia*	*Pleurosigma*	*Coscinodiscus*	*Ceratium*	*Coscinodiscus*	*Diploneis*	*Coscinodiscus*	*Diploneis*	*Coscinodiscus*	*Coscinodiscus*	*Ceratium*	*Coscinodiscus*	APHA (23rd Ed. 2017)10200 F
			Thalassionema	*Cyclotella*	*Diploneis*	*Diploneis*	*Diploneis*	*Rhizosolenia*	*Diploneis*	*Rhizosolenia*	*Diploneis*	*Thalassionema*	*Diploneis*	*Thalassionema*	
			Navicula	*Biddulphia*	*Rhizosolenia*	*Odentella*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Rhizosolenia*	*Odentella*	*Rhizosolenia*	
			Thallassiosira	*Skeletonema*	*Dinophysis*	*Gramma tophora*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Dinophysis*	*Gramma tophora*	*Dinophysis*	
			Skeletonema	*Thallassiosira*	*Thalassionema*	*Melosira*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Skeletonema*	*Melosira*	*Skeletonema*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	39	60	74	75	66	74	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Decapoda*	
			Egg(Fish and Shrimps)	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Copepods*	
			Copepods	*Copepods*	*Copepods*	*Copepods*	*Copepods*	*Crustacean Larvae*	
			Crustacean	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	
3	Total Biomass	ml/100 m³	15.63	15.96	15.64	15.64	16.52	15.89	

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RESULTS OF MARINE WATER [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	194		194		222		220		250		262		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	30		30		40		38		42		52		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	22		22		31		33		22		36		IS :15185:2016
4	Enterococcus	/100ml	19		19		22		30		10		26		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.86	0.74	0.62	0.59	0.54	0.57	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	580.4	538.4	546.7	534	552.4	562.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.52	3.62	3.69	3.62	3.74	3.92	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	110.4	114.5	118.6	104	112	124.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	539.4	540.9	551.2	548.5	550.4	562.8	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.11	4.06	4.11	4.06	4.09	3.89	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	38.64	41.11	46.21	44.02	44.52	42.15	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.61	44.25	46.33	48.26	51.24	48.65	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	84.21	81.36	89.45	88.05	82.54	80.28	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.56	2.46	2.42	2.51	2.42	2.28	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Polychates*	*Polychates*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	Decapods Larvae	APHA (23rd Ed. 2017)10500 C
			Gastropods	*Gastropods*	*Gastropods*	*Gastropods*	*Gastropods*	*Isopods*	
			Isopods	*Isopods*	*Isopods*	*Isopods*	*Isopods*	*Amphipods*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Sipunculids*	
2	MeioBenthos	--	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	Decapods Larvae	*Foraminiferan*	
			Polychates	*Polychates*	*Polychates*	*Polychates*	*Polychates*	*Herpectacoids*	
3	Population	no/m^2	300	328	286	301	295	325	

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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.19	8.09	8.21	8.11	8.19	8.1	8.15	8.02	8.21	7.98	8.24	7.88	IS 3025 (Part11)1983
2.	Temperature	°C	30.3	30.2	30	29.9	29.8	29.7	29.7	29.6	29.8	29.7	30	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	144	126	134	122	128	112	146	116	132	118	102	92	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	2.7	BDL	2.9	BDL	3.4	BDL	2.8	BDL	2.6	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.32	6.12	6.2	6.1	6.1	6	6.3	6.1	6.3	6.19	6.13	5.93	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.49	35.98	35.64	36.24	35.82	36.34	35.44	35.89	35.64	36.08	36.11	36.72	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd.2
8.	Nitrate as NO_3	µmol/L	2.8	2.67	2.93	2.37	2.8	2.59	2.59	3.66	2.76	2.59	2.84	2.76	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.414	0.379	0.241	0.198	0.362	0.345	0.259	0.328	0.379	0.276	0.474	0.431	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.28	3.23	3.32	3.1	2.8	2.5	3.84	3.79	2.32	1.56	2.93	2.76	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.6	BDL	0.78	0.69	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.494	6.279	6.491	5.668	5.962	5.435	6.689	7.778	5.459	4.426	6.244	5.951	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35980	36588	35868	36452	36002	36444	35266	36020	35348	36244	35800	36520	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	20.04	8.02	20.78	8.31	16.06	12.05	24.12	12.06	20.16	16.13	24.17	20.14	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.14	2.87	2.69	2.87	3.11	2.87	2.87	2.65	2.58	3.23	3.11	2.68	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.85	0.85	1.11	0.36	2.22	1.33	1.89	1.32	1.59	2.56	1.36	2.56	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	101	96	130	86	175	123	167	119	143	178	132	146	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Pinnularia*	*Grammatophora*	*Pinnularia*	*Ceratium*	*Navicula*	*Nitzschia*	*Navicula*	*Nitzschia*	*Ceratium*	*Nitzschia*	*Ceratium*	*Pleurosigma*	APHA (23rd Ed. 2017)10200 F
			Biddulphia	*Rhizosolenia*	*Biddulphia*	*Pinnularia*	*Fragillaria*	*Grammatophora*	*Fragillaria*	*Grammatophora*	*Diploneis*	*Grammatophora*	*Diploneis*	*Cyclotella*	
			Navicula	*Nitzschia*	*Navicula*	*Odontella*	*Thalassiothrix*	*Diploneis*	*Thalassiothrix*	*Diploneis*	*Odentella*	*Diploneis*	*Odentella*	*Biddulphia*	
			Thallassiosira	*Thallassiosira*	*Thallassiosira*	*Thalassiothrix*	*Grammatophora*	*Thalassiothrix*	*Grammatophora*	*Thalassiothrix*	*Grammatophora*	*Thalassiothrix*	*Grammatophora*	*Skeletonema*	
			Skeletonema	*Pleurosigma*	*Skeletonema*	*Thallassiosira*	*Surirella*	*Pleurosigma*	*Surirella*	*Pleurosigma*	*Melosira*	*Pleurosigma*	*Melosira*	*Thallassiosira*	
B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	63		48		50		54		48		55		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		
			Oikoplura		*Oikoplura*		*Oikoplura*		*Oikoplura*		*Decapoda*		*Oikoplura*		
			Crustacean Larvae		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		*Crustacean*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	17.54		16.35		14.88		14.88		15.68		16.23		

Continue…

RESULTS OF MARINE WATER [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

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SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	190		216		256		254		178		196		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	36		30		65		70		56		63		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	27		17		41		45		49		42		IS :15185:2016
4	Enterococcus	/100ml	15		10		19		21		29		22		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.56	0.52	0.48	0.41	0.46	0.54	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	562.8	544.2	536.6	505.4	510.2	521.4	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.68	3.71	3.78	3.81	3.89	3.96	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	68.4	69.5	74.8	78.4	80.2	84.4	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	448.6	456.6	470.4	501.2	520.2	522.7	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.54	3.63	3.75	3.81	3.88	4.06	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	44.67	45.58	42.64	44.25	45.28	41.39	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	34.59	35.12	38.42	40.14	42.16	46.36	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	84.56	85.24	89.42	80.28	82.24	80.33	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.54	2.62	2.56	2.64	2.53	2.46	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M5 TOWARDS WESTERN SIDE OF EAST PORT – N 22°46'041" E 069°47'296"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Amphipods*	*Amphipods*	*Amphipods*	*Amphipods*	*Amphipods*	*Polychates*	APHA (23rd Ed. 2017)10500 C
			Sipunculids	*Sipunculids*	*Polychates*	*Polychates*	*Sipunculids*	*Gastropods*	
			Isopods	*Isopods*	*Isopods*	*Isopods*	*Isopods*	*Isopods*	
			Gastropods	*Gastropods*	*Gastropods*	*Gastropods*	*Gastropods*	*Sipunculids*	
2	MeioBenthos	--	Decapods Larvae	Decapods Larvae	Decapods Larvae	Decapods Larvae	Decapods Larvae	*Herpectacoids*	
			Herpectacoids	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Polychates*	
3	Population	no/m²	328	360	360	362	301	365	

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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.24	8.08	8.16	8.11	8.19	8.06	8.14	7.94	8.18	8.06	8.14	7.74	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	29.9	29.8	29.7	29.6	29.6	29.5	29.7	29.6	30	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	148	128	134	106	130	112	124	108	144	118	162	148	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.9	BDL	3.2	BDL	3.1	BDL	2.4	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.22	6.02	6	5.9	5.9	5.7	6.2	5.99	6.19	6.09	6.03	5.83	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.32	36.04	35.84	36.19	35.76	36.21	35.34	35.56	35.38	35.97	35.94	36.51	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.72	2.67	3.45	3.02	2.76	2.59	3.23	2.37	3.44	2.59	2.76	2.32	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.379	0.362	0.302	0.276	0.379	0.276	0.345	0.302	0.344	0.293	0.379	0.431	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.45	3.36	3.19	2.84	2.32	1.56	3.62	3.28	3.83	2.75	3.19	3.02	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	0.52	BDL	0.86	0.78	1.29	1.12	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.549	6.392	6.942	6.136	5.459	4.426	7.195	5.952	7.614	5.633	6.329	5.771	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36110	35614	35718	36214	35894	36338	36288	36582	36324	36842	37210	37840	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	16.03	12.02	37.4	29.09	24.1	20.08	20.1	16.08	32.26	20.16	36.25	24.17	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.87	2.89	2.87	3.69	3.25	3.25	3.24	2.8	3.11	3.68	2.78	2.58	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.78	1.95	0.74	2.48	1.56	1.75	1.45	1.8	2.13	2.21	1.58	2.36	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	90	125	121	142	147	168	140	155	176	93	125	100	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Coscinodiscus*	*Coscinodiscus*	*Coscinodiscus*	*Surirella*	*Ceratium*	*Grammatophora*	*Ceratium*	*Grammatophora*	*Thalassiothrix*	*Odentella*	*Grammatophora*	*Grammatophora*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Diploneis*	*Diploneis*	*Thalassiothrix*	*Diploneis*	*Melosira*	*Diploneis*	*Melosira*	*Surirella*	*Rhizosolenia*	*Rhizosolenia*	*Rhizosolenia*	
			Rhizosolenia	*Rhizosolenia*	*Rhizosolenia*	*Navicula*	*Odentella*	*Odentella*	*Odentella*	*Odentella*	*Navicula*	*Coscinodiscus*	*Nitzschia*	*Nitzschia*	
			Dinophysis	*Dinophysis*	*Dinophysis*	*Skeletonema*	*Grammatophora*	*Pinnularia*	*Grammatophora*	*Pinnularia*	*Thallassiosira*	*Grammatophora*	*Thallassiosira*	*Thallassiosira*	
			Thalassionema	*Thalassionema*	*Thalassionema*	*Thallassiosira*	*Melosira*	*Pleurosigma*	*Melosira*	*Pleurosigma*	*Skeletonema*	*Thallassiosira*	*Pleurosigma*	*Pleurosigma*	
B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	50		38		44		52		57		59		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Egg(Fish and Shrimps)*		*Crustacean Larvae*		*Crustacean Larvae*		*Crustacean Larvae*		*Copepods nauplii*		*Crustacean Larvae*		
			Oikoplura		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Crustacean Larvae*		*Egg(Fish and Shrimps)*		
			Copepods nauplii		*Copepods*		*Copepods*		*Copepods*		*Oikoplura*		*Copepods*		
			Crustacean		*Crustacean*		*Crustacean*		*Crustacean*		*Bivalve Larvae*		*Crustacean*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Oikoplura*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	15.78		15.28		16.89		16.89		15.55		17.23		

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RESULTS OF MARINE WATER [M7 EAST PORT N 22°47'120" E 069°47'110"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	250		184		242		240		290		244		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	36		33		36		40		55		36		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	29		29		29		31		41		25		IS :15185:2016
4	Enterococcus	/100ml	18		19		21		22		32		16		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.18	7.98	8.22	8.12	8.18	8.07	8.21	8.12	8.19	8.11	8.28	8.04	IS 3025 (Part11)1983
2.	Temperature	°C	30.2	30.1	30	29.9	29.6	29.5	29.5	29.4	29.8	29.7	30	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	118	104	124	112	130	116	152	114	146	124	128	120	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.1	BDL	3	BDL	2.8	BDL	3.1	BDL	2.9	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.12	5.92	5.8	5.7	5.9	5.7	6.1	5.89	6.09	5.99	5.93	5.73	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.64	36.12	35.61	36.24	36.82	36.19	36.12	36.32	35.86	36.17	36.18	36.74	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.54	2.5	2.49	2.32	2.8	2.37	2.33	2.24	3.45	2.8	2.84	2.59	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.431	0.414	0.259	0.215	0.259	0.189	0.379	0.362	0.345	0.276	0.56	0.517	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.1	3.02	2.28	2.16	4.05	3.83	3.4	3.36	3.28	3.1	3.36	3.1	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.65	BDL	BDL	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.071	5.934	5.029	4.695	7.109	6.389	6.109	5.962	7.075	6.176	6.76	6.207	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36218	36684	36188	36522	36124	36514	35620	36080	35760	36240	36300	37050	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24.05	20.04	33.25	24.94	24.1	16.06	28.14	24.12	28.22	24.19	32.22	28.2	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.36	2.36	3.25	2.14	2.96	2.77	3.11	2.78	2.65	2.87	2.45	3.14	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.86	0.75	0.95	0.89	1.11	1.28	0.98	1.32	1.12	1.66	1.69	2.13	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	120	142	135	128	163	86	170	95	162	120	122	175	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Grammatophora*	*Rhizosolenia*	*Thalassiothrix*	*Rhizosolenia*	*Coscinodiscus*	*Skeletonema*	*Coscinodiscus*	*Skeletonema*	*Coscinodiscus*	*Dinophysis*	*Coscinodiscus*	*Coscinodiscus*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Pinnularia*	*Surirella*	*Pinnularia*	*Diploneis*	*Grammatophora*	*Diploneis*	*Grammatophora*	*Diploneis*	*Pinnularia*	*Diploneis*	*Diploneis*	
			Nitzschia	*Thalassiothrix*	*Navicula*	*Thalassiothrix*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Thalassiothrix*	*Rhizosolenia*	*Rhizosolenia*	
			Thalassionema	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Grammatophora*	*Dinophysis*	*Dinophysis*	
			Pleurosigma	*Ceratium*	*Skeletonema*	*Ceratium*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Ceratium*	*Thalassionema*	*Thalassionema*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	45	56	61	70	52	50	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Copepods*	*Copepods*	
			Oikoplura	*Copepods*	*Copepods*	*Copepods*	*Oikoplura*	*Oikoplura*	
			Crustacean Larvae	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Oikoplura	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Crustacean*	*Crustacean*	
			Bivalve Larvae	*Crustacean*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	17.21	16.98	15.48	15.6	16.24	17.42	

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RESULTS OF MARINE WATER [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	270		128		284		284		164		256		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	40		24		41		42		35		41		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	33		12		33		32		28		31		IS :15185:2016
4	Enterococcus	/100ml	20		8		16		18		11		23		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.62	0.59	0.51	0.43	0.48	0.56	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	541.2	525.2	532.4	506.4	514.2	523.6	IS: 10158 :1982, RA.2009 Method B
3.	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	Lab SOP No. UERL/CHM/LTM/108
4.	Petroleum Hydrocarbon	µg/g	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
5.0	Heavy Metals								
5.1	Aluminum as Al	%	3.49	3.55	3.64	3.71	3.46	3.62	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	74.2	78.5	86.5	88.2	86.3	89.6	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	524.64	534.4	551.2	542.4	548.3	555.8	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.58	3.62	3.71	3.76	3.81	3.96	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	36.21	36.28	38.26	38.88	39.42	42.21	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	28.64	29.22	34.21	35.06	36.28	37.21	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	82.48	84.12	91.24	92.12	91.8	98.1	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	3.11	2.86	2.81	2.74	2.46	2.52	EPA 3050B /7420 (Extraction &Analytical Method):1986
5.9	Mercury as Hg	µg/g	BDL	BDL	BDL	BDL	BDL	BDL	EPA 7471B (Extraction &Analytical Method) :2007

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RESULTS OF SEDIMENT ANALYSIS [M8 RIGHT SIDE OF BOCHA CREEK N 22°45'987" E 069°43'119"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Gastropods*	*Gastropods*	*Isopods*	*Isopods*	*Isopods*	*Sipunculids*	APHA (23rd Ed. 2017)10500 C
			Polychates	*Polychates*	*Polychates*	*Polychates*	*Polychates*	*Polychates*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Gastropods*	
			Amphipods	*Amphipods*	*Amphipods*	*Amphipods*	*Amphipods*	*Isopods*	
2	MeioBenthos	--	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	
			Foraminiferan	*Foraminiferan*	Decapods Larvae	Decapods Larvae	Decapods Larvae	*Foraminiferan*	
3	Population	no/m²	270	240	312	320	347	289	

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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.24	8.11	8.06	7.94	8.12	7.97	8.18	8.04	8.17	8.07	8.12	7.84	IS 3025 (Part11)1983
2.	Temperature	°C	30.3	30.2	29.9	29.8	29.7	29.6	29.6	29.5	29.8	29.7	29.9	28.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	134	116	128	106	134	118	124	108	111	102	118	94	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	3.1	BDL	2.8	BDL	3.3	BDL	2.8	BDL	3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.12	6.02	6	5.9	5.9	5.8	6.1	5.99	5.99	5.88	5.93	5.83	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.41	36.15	35.44	36.24	35.52	36.22	35.02	35.84	35.24	35.89	35.82	36.27	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.5	2.41	2.84	2.59	3.66	3.02	2.76	2.59	2.72	2.67	2.93	2.67	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.448	0.431	0.345	0.3	0.328	0.259	0.379	0.276	0.5	0.483	0.241	0.198	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.36	3.28	2.49	2.06	3.79	3.36	2.32	1.56	3.36	3.32	2.84	2.67	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.47	BDL	BDL	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.308	6.121	5.675	4.95	7.778	6.639	5.459	4.426	6.58	6.473	6.011	5.538	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	35984	36594	35864	36486	35800	36470	35422	35940	35420	36260	36890	37400	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24.05	16.03	29.09	20.78	20.08	12.05	28.14	20.1	24.19	20.16	28.2	24.17	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.21	2.6	3.21	3.21	3.26	3.14	3.33	3.17	3.02	3.64	3.25	2.88	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.02	1.1	2.23	1.47	1.85	2	1.78	1.99	2.01	2.13	1.96	1.86	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	86	135	90	96	152	135	149	132	140	155	152	146	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Nitzschia*	*Melosira*	*Navicula*	*Pinnularia*	*Fragillaria*	*Ceratium*	*Fragillaria*	*Ceratium*	*Thallassiosira*	*Rhizosolenia*	*Rhizosolenia*	*Diploneis*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Cyclotella*	*Skeletonema*	*Surirella*	*Thalassionema*	*Pinnularia*	*Thalassionema*	*Pinnularia*	*Melosira*	*Pinnularia*	*Pinnularia*	*Rhizosolenia*	
			Odontella	*Odontella*	*Rhizosolenia*	*Odentella*	*Navicula*	*Odontella*	*Navicula*	*Odontella*	*Nitzschia*	*Thalassiothrix*	*Thalassiothrix*	*Nitzschia*	
			Dinophysis	*Skeletonema*	*Dinophysis*	*Grammatophora*	*Thallassiosira*	*Thalassiothrix*	*Thallassiosira*	*Thalassiothrix*	*Rhizosolenia*	*Grammatophora*	*Grammatophora*	*Thalassiothrix*	
			Surirella	*Thallassiosira*	*Thalassionema*	*Melosira*	*Skeletonema*	*Thallassiosira*	*Skeletonema*	*Thallassiosira*	*Pleurosigma*	*Ceratium*	*Ceratium*	*Pleurosigma*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	52	49	54	59	64	44	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Decapoda*	
			Copepods	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Copepods*	
			Crustacean Larvae	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Bivalve Larvae	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Crustacean*	
			Crustacean	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	
3	Total Biomass	ml/100 m³	14.58	15.63	14.63	15.03	16.47	14.23	

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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	248		200		200		211		186		202		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	35		39		39		41		50		47		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	30		29		29		32		26		30		IS :15185:2016
4	Enterococcus	/100ml	28		22		22		24		14		21		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS: 5887 (Part V):1976

GUJARAT VAPI

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Sr. Chemist

Mr. Nitin Tandel
Technical Manager

RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.22	8.1	8.14	8.06	8.19	8.07	8.16	8.01	8.12	8.03	8.17	7.96	IS 3025 (Part11)1983
2.	Temperature	°C	30.3	30.1	29.9	29.8	29.7	29.6	29.6	29.5	29.8	29.7	29.9	29.8	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	128	116	114	98	120	102	144	112	128	116	112	84	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.9	BDL	3.1	BDL	2.7	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.02	5.92	6.1	6	6	5.9	5.99	5.89	6.09	5.99	5.83	5.63	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.24	36.01	35.22	36.15	35.61	36.24	35.84	36.18	35.94	36.22	36.25	36.98	By Calculation
7.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39) 1991, Amd. 2
8.	Nitrate as NO_3	µmol/L	2.67	2.54	2.67	2.33	2.84	2.59	2.76	2.59	2.84	2.59	3.66	3.44	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.414	0.362	0.325	0.235	0.474	0.31	0.379	0.276	0.474	0.31	0.413	0.379	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.4	3.32	2.67	2.58	2.41	1.89	2.32	1.56	2.41	1.89	3.96	3.62	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.65	BDL	0.56	BDL	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.484	6.222	5.665	5.145	5.724	4.79	5.459	4.426	5.724	4.79	8.033	7.439	APHA 23rd Ed., 2017,4500 NH3 - B
13.	Petroleum Hydrocarbon	µg/L	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 23rd ED,2017,5520 F
14.	Total Dissolved Solids	mg/L	36188	36806	36144	36582	36210	36690	35888	36310	35940	36480	36660	37340	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	20.04	12.02	24.94	33.25	20.08	12.05	24.12	16.08	20.16	16.13	24.17	20.14	APHA 23rd Ed.,2017, 5220-B

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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.11	2.86	2.21	2.86	2.36	2.65	3.26	3.01	2.27	2.89	2.65	3.01	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.43	0.97	1.87	1.25	0.85	1.49	0.89	1.88	1.11	2.1	1.63	2.44	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	95	97	102	98	140	127	134	130	134	106	145	152	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Odentella*	*Diploneis*	*Melosira*	*Nitzschia*	*Thallassiosira*	*Melosira*	*Thallassiosira*	*Melosira*	*Dinophysis*	*Pinnularia*	*Nitzschia*	*Nitzschia*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Rhizosolenia*	*Pinnularia*	*Pinnularia*	*Melosira*	*Cyclotella*	*Melosira*	*Cyclotella*	*Pinnularia*	*Surirella*	*Pinnularia*	*Gramma tophora*	
			Coscinodiscus	*Nitzschia*	*Skeletonema*	*Odontella*	*Nitzschia*	*Odontella*	*Nitzschia*	*Odontella*	*Thalassiothrix*	*Odentella*	*Diploneis*	*Diploneis*	
			Gramma tophora	*Thalassiothrix*	*Thallassiosira*	*Dinophysis*	*Rhizosolenia*	*Skeletonema*	*Rhizosolenia*	*Skeletonema*	*Gramma tophora*	*Gramma tophora*	*Gramma tophora*	*Thalassiothrix*	
			Thallassiosira	*Pleurosigma*	*Thalassionema*	*Surirella*	*Pleurosigma*	*Thallassiosira*	*Pleurosigma*	*Thallassiosira*	*Ceratium*	*Melosira*	*Ceratium*	*Pleurosigma*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	40	54	70	72	44	42	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*	*Crustacean*	*Crustacean*	*Crustacean*	*Crustacean*	*Egg(Fish and Shrimps)*	
			Oikoplura	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
			Crustacean Larvae	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	*Copepods nauplii*	
			Oikoplura	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Oikoplura*	*Crustacean*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	16.54	17.36	16.32	16.45	13.25	13.45	

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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	OCTOBER-2022		NOVEMBER-2022		DECEMBER-2022		JANUARY-2023		FEBRUARY-2023		MARCH-2023		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C			Microbiological												
1	Total Bacterial Count	CFU/ml	184		196		210		215		206		222		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	49		47		48		51		42		35		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	38		25		23		25		35		23		IS :15185:2016
4	Enterococcus	/100ml	27		20		20		18		22		14		IS:15186:2002
5	Salmonella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:15187:2016
6	Shigella	/100ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA 23rd Ed.2017,9260-E
7	Vibrio	/100ml	110		142		230		222		212		196		IS: 5887 (Part V):1976

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RESULTS OF ETP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023		
			21-10-2022	21-11-2022	28-12-2022	28-01-2023	27-02-2023	29-03-2023		
1.	Colour	Pt. Co. Scale	30	25	30	20	40	50	100	IS 3025(Part 4)
2.	pH @ 27 ° C	--	7.05	7.35	7.24	7.48	6.94	7.08	6.5 to 8.5	APHA 23rd Ed.,2017,4500-H^+B
3.	Temperature	^0C	30.5	30	29	28.5	29	29	40	IS 3025(Part 9)1984
4.	Total Suspended Solid	mg/L	36	32	30	34	42	26	100	APHA 23rd Ed.,2017,2540 –D
5.	Total Dissolved Solids	mg/L	1480	1480	1460	1044	904	990	2100	APHA 23rd Ed.,2017,2540- C
6.	COD	mg/L	81.1	78.6	86.4	82.4	84.2	80.6	100	IS 3025(Part 58)2006
7.	BOD (3 days at 27 ^0C)	mg/L	22	21	23	23	23	22	30	IS 3025(Part 44)1993Amd.01
8.	Chloride (as Cl) -	mg/L	539.1	510.4	311.1	410.5	536	443.2	600	IS 3025(PART 32) 1988
9.	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	10	IS 3025(Part39)1991, Amd. 2
10.	Sulphate (as SO_4)	mg/L	94	88	33.4	46	110	90	1000	IS 3025(Part 24)1986
11.	Ammonical Nitrogen	mg/L	29.8	25.4	25.3	18.6	22.4	26.8	50	IS 3025(Part 34)1988,
12.	Phenolic Compound	mg/L	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	BDL(MDL:0.1)	1	IS 3025(Part 43)1992, Amd.2
13.	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	3	IS 3025(Part 42)1992amd.01,
14.	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	0.1	APHA 23rd Ed.,2017,3111-B

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SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			OCTOBER-2022	NOVEMBER-2022	DECEMBER-2022	JANUARY-2023	FEBRUARY-2023	MARCH-2023		
			21-10-2022	21-11-2022	28-12-2022	28-01-2023	27-02-2023	29-03-2023		
15.	Sulphide as S	mg/L	0.12	0.64	0.6	0.94	0.86	0.58	2	APHA 23rd Ed.,2017,4500 S^{-2} F
16.	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	2	APHA 23rd Ed.,2017,3111-B
17.	Fluoride as F	mg/L	0.84	0.64	1.1	1.15	0.94	0.86	2	APHA 23rd Ed.,2017,4500 F, D
18.	Residual Chlorine	mg/L	0.75	0.82	0.94	0.86	BDL(MDL:0.1)	0.92	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
19.	Percent Sodium	%	45.93	45.32	47.91	47.85	46.99	45.28	60	By Calculation
20.	Sodium Absorption ratio	--	6.5	5.73	4.86	5.03	3.46	3.3	26	By Calculation

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Results of Ambient Air Quality Monitoring

Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	84.41	39.33	22.47	29.33	0.92	NOT DETECTED	NOT DETECTED
2.	06-10-2022	76.53	34.26	19.89	26.34	1.15	NOT DETECTED	NOT DETECTED
3.	10-10-2022	85.65	38.93	26.69	37.18	1.00	NOT DETECTED	NOT DETECTED
4.	13-10-2022	86.38	28.63	34.27	41.13	1.20	NOT DETECTED	NOT DETECTED
5.	17-10-2022	72.97	37.23	31.92	36.48	1.15	NOT DETECTED	NOT DETECTED
6.	20-10-2022	78.29	42.35	23.74	33.63	1.23	NOT DETECTED	NOT DETECTED
7.	27-10-2022	82.36	31.12	26.48	36.82	1.00	NOT DETECTED	NOT DETECTED
8.	28-10-2022	79.19	29.70	34.86	38.62	0.95	NOT DETECTED	NOT DETECTED
9.	31-10-2022	88.69	34.26	29.85	36.73	1.15	NOT DETECTED	NOT DETECTED
10.	03-11-2022	85.45	45.12	17.68	29.34	1.00	2.94	NOT DETECTED
11.	07-11-2022	88.34	44.56	20.14	32.45	0.94	4.69	NOT DETECTED
12.	10-11-2022	86.78	49.12	19.87	34.12	1.15	3.27	NOT DETECTED
13.	14-11-2022	79.23	40.16	20.15	32.45	1.15	4.19	NOT DETECTED
14.	17-11-2022	85.34	47.12	17.89	27.89	1.00	6.83	NOT DETECTED
15.	21-11-2022	83.45	44.56	21.45	31.89	0.95	6.03	NOT DETECTED

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Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	81.26	39.12	22.17	34.12	1.18	3.35	NOT DETECTED
17.	28-11-2022	83.54	44.23	15.89	28.92	1.05	5.12	NOT DETECTED
18.	01-12-2022	83.26	36.38	24.75	36.68	1.15	4.21	NOT DETECTED
19.	05-12-2022	76.23	39.63	16.92	27.13	1.00	3.27	NOT DETECTED
20.	08-12-2022	85.39	42.39	26.46	32.04	1.19	2.19	NOT DETECTED
21.	12-12-2022	74.62	44.26	24.19	28.46	0.92	2.34	NOT DETECTED
22.	15-12-2022	89.34	37.85	24.74	38.19	1.15	4.31	NOT DETECTED
23.	19-12-2022	82.62	41.05	27.64	37.26	1.14	4.72	NOT DETECTED
24.	22-12-2022	75.44	34.97	16.54	29.91	1.00	4.86	NOT DETECTED
25.	26-12-2022	73.86	37.13	18.62	32.25	1.16	2.64	NOT DETECTED
26.	29-12-2022	87.63	32.57	22.39	36.47	1.00	3.18	NOT DETECTED
27.	02-01-2023	71.69	42.17	27.73	33.18	1.00	2.96	NOT DETECTED
28.	05-01-2023	82.11	32.92	24.84	34.79	1.13	3.26	NOT DETECTED
29.	09-01-2023	87.24	31.29	21.46	27.56	1.00	3.28	NOT DETECTED
30.	12-01-2023	85.24	38.37	28.84	34.1	1.15	2.98	NOT DETECTED
31.	16-01-2023	67.86	27.41	18.27	31.36	1.00	3.17	NOT DETECTED

Continue...

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CIN:U73100GJ2007PTC051463

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Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	83.02	31.27	22.76	29.14	1.15	3.63	NOT DETECTED
33.	23-01-2023	68.39	38.49	21.27	37.56	1.12	5.72	NOT DETECTED
34.	26-01-2023	86.56	31.28	24.66	36.96	1.19	3.68	NOT DETECTED
35.	30-01-2023	73.42	26.58	28.93	33.41	1.15	2.39	NOT DETECTED
36.	02-02-2023	78.63	34.58	23.73	28.14	1.17	3.28	NOT DETECTED
37.	06-02-2023	64.18	37.16	31.47	39.02	1.00	4.26	NOT DETECTED
38.	09-02-2023	85.3	43.63	27.59	34.61	0.96	3.59	NOT DETECTED
39.	13-02-2023	72.44	31.63	26.56	31.29	1.00	3.73	NOT DETECTED
40.	16-02-2023	87.18	42.16	34.71	41.38	1.14	4.82	NOT DETECTED
41.	20-02-2023	76.28	36.28	31.39	37.86	1.15	2.69	NOT DETECTED
42.	23-02-2023	86.27	34.92	26.37	33.49	1.00	3.61	NOT DETECTED
43.	27-02-2023	71.32	36.47	28.62	32.17	1.12	4.79	NOT DETECTED
44.	02-03-2023	88.48	31.25	27.61	34.05	1.00	3.89	NOT DETECTED
45.	06-03-2023	81.97	43.76	36.28	41.83	1.14	4.79	NOT DETECTED
46.	09-03-2023	85.35	39.68	34.76	39.53	1.17	3.26	NOT DETECTED
47.	13-03-2023	78.12	36.62	29.76	34.14	1.13	3.15	NOT DETECTED

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Name of Location		CT3 RMU-2						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	86.39	38.11	27.36	32.89	1.00	4.16	NOT DETECTED
49.	20-03-2023	79.83	40.87	33.46	38.95	1.18	3.64	NOT DETECTED
50.	23-03-2023	85.76	42.86	36.14	42.47	1.14	4.28	NOT DETECTED
51.	27-03-2023	72.19	39.76	31.53	37.68	1.00	4.18	NOT DETECTED
52.	30-03-2023	78.84	36.17	28.73	35.66	1.15	3.57	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

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Jaivik S. Tandel
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Results of Ambient Air Quality Monitoring

Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	87.35	37.24	24.92	32.24	1.00	NOT DETECTED	NOT DETECTED
2.	06-10-2022	72.06	32.21	27.58	34.39	1.15	NOT DETECTED	NOT DETECTED
3.	10-10-2022	82.91	28.36	23.93	28.64	0.92	NOT DETECTED	NOT DETECTED
4.	13-10-2022	75.31	38.95	28.37	37.81	0.95	NOT DETECTED	NOT DETECTED
5.	17-10-2022	83.28	36.82	31.29	38.62	1.10	NOT DETECTED	NOT DETECTED
6.	20-10-2022	83.23	31.06	34.22	41.27	1.14	NOT DETECTED	NOT DETECTED
7.	27-10-2022	79.42	29.24	28.39	36.74	0.90	NOT DETECTED	NOT DETECTED
8.	28-10-2022	81.29	37.86	28.19	32.68	1.15	NOT DETECTED	NOT DETECTED
9.	31-10-2022	88.67	38.72	33.26	39.93	1.00	NOT DETECTED	NOT DETECTED
10.	03-11-2022	81.23	38.76	21.34	26.51	1.00	3.95	NOT DETECTED
11.	07-11-2022	83.45	35.12	18.12	23.45	1.15	4.13	NOT DETECTED
12.	10-11-2022	80.12	30.89	25.23	29.23	0.94	4.74	NOT DETECTED
13.	14-11-2022	73.45	39.76	28.15	33.45	1.10	5.83	NOT DETECTED
14.	17-11-2022	77.34	31.25	25.66	30.12	1.15	3.89	NOT DETECTED
15.	21-11-2022	85.67	43.45	27.35	32.05	0.95	5.64	NOT DETECTED

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Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	82.45	38.12	23.45	28.45	1.13	3.68	NOT DETECTED
17.	28-11-2022	73.45	29.53	27.15	32.45	1.15	4.13	NOT DETECTED
18.	01-12-2022	73.28	43.39	17.2	21.63	1.18	2.64	NOT DETECTED
19.	05-12-2022	78.64	39.17	24.36	32.87	1.00	2.39	NOT DETECTED
20.	08-12-2022	87.32	34.53	28.61	37.27	1.16	3.18	NOT DETECTED
21.	12-12-2022	82.59	44.16	21.67	31.46	1.00	4.4	NOT DETECTED
22.	15-12-2022	71.36	37.49	27.36	35.97	1.15	4.33	NOT DETECTED
23.	19-12-2022	89.61	36.83	29.72	38.49	1.15	2.97	NOT DETECTED
24.	22-12-2022	68.42	41.06	28.48	33.74	1.12	5.27	NOT DETECTED
25.	26-12-2022	78.26	36.11	24.17	29.55	1.00	2.41	NOT DETECTED
26.	29-12-2022	73.47	39.58	26.74	34.16	1.12	3.79	NOT DETECTED
27.	02-01-2023	87.55	29.38	14.45	27.52	1.00	3.73	NOT DETECTED
28.	05-01-2023	73.18	31.84	28.63	28.48	1.13	4.18	NOT DETECTED
29.	09-01-2023	64.83	38.61	21.99	34.17	1.15	2.48	NOT DETECTED
30.	12-01-2023	87.36	35.26	26.28	31.63	1.12	3.28	NOT DETECTED
31.	16-01-2023	69.58	27.42	31.24	39.29	1.00	3.77	NOT DETECTED

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Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	81.27	31.48	23.59	36.92	1.00	3.39	NOT DETECTED
33.	23-01-2023	70.92	34.57	29.89	38.56	1.15	2.58	NOT DETECTED
34.	26-01-2023	79.68	29.72	16.27	24.36	1.14	3.85	NOT DETECTED
35.	30-01-2023	73.29	32.96	31.36	38.84	1.00	2.14	NOT DETECTED
36.	02-02-2023	76.38	31.62	18.14	21.28	0.92	3.27	NOT DETECTED
37.	06-02-2023	88.17	24.29	33.73	43.44	1.00	3.72	NOT DETECTED
38.	09-02-2023	71.63	31.62	27.38	39.74	1.12	3.86	NOT DETECTED
39.	13-02-2023	69.74	27.63	21.92	27.53	1.00	2.18	NOT DETECTED
40.	16-02-2023	85.41	39.84	28.66	32.19	1.17	4.52	NOT DETECTED
41.	20-02-2023	62.18	36.62	31.39	43.65	0.95	2.18	NOT DETECTED
42.	23-02-2023	75.37	28.18	19.32	26.17	1.00	4.38	NOT DETECTED
43.	27-02-2023	83.56	33.69	26.18	37.51	1.16	2.95	NOT DETECTED
44.	02-03-2023	84.38	26.15	23.89	31.27	1.14	3.57	NOT DETECTED
45.	06-03-2023	73.81	29.27	26.64	35.86	1	4.13	NOT DETECTED
46.	09-03-2023	89.64	39.55	34.28	42.46	0.96	4.27	NOT DETECTED
47.	13-03-2023	82.57	36.39	31.67	37.16	1.15	3.19	NOT DETECTED

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Name of Location		Near Fire Station						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	89.79	34.18	28.36	35.13	1.12	4.25	NOT DETECTED
49.	20-03-2023	77.73	39.13	34.88	41.29	1.00	2.69	NOT DETECTED
50.	23-03-2023	74.52	35.07	23.18	31.44	1.14	3.56	NOT DETECTED
51.	27-03-2023	85.36	37.48	29.67	34.89	1.1	3.21	NOT DETECTED
52.	30-03-2023	81.29	41.35	32.58	38.1	1.17	4.24	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/ SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Ambient Air Quality Monitoring

Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	83.26	32.68	21.38	34.27	1.00	NOT DETECTED	NOT DETECTED
2.	06-10-2022	79.54	36.82	26.32	34.86	1.12	NOT DETECTED	NOT DETECTED
3.	10-10-2022	88.31	33.96	28.64	34.72	1.00	NOT DETECTED	NOT DETECTED
4.	13-10-2022	78.47	29.81	29.94	41.65	0.95	NOT DETECTED	NOT DETECTED
5.	17-10-2022	83.27	27.38	32.16	39.89	1.00	NOT DETECTED	NOT DETECTED
6.	20-10-2022	82.86	36.32	24.28	27.13	1.15	NOT DETECTED	NOT DETECTED
7.	27-10-2022	69.89	38.24	31.46	39.03	1.00	NOT DETECTED	NOT DETECTED
8.	28-10-2022	79.84	27.38	19.24	26.86	0.95	NOT DETECTED	NOT DETECTED
9.	31-10-2022	81.29	29.17	32.23	37.2	1.00	NOT DETECTED	NOT DETECTED
10.	03-11-2022	86.78	37.65	22.43	28.25	1.00	2.97	NOT DETECTED
11.	07-11-2022	83.45	43.45	24.14	30.25	1.09	4.28	NOT DETECTED
12.	10-11-2022	88.76	44.12	21.34	27.12	1.15	3.16	NOT DETECTED
13.	14-11-2022	83.45	45.67	25.67	32.45	1.00	6.79	NOT DETECTED
14.	17-11-2022	80.68	37.83	26.74	33.89	1.12	3.57	NOT DETECTED
15.	21-11-2022	84.21	36.46	22.35	28.95	0.95	2.86	NOT DETECTED

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Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	86.53	43.15	27.69	35.15	1.00	3.29	NOT DETECTED
17.	28-11-2022	83.24	40.15	22.45	27.86	0.94	4.69	NOT DETECTED
18.	01-12-2022	72.18	31.63	28.46	35.27	1.15	3.14	NOT DETECTED
19.	05-12-2022	85.42	37.89	21.75	32.84	1.00	3.28	NOT DETECTED
20.	08-12-2022	83.81	41.52	26.34	38.91	1.00	2.68	NOT DETECTED
21.	12-12-2022	88.57	37.6	29.49	31.06	1.17	4.52	NOT DETECTED
22.	15-12-2022	86.77	34.28	19.96	26.43	0.94	2.16	NOT DETECTED
23.	19-12-2022	76.23	46.16	27.28	37.67	1.13	4.66	NOT DETECTED
24.	22-12-2022	82.94	38.58	32.13	39.64	1.00	2.79	NOT DETECTED
25.	26-12-2022	86.41	34.24	28.44	34.59	1.15	3.83	NOT DETECTED
26.	29-12-2022	79.67	36.79	23.46	31.37	1.00	2.65	NOT DETECTED
27.	02-01-2023	66.17	36.24	21.45	32.19	1.12	2.37	NOT DETECTED
28.	05-01-2023	79.46	27.52	16.38	28.74	1.00	2.96	NOT DETECTED
29.	09-01-2023	74.61	36.74	29.64	36.78	1.15	3.17	NOT DETECTED
30.	12-01-2023	76.24	32.82	24.79	39.83	1.00	2.68	NOT DETECTED
31.	16-01-2023	82.47	27.17	27.54	19.99	1.00	4.27	NOT DETECTED

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Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	78.52	39.36	26.17	28.14	1.15	3.95	NOT DETECTED
33.	23-01-2023	85.35	31.24	24.39	31.57	1.12	4.68	NOT DETECTED
34.	26-01-2023	78.31	38.57	26.73	33.87	1.00	2.52	NOT DETECTED
35.	30-01-2023	87.49	29.63	25.44	36.26	1.17	3.47	NOT DETECTED
36.	02-02-2023	83.26	31.59	16.72	24.14	1.15	3.62	NOT DETECTED
37.	06-02-2023	86.72	37.52	28.68	36.89	0.95	3.79	NOT DETECTED
38.	09-02-2023	67.38	44.74	34.54	41.38	1.00	4.62	NOT DETECTED
39.	13-02-2023	75.18	38.57	29.84	37.49	1.14	3.96	NOT DETECTED
40.	16-02-2023	81.38	36.62	26.81	29.75	1.00	2.85	NOT DETECTED
41.	20-02-2023	80.32	31.28	33.49	38.16	1.13	2.59	NOT DETECTED
42.	23-02-2023	74.91	37.26	28.81	36.57	0.97	3.66	NOT DETECTED
43.	27-02-2023	87.74	35.96	31.63	38.27	1.00	3.74	NOT DETECTED
44.	02-03-2023	70.69	42.58	23.34	29.75	1.00	3.88	NOT DETECTED
45.	06-03-2023	87.43	44.51	32.74	39.46	1.14	4.15	NOT DETECTED
46.	09-03-2023	76.57	37.59	28.17	34.15	1.12	4.86	NOT DETECTED
47.	13-03-2023	72.45	34.21	31.42	38.76	1.00	2.98	NOT DETECTED

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Name of Location		ADANI PORT – TUG Berth 600 KL Pupm House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	78.82	39.76	29.57	32.56	1.12	3.12	NOT DETECTED
49.	20-03-2023	87.05	42.95	32.47	41.2	1.15	3.26	NOT DETECTED
50.	23-03-2023	85.26	34.18	30.88	38.65	1.00	4.62	NOT DETECTED
51.	27-03-2023	74.24	38.65	29.74	34.71	1.13	4.42	NOT DETECTED
52.	30-03-2023	83.28	32.41	24.25	29.48	1.15	3.78	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

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Results of Ambient Air Quality Monitoring

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
1.	03-10-2022	79.37	28.34	17.38	26.86	0.92	NOT DETECTED	NOT DETECTED
2.	06-10-2022	83.47	36.86	19.63	23.26	1.15	NOT DETECTED	NOT DETECTED
3.	10-10-2022	82.38	32.12	17.88	29.10	1.00	NOT DETECTED	NOT DETECTED
4.	13-10-2022	73.48	29.73	18.39	26.24	1.12	NOT DETECTED	NOT DETECTED
5.	17-10-2022	84.32	26.46	24.96	31.82	1.00	NOT DETECTED	NOT DETECTED
6.	20-10-2022	88.74	37.94	23.58	29.39	1.10	NOT DETECTED	NOT DETECTED
7.	27-10-2022	75.93	23.63	29.34	37.43	0.96	NOT DETECTED	NOT DETECTED
8.	28-10-2022	81.29	32.45	22.25	31.98	1.13	NOT DETECTED	NOT DETECTED
9.	31-10-2022	78.64	39.41	31.48	38.71	1.00	NOT DETECTED	NOT DETECTED
10.	03-11-2022	83.21	27.43	11.24	16.78	1.00	4.72	NOT DETECTED
11.	07-11-2022	78.23	21.25	14.78	20.15	1.15	3.29	NOT DETECTED
12.	10-11-2022	65.78	31.16	17.89	24.56	0.94	5.63	NOT DETECTED
13.	14-11-2022	77.58	22.47	23.45	31.36	1.00	5.09	NOT DETECTED
14.	17-11-2022	81.24	26.28	26.78	30.15	1.00	4.37	NOT DETECTED
15.	21-11-2022	83.45	34.56	23.10	28.15	1.15	4.86	NOT DETECTED

Continue…

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CIN:U73100GJ2007PTC051463

Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
16.	24-11-2022	73.45	28.51	22.45	27.14	0.95	2.98	NOT DETECTED
17.	28-11-2022	80.12	23.83	19.25	22.53	1.00	4.12	NOT DETECTED
18.	01-12-2022	84.42	23.57	16.38	26.47	1.16	3.72	NOT DETECTED
19.	05-12-2022	68.54	21.75	19.43	25.79	1.00	4.76	NOT DETECTED
20.	08-12-2022	82.71	24.17	26.19	34.27	1.10	4.88	NOT DETECTED
21.	12-12-2022	76.83	29.96	28.77	37.36	1.13	4.26	NOT DETECTED
22.	15-12-2022	86.53	32.78	21.91	27.52	1.00	3.57	NOT DETECTED
23.	19-12-2022	83.36	31.26	27.62	33.13	1.16	3.72	NOT DETECTED
24.	22-12-2022	79.16	34.04	25.12	31.98	1.00	3.14	NOT DETECTED
25.	26-12-2022	73.58	29.36	22.65	29.07	1.00	3.64	NOT DETECTED
26.	29-12-2022	85.63	36.42	26.83	36.17	1.15	4.12	NOT DETECTED
27.	02-01-2023	72.36	29.62	13.28	31.34	1.00	2.96	NOT DETECTED
28.	05-01-2023	84.27	24.38	26.73	34.86	1.12	3.59	NOT DETECTED
29.	09-01-2023	81.63	27.47	17.38	26.47	1.00	3.26	NOT DETECTED
30.	12-01-2023	75.38	37.24	26.77	32.14	1.00	4.83	NOT DETECTED
31.	16-01-2023	87.31	26.48	16.64	27.92	1.15	4.89	NOT DETECTED

Continue…

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Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
32.	19-01-2023	64.38	39.63	21.94	31.23	1.13	3.26	NOT DETECTED
33.	23-01-2023	73.29	32.47	29.58	38.96	1.17	2.13	NOT DETECTED
34.	26-01-2023	69.04	36.72	26.16	37.53	1.13	2.79	NOT DETECTED
35.	30-01-2023	84.27	27.84	18.24	26.48	1.12	3.74	NOT DETECTED
36.	02-02-2023	89.28	34.79	23.85	27.13	1.17	4.83	NOT DETECTED
37.	06-02-2023	73.59	29.82	21.29	29.75	1.00	2.37	NOT DETECTED
38.	09-02-2023	86.27	39.84	32.06	43.27	1.17	4.72	NOT DETECTED
39.	13-02-2023	77.33	32.61	31.29	37.55	0.95	2.79	NOT DETECTED
40.	16-02-2023	76.52	31.28	24.66	31.74	1.00	3.16	NOT DETECTED
41.	20-02-2023	63.38	34.39	28.17	37.93	1.00	4.33	NOT DETECTED
42.	23-02-2023	88.56	41.39	23.72	33.84	1.15	3.69	NOT DETECTED
43.	27-02-2023	73.41	38.69	31.43	36.16	1.00	3.48	NOT DETECTED
44.	02-03-2023	75.41	40.62	27.17	34.29	0.95	4.03	NOT DETECTED
45.	06-03-2023	86.36	36.17	25.74	31.58	0.98	3.12	NOT DETECTED
46.	09-03-2023	78.72	32.96	24.68	28.49	1.14	4.18	NOT DETECTED
47.	13-03-2023	74.17	41.22	28.54	35.25	1.12	2.96	NOT DETECTED

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Name of Location		PUB / Adani House						
Sr. No.	Date of Monitoring	Parameter with Results						
		PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	HC µg/m³	Benzene µg/m³
48.	16-03-2023	84.23	36.71	28.16	34.86	1.00	3.55	NOT DETECTED
49.	20-03-2023	88.98	42.58	31.32	39.13	1.12	3.75	NOT DETECTED
50.	23-03-2023	76.63	35.93	29.65	36.29	1.00	4.25	NOT DETECTED
51.	27-03-2023	86.24	31.47	26.96	31.83	1.14	3.38	NOT DETECTED
52.	30-03-2023	89.58	38.25	19.63	25.58	1.11	3.15	NOT DETECTED
Permissible Value as per NAAQMS		**100.0**	**60.0**	**80.0**	**80.0**	**2.0**	**---**	**5.0**
Test Method		**IS - 5182, Part-23**	**UERL/AIR/ SOP/11**	**IS - 5182, Part - 2**	**IS - 5182, Part - 6**	**IS - 5182, Part - 10**	**Gas analyzer**	**IS – 5182, Part – 11**

Nikunj D. Patel
(Chemist)

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(Manager - Operations)

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Results of Noise Level Monitoring

Location Name		CT3 RMU-2					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		13-10-2022	14-11-2022	12-12-2022	12-01-2023	13-02-2023	13-03-2023
1	06:00 to 07:00	63.4	62.8	61.2	59.9	61.9	64.6
2	07:00 to 08:00	66.9	68.5	63.8	61.4	68.5	68.2
3	08:00 to 09:00	63.2	67.4	62.8	68.6	64.7	66.7
4	09:00 to 10:00	69.6	64.7	64.3	65.5	62.1	64.9
5	10:00 to 11:00	61.2	64.1	68.5	66.1	67.5	63.6
6	11:00 to 12:00	67.4	68.9	69.1	69.1	65.7	64.2
7	12:00 to 13:00	68.8	67.1	64.2	64.2	62.4	64.9
8	13:00 to 14:00	67.5	68.3	66.9	68.3	69.0	68.7
9	14:00 to 15:00	65.2	64.2	63.6	63.6	64.2	63.6
10	15:00 to 16:00	69.5	62.3	64.2	62.6	62.3	61.9
11	16:00 to 17:00	65.5	69.4	63.9	63.9	68.6	68.4
12	17:00 to 18:00	68.2	61.2	66.8	62.9	61.2	67.4
13	18:00 to 19:00	68.7	68.4	64.4	63.7	67.2	63.4
14	19:00 to 20:00	65.5	65.5	63.6	62.2	65.5	62.7
15	20:00 to 21:00	60.7	65.4	65.4	65.4	63.4	60.5
16	21:00 to 22:00	62.9	64.8	63.1	62.7	64.7	63.8
Day Time		<75 dB (A)					

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Location Name		CT3 RMU-2					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		13-10-2022	14-11-2022	12-12-2022	12-01-2023	13-02-2023	13-03-2023
1	22:00 to 23:00	62.4	59.2	59.6	59.0	60.3	62.4
2	23:00 to 24:00	63.1	62.5	60.3	60.8	61.3	60.5
3	24:00 to 01:00	57.5	61.2	63.2	62.2	61.2	58.5
4	01:00 to 02:00	61.1	57.9	61.7	60.8	57.4	59.3
5	02:00 to 03:00	62.7	57.4	62.1	62.1	58.3	56.8
6	03:00 to 04:00	60.9	60.2	60.4	60.4	61.9	60.9
7	04:00 to 05:00	58.4	61.8	64.5	63.1	61.8	62.6
8	05:00 to 06:00	59.9	63.9	62.5	61.9	58.6	60.7
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring							
Location Name		**Near Fire Station**					
Sr. No.	**Sampling Date and Time**	**Noise Level Leq. dB(A) - Day Time**					
		06-10-2022	**07-11-2022**	**05-12-2022**	**05-01-2023**	**06-02-2023**	**06-03-2023**
1	06:00 to 07:00	63.5	63.4	62.3	61.4	64.8	61.9
2	07:00 to 08:00	64.3	67.8	63.6	66.8	61.6	63.6
3	08:00 to 09:00	66.7	69.3	67.2	65.3	68.4	67.3
4	09:00 to 10:00	62.8	61.3	63.0	67.5	65.3	66.8
5	10:00 to 11:00	68.1	65.1	64.4	61.3	68.1	63.2
6	11:00 to 12:00	63.2	68.3	66.8	62.8	67.2	65.1
7	12:00 to 13:00	64.2	68.9	65.9	62.9	64.7	67.3
8	13:00 to 14:00	66.9	66.7	63.5	61.4	68.3	68.1
9	14:00 to 15:00	61.2	58.7	68.2	66.3	59.7	60.2
10	15:00 to 16:00	64.8	67.5	62.6	65.7	68.4	65.3
11	16:00 to 17:00	63.1	66.3	67.9	67.9	67.7	68.3
12	17:00 to 18:00	60.8	67.1	61.4	64.7	61.0	63.2
13	18:00 to 19:00	66.9	65.9	66.8	62.4	66.3	67.5
14	19:00 to 20:00	61.3	64.2	64.2	64.2	65.1	63.9
15	20:00 to 21:00	63.3	63.2	62.1	64.1	64.8	63.2
16	21:00 to 22:00	58.7	61.3	61.3	63.6	62.6	64.8
Day Time		**<75 dB (A)**					

Continue…

Location Name		Near Fire Station					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		06-10-2022	07-11-2022	05-12-2022	05-01-2023	06-02-2023	06-03-2023
1	22:00 to 23:00	59.2	58.6	60.9	58.4	56.8	54.8
2	23:00 to 24:00	62.5	57.8	61.3	61.3	58.4	56.6
3	24:00 to 01:00	62.3	61.2	59.6	59.3	60.2	58.5
4	01:00 to 02:00	57.9	59.8	61.3	60.2	56.4	57.4
5	02:00 to 03:00	60.3	60.4	59.8	59.8	57.3	58.4
6	03:00 to 04:00	62.4	58.6	60.3	61.3	61.3	60.4
7	04:00 to 05:00	61.5	61.3	59.5	59.5	60.2	58.7
8	05:00 to 06:00	61.7	59.8	58.6	58.1	59.8	55.2
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		ADANI PORT – TUG Berth 600 KL Pump House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		10-10-2022	10-11-2022	08-12-2022	09-01-2023	09-02-2023	09-03-2023
1	06:00 to 07:00	63.8	61.3	59.7	62.3	63.1	62.7
2	07:00 to 08:00	65.4	65.4	62.7	64.8	64.4	61.3
3	08:00 to 09:00	61.2	67.3	63.9	61.8	66.3	64.8
4	09:00 to 10:00	67.4	64.3	63.2	62.3	67.5	68.3
5	10:00 to 11:00	63.3	68.9	68.6	65.9	67.9	64.7
6	11:00 to 12:00	68.8	67.3	63.6	68.1	68.4	67.5
7	12:00 to 13:00	67.2	64.3	68.1	67.4	62.1	64.8
8	13:00 to 14:00	61.5	67.1	65.4	68.2	68.3	67.2
9	14:00 to 15:00	67.1	66.2	61.3	65.8	65.3	67.9
10	15:00 to 16:00	60.4	69.8	64.9	64.9	68.1	66.5
11	16:00 to 17:00	62.6	68.2	67.4	67.4	67.4	68.3
12	17:00 to 18:00	68.2	65.3	67.3	64.2	61.7	62.5
13	18:00 to 19:00	68.1	66.4	66.2	66.2	64.3	66.8
14	19:00 to 20:00	65.2	61.3	69.7	69.7	63.2	64.1
15	20:00 to 21:00	64.1	64.3	64.8	64.8	65.8	63.8
16	21:00 to 22:00	62.3	63.9	63.4	58.4	62.8	60.9
Day Time		<75 dB (A)					

Continue…

Location Name		ADANI PORT – TUG Berth 600 KL Pump House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		10-10-2022	10-11-2022	08-12-2022	09-01-2023	09-02-2023	09-03-2023
1	22:00 to 23:00	60.8	61.4	61.2	61.2	58.5	56.7
2	23:00 to 24:00	63.5	62.3	61.8	61.8	61.8	60.4
3	24:00 to 01:00	63.8	56.8	62.3	62.8	56.8	57.2
4	01:00 to 02:00	62.7	59.5	60.9	60.7	58.5	57.7
5	02:00 to 03:00	60.6	56.5	60.3	61.4	56.5	58.5
6	03:00 to 04:00	61.4	58.8	61.5	61.5	57.3	58.5
7	04:00 to 05:00	58.7	60.7	63.8	64.5	60.7	58.4
8	05:00 to 06:00	54.7	61.4	62.4	62.7	62.4	59.9
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

GUJARAT VAPI.

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Results of Noise Level Monitoring

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		03-10-2022	03-11-2022	01-12-2022	02-01-2023	02-02-2023	02-03-2023
1	06:00 to 07:00	62.5	63.8	62.7	61.8	60.6	62.4
2	07:00 to 08:00	66.1	61.4	64.2	63.5	62.5	61.8
3	08:00 to 09:00	68.2	58.7	63.1	62.8	60.9	63.7
4	09:00 to 10:00	62.4	62.6	65.6	62.4	63.2	63.2
5	10:00 to 11:00	67.8	68.7	64.2	63.4	67.4	64.2
6	11:00 to 12:00	64.0	63.4	67.9	69.6	65.2	61.8
7	12:00 to 13:00	61.3	69.7	64.3	65.7	68.9	65.9
8	13:00 to 14:00	65.9	62.1	63.2	64.2	64.8	63.1
9	14:00 to 15:00	64.2	62.5	66.5	67.5	63.6	66.3
10	15:00 to 16:00	63.7	61.8	65.2	67.1	61.8	62.9
11	16:00 to 17:00	67.0	65.5	64.5	63.8	66.4	64.7
12	17:00 to 18:00	65.3	64.1	65.1	64.9	67.9	64.3
13	18:00 to 19:00	69.1	59.2	62.7	63.8	58.2	60.1
14	19:00 to 20:00	66.7	68.3	61.3	65.4	67.0	63.4
15	20:00 to 21:00	61.8	63.3	60.2	63.9	61.9	62.7
16	21:00 to 22:00	60.4	66.3	60.8	62.5	65.3	61.2
Day Time		<75 dB (A)					

Continue…

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CIN:U73100GJ2007PTC051463

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Email : response@uerl.in Website : www.uerl.in

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		03-10-2022	03-11-2022	01-12-2022	02-01-2023	02-02-2023	02-03-2023
1	22:00 to 23:00	63.6	56.3	58.7	60.3	57.3	58.4
2	23:00 to 24:00	64.2	57.8	61.6	62.3	56.2	54.2
3	24:00 to 01:00	63.4	54.3	60.7	59.8	54.3	55.7
4	01:00 to 02:00	64.1	58.6	60.6	60.6	57.4	58.3
5	02:00 to 03:00	58.6	59.3	59.3	58.1	60.1	59.2
6	03:00 to 04:00	58.2	55.8	60.5	59.2	56.3	57.9
7	04:00 to 05:00	64.2	59.2	61.3	60.5	59.2	55.4
8	05:00 to 06:00	61.3	57.4	62.7	61.3	58.3	57.8
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

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GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring

Sr. No.	Parameter	Unit	Hot Water System-1 (Liquid Terminal)	Hot Water System-2 (Liquid Terminal)	Thermic Fluid Heater (Bitumin-1)	Thermic Fluid Heater (Bitumin-2)	GPCB LIMIT	Method of Test
Oct-22								
1	Particulate Matter	mg/Nm^3	21.19	23.64	23.72	22.96	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	6.63	7.24	9.03	9.84	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	18.47	23.36	22.38	21.29	50	IS 11255 (Part - 7)
Nov-22								
1	Particulate Matter	mg/Nm^3	22.79	21.44	22.37	21.47	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO2	ppm	7.26	6.63	8.69	8.32	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NOX	ppm	20.19	21.79	21.52	22.16	50	IS 11255 (Part - 7)
Dec-22								
1	Particulate Matter	mg/Nm^3	22.48	22.92	22.89	22.36	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	6.84	6.89	9.08	9.16	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	19.72	22.31	22.14	22.68	50	IS 11255 (Part - 7)
Jan-23								
1	Particulate Matter	mg/Nm^3	22.83	23.18	23.48	22.79	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.12	7.13	9.83	9.58	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	21.26	22.58	22.94	23.13	50	IS 11255 (Part - 7)

Continue…

Sr. No.	Parameter	Unit	Hot Water System-1 (Liquid Terminal)	Hot Water System-2 (Liquid Terminal)	Thermic Fluid Heater (Bitumin-1)	Thermic Fluid Heater (Bitumin-2)	GPCB LIMIT	Method of Test
Feb-23								
1	Particulate Matter	mg/Nm^3	21.36	22.39	21.72	19.79	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	6.27	7.58	8.36	8.68	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	19.89	22.94	20.52	21.56	50	IS 11255 (Part - 7)
Mar-23								
1	Particulate Matter	mg/Nm^3	21.14	21.85	19.38	18.78	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	6.58	7.32	8.14	7.46	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	20.36	22.58	19.69	20.83	50	IS 11255 (Part - 7)

Nikunj D. Patel
(Chemist)

GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Stack Monitoring

Sr. No.	Parameter	Unit	D.G. Set-6, 7 & 8 (1250 KVA - CT2) Common Stack	D.G. Set-9 (1500 KVA - CT3)	D.G. Set-10 (1500 KVA - CT3)	D.G. Set-11 (1500 KVA - CT3)	GPCB LIMIT	Method of Test
			Mar-23	Feb-23				
			17-03-2023	03-02-2023	03-02-2023	03-02-2023		
1	Particulate Matter	mg/Nm^3	22.48	13.49	17.28	14.96	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	8.26	9.84	13.63	13.37	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	17.85	21.69	24.71	17.81	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	3.27	4.6	4.8	4.2	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

Sr. No.	Parameter	Unit	D.G. Set-12 (1500 KVA) - CT4	D.G. Set-13 (1500 KVA) - CT4	D.G. Set-14 (1500 KVA) - CT4	D.G. Set-1 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Feb-23			Dec-22		
			01-02-2023	01-02-2023	01-02-2023	18-12-2022		
1	Particulate Matter	mg/Nm^3	19.27	22.39	19.36	18.73	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.84	8.68	7.73	7.42	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	15.96	19.52	15.24	24.38	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	4.13	4.46	3.92	2.69	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

Continue…

Sr. No.	Parameter	Unit	D.G. Set-2 (500 KVA) - DG House - MPT	D.G. Set-3 (500 KVA) - DG House - MPT	D.G. Set-4 (500 KVA) - DG House - MPT	D.G. Set-5 (500 KVA) - DG House - MPT	GPCB LIMIT	Method of Test
			Dec-22					
			18-12-2022	18-12-2022	18-12-2022	18-12-2022		
1	Particulate Matter	mg/Nm^3	23.74	21.47	26.68	23.74	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	6.84	9.39	8.36	9.37	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	26.72	27.51	26.64	28.58	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	3.26	4.17	4.79	4.15	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

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RESULTS OF BORE HOLE WATER

SR.NO.	TEST PARAMETERS	UNIT	Pump House-1	Pump House-2	Pump House-3	Near Unloading bays	Near ETP	TEST METHOD
			14-02-2023	14-02-2023	14-02-2023	14-02-2023	14-02-2023	
1.	pH @ 25 ° C	--	8.11	7.78	7.89	7.98	8.01	IS 3025(Part 11)1983
2.	Salinity	ppt	3.37	1.06	1.81	1.02	7.17	APHA 23rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	IS 3025(Part39)1991, Amd. 2
4.	Hydrocarbon	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	GC/GCMS
5.	Lead as Pb	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	IS 3025 (PART 47) 1994
6.	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,3114-C
7.	Nickel as Ni	mg/L	0.076	0.022	0.033	0.015	0.127	IS 3025 (PART 54) 2003
8.	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 3025 (PART 52) 2003
9.	Cadmium as Cd	mg/L	0.042	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	0.094	IS 3025(PART 41) 1992
10.	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	APHA 23rd Ed.,2017, 3112-B
11.	Zinc as Zn	mg/L	0.102	0.061	BDL(MDL:0.05)	BDL(MDL:0.05)	0.054	IS 3025(PART 49) 1994
12.	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 3025 (PART 42) 1992
13.	Iron as Fe	mg/L	0.835	0.516	BDL(MDL:0.1)	BDL(MDL:0.1)	0.342	IS 3025(PART 53) 2003
14.	Insecticides/Pesticides	µg/L	Absent	Absent	Absent	Absent	Absent	USEPA 8081 B
15.	Depth of Water Level from Ground Level	meter	1.9	2.1	1.95	2.15	2	--

GUJARAT VAPI

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Sr. Chemist

Mr. Nitin Tandel
Technical Manager

RESULTS OF BORE HOLE WATER

SR.NO.	TEST PARAMETERS	UNIT	Pump House-1	Pump House-2	Pump House-3	Near Unloading bays	Near ETP	TEST METHOD
			04-08-2022	04-08-2022	04-08-2022	04-08-2022	04-08-2022	
1.	pH @ 25 ° C	--	8.44	8.02	8.06	7.79	7.6	IS 3025(Part 11)1983
2.	Salinity	ppt	3.4	0.79	0.81	1.12	11.64	APHA 23rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	IS 3025(Part39)1991, Amd. 2
4.	Hydrocarbon	mg/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	GC/GCMS
5.	Lead as Pb	mg/L	0.064	0.072	0.044	0.034	0.042	IS 3025 (PART 47) 1994
6.	Arsenic as As	mg/L	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	APHA 23rd Ed.,2017,3114-C
7.	Nickel as Ni	mg/L	0.114	0.101	0.09	0.069	0.105	IS 3025 (PART 54) 2003
8.	Total Chromium as Cr	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 3025 (PART 52) 2003
9.	Cadmium as Cd	mg/L	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	BDL(MDL:0.003)	IS 3025(PART 41) 1992
10.	Mercury as Hg	mg/L	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	BDL(MDL:0.001)	APHA 23rd Ed.,2017, 3112-B
11.	Zinc as Zn	mg/L	0.132	0.246	0.129	0.122	0.197	IS 3025(PART 49) 1994
12.	Copper as Cu	mg/L	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 3025 (PART 42) 1992
13.	Iron as Fe	mg/L	0.12	0.85	0.79	1.12	0.94	IS 3025(PART 53) 2003
14.	Insecticides/Pesticides	µg/L	Absent	Absent	Absent	Absent	Absent	USEPA 8081 B
15.	Depth of Water Level from Ground Level	meter	1.9	2.1	1.95	2.15	2	--

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Minimum Detection Limit			
Ambient Air Quality Monitoring			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Particulate Matter (PM10)	µg/m3	5 µg/m3
2	Particulate Matter (PM2.5)	µg/m3	5 µg/m3
3	Sulphur Dioxide (SO2)	µg/m3	4 µg/m3
4	Nitrogen Dioxide (NO2)	µg/m3	5 µg/m3
5	Carbon Monoxide (CO)	mg/m3	0.01 mg/m3
6	Ammonia (NH3)	µg/m3	5 µg/m3
7	Ozone (O3)	µg/m3	5 µg/m3
8	Lead (Pb)	µg/m3	0.5 µg/m3
9	Nickle (Ni)	ng/m3	1 ng/m3
10	Arsenic (As)	ng/m3	1 ng/m3
11	Benzene	µg/m3	1µg/m3
12	Benzo(o)Pyrene	ng/m3	0.1 ng/m3
14	Hydro Carbon	µg/m3	1 µg/m3
Stack Emission Monitoring			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Suspended particulate matter	mg/Nm3	2 mg/Nm3
2	Sulphur Dioxide SOX	mg/Nm3	4 mg/Nm3
3	Oxides of Nitrogen NOX	mg/Nm3	5 mg/Nm3

ETP Water			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Colour	Pt. Co. Scale	5
2	pH @ 27 ° C	--	2
3	Temperature	0C	5
4	Total Suspended Solids	mg/L	4
5	Total Dissolved Solids	mg/L	4
6	COD	mg/L	2
7	BOD (3 days at 27 0C)	mg/L	1
8	Chloride (as Cl) -	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate (as SO4)	mg/L	1
11	Ammonical Nitrogen	mg/L	2
12	Phenolic Compound	mg/L	0.1
13	Copper as Cu	mg/L	0.05
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.05
16	Cadmium as Cd	mg/L	0.003
17	Fluoride as F	mg/L	0.2
18	Residual Chlorine	mg/L	0.1
19	Percent Sodium	%	--
20	Sodium Absorption ratio	--	--

MARINE WATER			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	pH	--	5
2	Temperature	oC	5
3	Total Suspended Solids	mg/L	4
4	BOD (3 Days @ 27oC)	mg/L	1
5	Dissolved Oxygen	mg/L	0.2
6	Salinity	ppt	0.01
7	Oil & Grease	mg/L	2
8	Nitrate as NO_3	µmol/L	0.4
9	Nitrite as NO_2	µmol/L	0.04
10	Ammonical Nitrogen as NH_3	µmol/L	0.8
11	Phosphates as PO_4	µmol/L	0.4
12	Total Nitrogen	µmol/L	2.2
13	Petroleum Hydrocarbon	µg/L	0.1
14	Total Dissolved Solids	mg/L	4
15	COD	mg/L	2

Sea SEDIMENT			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	Organic Matter	%	0.5
2	Phosphorus as P	µg/g	1
3	Texture	--	--
4	Petroleum Hydrocarbon	µg/g	0.1
5	Aluminum as Al	%	0.1
6	Total Chromium as Cr+3	µg/g	2
7	Manganese as Mn	µg/g	1
8	Iron as Fe	%	0.1
9	Nickel as Ni	µg/g	1
10	Copper as Cu	µg/g	1
11	Zinc as Zn	µg/g	1
12	Lead as Pb	µg/g	1
13	Mercury as Hg	µg/g	0.05

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BORE HOLE WATER			
Sr. No.	**Test Parameter**	**Unit**	**MDL**
1	pH @ 25 ° C	--	5
2	Salinity	ppt	--
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.1
5	Lead as Pb	mg/L	0.01
6	Arsenic as As	mg/L	0.01
7	Nickel as Ni	mg/L	0.02
8	Total Chromium as Cr	mg/L	0.05
9	Cadmium as Cd	mg/L	0.003
10	Mercury as Hg	mg/L	0.001
11	Zinc as Zn	mg/L	0.05
12	Copper as Cu	mg/L	0.05
13	Iron as Fe	mg/L	0.1
14	Insecticides/Pesticides	µg/L	0.1
15	Depth of Water Level from Ground Level	meter	--

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : January - 2023

Name of Location : Village - Siracha

ID No. : **URA/ID/A-23/01/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/01/2023	56.2	25.2	13.2	15.6		--
2.	06/01/2023	59.7	24.5	11.0	13.4		--
3.	10/01/2023	41.8	19.5	10.6	19.1	14.8	BDL
4.	13/01/2023	59.5	24.9	10.8	12.3		--
5.	17/01/2023	68.6	26.9	12.5	17.7		--
6.	20/01/2023	65.2	25.7	13.6	18.5		--
7.	24/01/2023	57.4	24.7	15.8	20.1		--
8.	27/01/2023	58.2	28.5	11.6	15.2		--
Average		**58.3**	**25.0**	**12.4**	**16.5**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_X** – IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : January - 2023

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/12/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/01/2023	65.1	25.3	8.8	11.3		--
2.	06/01/2023	50.4	25.8	11.7	18.8		--
3.	10/01/2023	68.1	30.0	10.1	14.3	14.1	BDL
4.	13/01/2023	57.3	26.7	14.6	19.1		--
5.	17/01/2023	61.5	27.6	11.2	16.9		--
6.	20/01/2023	54.8	23.4	9.7	12.5		--
7.	24/01/2023	60.6	28.7	12.7	19.7		--
8.	27/01/2023	52.6	27.8	11.8	17.3		--
Average		**58.8**	**26.9**	**11.3**	**16.2**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_X**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : January - 2023

Name of Location : Village - Wandh

ID No. : **URA/ID/A-23/01/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/01/2023	56.6	29.2	15.6	18.8		--
2.	06/01/2023	59.1	29.1	12.9	14.3		--
3.	10/01/2023	52.2	22.7	11.4	18.7	18.1	BDL
4.	13/01/2023	61.7	30.0	16.1	19.5		--
5.	17/01/2023	70.8	31.5	13.7	16.4		--
6.	20/01/2023	64.5	29.0	12.3	21.8		--
7.	24/01/2023	59.0	27.4	15.6	18.1		--
8.	27/01/2023	59.3	26.3	12.3	19.6		--
Average		**60.4**	**28.1**	**13.7**	**18.4**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : January - 2023

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-23/01/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	19/01/2023	58.4	23.1	13.2	20.6	16.2	BDL
Average		**58.4**	**23.1**	**13.2**	**20.6**	**16.2**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : January - 2023

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-23/01/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	19/01/2023	48.7	20.6	11.8	18.8	14.3	BDL
Average		**48.7**	**20.6**	**11.8**	**18.8**	**14.3**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : October - 2022

Name of Location : Village - Siracha

ID No. : **URA/ID/A-22/10/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/10/2022	48.2	28.8	13.7	17.2		--
2.	07/10/2022	64.5	31.3	19.3	20.6		--
3.	11/10/2022	53.2	28.3	15.7	22.8	13.3	BDL
4.	14/10/2022	67.1	28.8	13.2	19.9		--
Average		**58.2**	**29.3**	**15.5**	**20.1**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_x** – IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : October - 2022

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/10/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/10/2022	65.4	30.4	15.3	21.6		--
2.	07/10/2022	57.5	29.9	12.1	17.2		--
3.	11/10/2022	62.3	30.6	20.6	24.6	15.8	BDL
4.	14/10/2022	51.2	26.9	17.7	21.4		--
Average		**59.1**	**29.4**	**16.4**	**21.2**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : October - 2022

Name of Location : Village - Wandh

ID No. : **URA/ID/A-22/10/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	04/10/2022	61.1	23.4	14.6	18.2		--
2.	07/10/2022	52.5	28.1	21.6	25.3		--
3.	11/10/2022	64.4	30.8	18.4	23.7	18.4	BDL
4.	14/10/2022	70.3	32.5	16.3	20.9		--
Average		**62.1**	**28.7**	**17.7**	**22.0**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : October - 2022

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-22/10/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	12/10/2022	70.4	30.8	16.2	21.5	20.2	BDL
Average		**70.4**	**30.8**	**16.2**	**21.5**	**20.2**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : October - 2022

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-22/10/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	12/10/2022	61.3	26.4	14.7	20.3	18.5	BDL
Average		**61.3**	**26.4**	**14.7**	**20.3**	**18.5**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : November - 2022

Name of Location : Village - Siracha

ID No. : **URA/ID/A-22/11/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	01/11/2022	63.0	24.4	13.5	16.5		--
2.	04/11/2022	49.5	20.0	15.8	22.8		--
3.	08/11/2022	54.8	25.1	17.6	24.6	15.8	BDL
4.	11/11/2022	51.5	18.6	12.7	15.3		
5.	15/11/2022	65.1	24.1	14.9	19.6		
6.	18/11/2022	59.0	22.3	17.1	22.2		
7.	22/11/2022	69.1	27.6	14.3	17.5		
8.	25/11/2022	69.8	24.5	12.9	19.4		
9.	29/11/2022	51.9	20.9	12.2	26.8		--
Average		**59.3**	**23.1**	**14.6**	**20.5**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_x** – IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : November - 2022

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/11/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	01/11/2022	60.5	24.0	16.3	20.5		--
2.	04/11/2022	47.9	28.9	10.7	15.2		--
3.	08/11/2022	65.9	24.6	13.8	17.5	18.9	BDL
4.	11/11/2022	60.1	20.8	15.4	20.8		
5.	15/11/2022	59.8	24.7	17.9	23.6		
6.	18/11/2022	55.7	22.9	14.4	21.4		
7.	22/11/2022	71.2	26.2	13.5	19.7		
8.	25/11/2022	64.5	25.6	14.8	21.3		
9.	29/11/2022	52.0	22.5	26.6	25.6		--
Average		**59.8**	**24.5**	**15.9**	**20.6**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : November - 2022

Name of Location : Village - Wandh

ID No. : **URA/ID/A-22/11/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	01/11/2022	64.6	30.9	18.5	22.7		--
2.	04/11/2022	72.6	31.2	16.7	25.4		--
3.	08/11/2022	66.2	29.5	15.5	21.2	22.6	BDL
4.	11/11/2022	49.3	26.2	13.9	18.5		
5.	15/11/2022	67.9	30.3	16.2	23.7		
6.	18/11/2022	53.8	25.6	15.8	21.3		
7.	22/11/2022	68.1	30.2	14.5	19.8		
8.	25/11/2022	66.9	27.2	17.2	22.6		
9.	29/11/2022	51.9	23.9	15.7	20.6		--
Average		**62.4**	**28.3**	**16.0**	**21.8**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : November - 2022

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-22/11/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1	15/11/2022	68.4	27.1	15.3	19.2	18.5	BDL
Average		68.4	27.1	15.3	19.2	18.5	BDL

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : November - 2022

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-22/11/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	15/11/2022	54.6	23.8	13.7	18.2	16.4	BDL
Average		**54.6**	**23.8**	**13.7**	**18.2**	**16.4**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : December - 2022

Name of Location : Village - Siracha

ID No. : **URA/ID/A-22/12/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/12/2022	59.8	31.8	13.8	17.3		--
2.	06/12/2022	60.6	29.4	19.5	23.2		--
3.	09/12/2022	74.6	32.5	18.2	27.8	13.2	BDL
4.	13/12/2022	51.3	22.0	10.6	15.1		
5.	16/12/2022	61.9	31.5	14.5	25.3		
6.	20/12/2022	45.8	24.7	18.3	19.5		
7.	23/12/2022	65.9	26.0	15.1	27.5		
8.	27/12/2022	59.6	30.9	13.4	22.2		
9.	30/12/2022	58.7	24.3	11.6	26.8		--
Average		**59.8**	**28.1**	**15.0**	**22.7**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_x** – IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : December - 2022

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/12/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/12/2022	51.6	24.4	11.4	13.7		--
2.	06/12/2022	57.3	26.9	12.3	17.8		--
3.	09/12/2022	63.6	29.3	18.9	22.2	15.7	BDL
4.	13/12/2022	46.5	27.7	14.1	14.2		
5.	16/12/2022	52.1	21.1	15.3	18.9		
6.	20/12/2022	59.3	27.6	13.7	18.3		
7.	23/12/2022	65.1	23.9	19.6	23.1		
8.	27/12/2022	73.7	33.5	17.1	21.5		
9.	30/12/2022	60.8	28.3	15.2	22.3		--
Average		**58.9**	**27.0**	**15.3**	**19.1**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : December - 2022

Name of Location : Village - Wandh

ID No. : **URA/ID/A-22/12/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	02/12/2022	52.6	21.2	14.3	20.2		--
2.	06/12/2022	57.1	27.0	12.6	25.3		--
3.	09/12/2022	74.5	33.3	20.4	23.7	20.4	BDL
4.	13/12/2022	64.7	31.9	17.3	25.1		
5.	16/12/2022	55.9	24.1	19.6	28.0		
6.	20/12/2022	64.4	31.9	13.1	17.5		
7.	23/12/2022	61.4	28.2	15.6	22.3		
8.	27/12/2022	63.7	30.2	20.6	25.2		
9.	30/12/2022	61.5	26.0	18.9	23.6		--
Average		**61.8**	**28.2**	**16.9**	**23.4**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : December - 2022

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-22/12/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	06/12/2022	62.8	25.2	13.9	21.3	17.2	BDL
Average		**62.8**	**25.2**	**13.9**	**21.3**	**17.2**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

UniStar Environment &
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(Authorized Signatory)

Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : December - 2022

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-22/12/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	06/12/2022	52.1	21.7	12.9	20.3	15.1	BDL
Average		**52.1**	**21.7**	**12.9**	**20.3**	**15.1**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Remarks:
Opinion & Interpretation (if required):

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Village - Siracha

ID No. : **URA/ID/A-23/02/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/02/2023	50.2	21.0	10.5	16.7		--
2.	10/02/2023	42.1	18.9	11.7	17.1		--
3.	14/02/2023	52.5	27.4	13.8	18.4		--
4.	17/02/2023	58.8	28.3	16.5	22.3		--
5.	21/02/2023	68.5	31.5	17.7	21.1	17.2	BDL
6.	24/02/2023	64.9	27.7	14.9	19.4		--
7.	28/02/2023	69.1	34.7	15.6	22.6		--
Average		**58.0**	**27.1**	**14.4**	**19.7**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_x** – IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/02/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/02/2023	46.4	21.7	12.4	18.3		--
2.	10/02/2023	54.2	24.1	14.2	21.8		--
3.	14/02/2023	51.9	27.4	15.7	18.5		--
4.	17/02/2023	60.7	28.8	12.6	15.7		--
5.	21/02/2023	65.3	30.1	17.3	24.2	18.9	BDL
6.	24/02/2023	63.0	27.3	19.7	27.4		--
7.	28/02/2023	71.8	33.5	15.4	20.8		--
Average		**59.1**	**27.6**	**15.3**	**20.9**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Village - Wandh

ID No. : **URA/ID/A-23/02/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/02/2023	52.1	24.0	13.8	21.6		--
2.	10/02/2023	59.0	29.4	14.3	20.1		--
3.	14/02/2023	60.5	26.4	14.6	19.4		--
4.	17/02/2023	62.8	34.8	18.6	22.7		--
5.	21/02/2023	72.7	35.1	19.1	24.6	22.2	BDL
6.	24/02/2023	67.9	32.7	18.7	26.2		--
7.	28/02/2023	61.9	29.5	17.5	24.5		--
Average		**62.4**	**30.3**	**16.7**	**22.7**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-23/02/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	23/02/2023	72.8	29.2	17.4	24.8	20.7	BDL
Average		**72.8**	**29.2**	**17.4**	**24.8**	**20.7**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-23/02/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	23/02/2023	61.4	25.8	14.8	21.3	17.8	BDL
Average		**61.4**	**25.8**	**14.8**	**21.3**	**17.8**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Nr. Coal Handling Plant

ID No. : **URA/ID/A-23/02/006**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)			
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**
1	24/02/2023	79.5	32.9	19.4	23.9
Average		**79.5**	**32.9**	**19.4**	**23.9**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : February - 2023

Name of Location : Nr. Integrated Ash Silo

ID No. : **URA/ID/A-23/02/007**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)			
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**
1	24/02/2023	67.3	28.6	17.2	22.1
Average		**67.3**	**28.6**	**17.2**	**22.1**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg:** AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : March - 2023

Name of Location : Village - Siracha

ID No. : **URA/ID/A-23/03/001**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/03/2023	70.8	31.4	16.3	21.3		--
2.	07/03/2023	57.6	23.4	14.5	22.7		--
3.	10/03/2023	50.9	21.2	10.6	16.0	17.8	BDL
4.	14/03/2023	61.9	22.8	13.3	19.9		--
5.	17/03/2023	52.6	26.2	14.5	21.7		--
6.	21/03/2023	48.1	20.9	11.7	17.0		--
7.	24/03/2023	61.9	27.4	12.4	20.2		--
8.	28/03/2023	61.0	30.8	12.7	19.3		--
9.	31/03/2023	54.2	26.4	12.8	19.4		--
Average		**57.7**	**25.6**	**13.2**	**19.7**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM – IS: 5182 (Part 4), 1999, **PM_{10}** – IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** – IS: 5182 (Part 2), 2001, **NO_x** – IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb**O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report
AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : March - 2023

Name of Location : Village – Kandagara

ID No. : **URA/ID/A-22/03/002**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/03/2023	62.2	30.7	16.9	22.7		--
2.	07/03/2023	61.0	24.6	15.8	20.2		--
3.	10/03/2023	56.5	23.9	13.4	16.9	18.3	BDL
4.	14/03/2023	62.0	29.3	11.1	14.1		--
5.	17/03/2023	52.8	29.4	13.8	22.6		--
6.	21/03/2023	57.6	32.9	12.6	25.8		--
7.	24/03/2023	64.8	24.8	13.9	19.0		--
8.	28/03/2023	55.2	22.8	14.1	18.9		--
9.	31/03/2023	60.6	27.3	12.5	20.6		--
Average		**59.2**	**27.3**	**13.8**	**20.1**		**--**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, **PM_{10}**– IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2**– IS: 5182 (Part 2), 2001, **NO_x**– IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : March - 2023

Name of Location : Village - Wandh

ID No. : **URA/ID/A-23/03/003**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1.	03/03/2023	67.2	32.8	18.2	23.6		--
2.	07/03/2023	72.5	33.4	16.7	25.7		--
3.	10/03/2023	55.9	26.8	14.0	18.6	19.6	BDL
4.	14/03/2023	57.7	25.1	12.6	20.7		--
5.	17/03/2023	51.5	27.2	15.1	20.6		--
6.	21/03/2023	62.7	35.0	12.7	18.2		--
7.	24/03/2023	60.9	27.0	17.5	22.2		--
8.	28/03/2023	52.9	23.0	12.3	21.3		--
9.	31/03/2023	66.9	31.6	14.1	19.2		--
Average		**60.9**	**29.1**	**14.8**	**21.1**		--

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_X** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : March - 2023

Name of Location : Nr.20 MLD Plant

ID No. : **URA/ID/A-23/03/004**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	04/03/2023	67.4	31.3	18.3	22.6	20.4	BDL
Average		**67.4**	**31.3**	**18.3**	**22.6**	**20.4**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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Email : response@uerl.in Website : www.uerl.in

Monthly Average Report

AMBIENT AIR MONITORING

Name and Address of Client : **M/s. Adani Power (Mundra) Ltd.**
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring : March - 2023

Name of Location : Nr. Shantiniketan - 1

ID No. : **URA/ID/A-23/03/005**

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM_{10} µg/M³	$PM_{2.5}$ µg/M³	Sulphur Dioxide (SO_2) µg/M³	Nitrogen Dioxide (NO_2) µg/M³	Ozone (O_3) µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		**100**	**60**	**80**	**80**	**100**	**N.A.**
1	04/03/2023	57.2	27.4	13.9	19.4	19.6	BDL
Average		**57.2**	**27.4**	**13.9**	**19.4**	**19.6**	**BDL**

Remark: Calibrated equipment & instruments were used during monitoring & analysis of above identified sample.

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, **PM_{10}** - IS: 5182 (Part 23), 2006, **$PM_{2.5}$**- Guidelines by CPCB (Vol-1), **SO_2** - IS: 5182 (Part 2), 2001, **NO_x** - IS: 5182 (Part 6), 2006, **Hg**: AAS by VGA Method -3112 B APHA 22 Edison & **Hg:** 2 ppb **O3**: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 µg/m3

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adani

MARINE MONITORING REPORT

October 2022

FOR

M/s. ADANI POWER (MUNDRA) LIMITED

At

Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
KUTCH, GUJARAT – 370 435

Prepared by

UniStar
Environment & Research Labs Pvt. Ltd.

PREFACE

M/s. Adani Power (Mundra) Limited (APMuL) is a subsidiary company of Adani Group engaged in imported coal-based thermal power generation located near village Tunda and Siracha, Taluka Mundra District Kutch, Gujarat. APMuL has commissioned the first supercritical 660 MW unit in the country. This is also the World's First supercritical technology project to have received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). Currently, the total power production capacity of the APMuL has increased to 4620 MW.

APMuL has engaged **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi** to **carry out the** seasonal Marine Monitoring Study along with the seawater intake and outfall (discharge) channels of Mundra power plant. This marine monitoring study involved the assessment of Physio-chemical parameters at the earlier prescribed locations. The distribution and diversity of marine flora and fauna were assessed through water sampling from sub-tidal regions. Furthermore, the distribution of the benthic community was evaluated from the sediment samples collected along the sub-tidal and inter-tidal regions. The overall objective of this study is to monitor the status of prevailing ecology along the intake and discharge (outfall) channels, in terms of water and sediment quality through assessment of physico-chemical parameters and marine biota. This marine monitoring report provides a comprehensive analysis of the Data obtained through a monitoring study undertaken during October 2022.

Date: 14/11/2022

M/S. UniStar Environment and Research Labs Pvt. Ltd.

White House, Char Rasta,

Vapi-396 191

Approved by

Mr. Jaivik Tandel
(Authorized By)

adani

TABLE OF CONTENTS

1. INTRODUCTION

1.1 OVERVIEW

Adani Power (Mundra) Limited (APMuL) is an imported coal-based thermal power plant located near village Tunda and Siracha, Taluka Mundra, District Kutch, Gujarat, India. APMuL is the largest single location private coal-based power plant in India. Mundra plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW (Phase I and II) and 5 units of 660MW (Phase III and IV). The 330 MW units are based on subcritical technology and the 660 MW units are based on supercritical technology. APMuL has created history by synchronizing the first super-critical technology-based 660 MW generating unit. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra project, which is based on supercritical technology, has received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

M/S. UniStar Environment and Research Labs Pvt. Ltd., Vapi, India have carried out the routine Marine Monitoring Study in the vicinity of the APMuL Mundra plant during 13 and 14 October 2022. The sampling was carried out along the sea intake channel (2 stations) and discharge/outfall water mixing (3 stations) region. This assessment involves the collection of Physico-chemical parameters from 5 subtidal locations (Table 1). The distribution and diversity of marine microflora (phytoplankton and pigments) and fauna (zooplankton) were assessed from water samples collected from 5 subtidal stations (Table 1). The assemblage of the microbenthic community was studied from 5 sub-tidal and 3 inter-tidal stations. The present report presents a detailed account of the results observed during the Marine Monitoring Study at the vicinity of the APMuL during October 2022.

1.2 OBJECTIVES

a) To analyses the Physico-chemical seawater parameter for understanding the water quality in the study area.

b) Evaluation of the prevailing status of marine biota through the quantitative and qualitative analysis of marine flora (phytoplankton and pigments) and fauna (zooplankton and macrobenthos).

c) To recommend adequate marine environmental management measures.

2. STUDY PROGRAM

2.1 STUDY PERIOD

The field investigation was carried out on 13 and 14 October 2022. The sampling strategy was planned in such a manner as to get a detailed characteristic of the marine environment of the study area. Sampling and analysis for the marine environment have been carried out by **M/s. UniStar Environment and Research Labs Pvt. Ltd, Vapi, India**.

2.2 SAMPLING LOCATIONS

Sampling was carried out at 5 subtidal stations and 3 intertidal transects along with the sea intake and outfall channels. Out of 5 subtidal stations, 2 were in the sea intake channel and 3 along the discharge mixing (outfall channel) region. One intertidal station was located along the sea intake channel and 2 were along the discharge region. The detailed geographic coordinates of sampling stations are given in Table 1 and Figure 1.1.

Table 1: Geographic coordinates, water, and sediment parameters at the subtidal sampling stations, APMuL during October 2022.

Subtidal station							
Station	**Station code**	**Locations**	**Coordinates**		**Water depth**	**Tide**	**Sediment texture**
1	St-1	Intake point	22°48’30.’50”N	69°32’57.84”E	5.5 m	Flood	Silty-sand
2	St-2	Mouth of intake point	22°47’07.20”N	69°32’06.50”E	6 m	Flood	Silty-sand
3	St-3	West port area	22°45’27.70”N	69°34’50.63”E	5.2 m	Ebb	Silty-sand
4	St-4	Outfall area	22°44’40.56”N	69°36’26.61”E	4.5 m	Ebb	Silty clay
5	St-5	Outfall area	22°45’12.60”N	69°36’44.54”E	4.3 m	Ebb	Silty clay

Table 2: Geographic coordinates, water, and sediment parameters at the inertial sampling stations, APMuL during October 2022.

Intertidal transect						
Station	**Station code**	**Tide Level**	**Coordinates**	**Water depth**	**Intertidal exposed area**	**Sediment texture**
I	IT-1 (HW)	High Tidewater level	22°47'07.55" N	69°32'16.91" E	7.2 m	Silty-sand
	IT-1 (LW)	Low Tide water level	22°47'06.38"N	69°32'11.62"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°45'58.72" N	69°34'35.41" E	7.3 m	Silty-Sandy
	IT-2 (LW)	Low Tidewater level	22°45'57.74" N	69°34'35.05" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°44' 52.21" N	69°36'41.64"E	8 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°44' 51.23" N	69°36'39.28" E		Sandy

Figure 1: Map of the study area illustrating the subtidal and intertidal sampling stations.

2.3 SAMPLING STRATEGY

2.3.1 Sampling frequency

A sampling at the subtidal stations was carried out during the flood to ebb tides. Surface and bottom water samples were collected in duplicate for assessing water quality and marine biota. Intertidal samples were collected in duplicate during low tide at each transect.

2.3.2 Sampling methodology

For estimation of Physico-chemical parameters and marine flora (phytoplankton and pigments), subsurface samples were collected using the Niskin water sampler (5-litre capacity) with a mechanism for closing at the desired depth. Surface water samples were collected using a clean polyethylene bucket. Phytoplankton samples were collected in clean polyethylene bottles (1 L) fitted with inert cap liners and preserved with 4% Lugol's iodine solution. For pigment analysis, water samples were stored in clean, dark polyethylene cans (5 L). Chemical parameters samples were collected in polyethylene or glass bottles. Samples for phenol were collected in polyethylene or glass bottles and Petroleum Hydrocarbon samples collected in glass bottles. Dissolve oxygen (DO) and Biological Oxygen Demand (BOD) samples were collected in glass BOD bottles. The temperature was measured on the field with a calibrated thermometer. Analysis of other parameters was carried out in the laboratory.

For zooplankton, oblique hauls were made using Heron Tranter net attached with calibrated flow meter. Samples were stored in clean polyethylene bottles (0.5 L) and fixed with 5% formaldehyde.

For the analysis of macrobenthos, subtidal sediment samples were collected using a Van Veen grab covering an area of 0.04 m^2. Intertidal samples were collected using a metal quadrant. Samples were sieved with a 500 µ metal sieve and preserved with Rose Bengal-formalin solution and stored in plastic zip-lock bags.

2.4 SAMPLE ANALYSIS METHODS

2.4.1 Physico-chemical parameter:

Samples were analysed by using different analytical methods for estimations of Temperature, Turbidity, PH, Suspended Solid (SS), Salinity, DO, BOD, COD, Phosphate, Total nitrogen, Nitrite, Nitrate, Phenols and PHc. The standard methods used for the analysis of each parameter are given in Table 3.

2.4.2 Sediment Quality parameters:

Sediment texture, Petroleum Hydrocarbon (PHc), Phosphorus, Organic Carbon, Aluminium, Iron, Chromium, Nickel, Zinc, Lead, Copper, Cobalt, Cadmium, Mercury, Arsenic. The standard methods used for the analysis of each parameter.

2.4.3 Biological parameters:

2.4.3a Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

2.4.3b Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

2.4.3c Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

2.4.3d Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

3 WATER QUALITY MONITORING

3.1 RESULT OF PHYSICO-CHEMICAL WATER PARAMETER ANALYSIS

The samples collected during the field visit were brought to the laboratory for further analysis of Physico-chemical parameters. The standard methods used for the analysis of water quality parameters are given in Table 3

Table 3: Water quality parameters and their test methods.

Sr. No.	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.05	7.97	7.92	7.88	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	29	28.5	29	28.5	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	54	78	70	95	APHA 23rd Ed.,2017,2540- D
2.	Salinity	36.4	37.9	36.3	37.8	By Calculation
3.	Dissolved Oxygen (mg/l)	4.8	4.6	5.1	4.9	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.8	3.6	3.1	3.8	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	2420	2410	2490	2310	APHA 23rd Ed.,2017,4500- SO_4 E
6.	Ammonical Nitrogen (µmol/l)	BDL(MDL: 2.0)	BDL(MDL :2.0)	BDL(MDL: 2.0)	BDL(MDL:2.0)	APHA 23rd Ed.,2017,4500- NH_3 B
7.	Total Nitrogen (µmol/l)	6.9	7.8	6.2	6.1	By Calculation
8.	PO_4^{3-}-P (µmol/l)	0.9	1.08	0.7	1.3	APHA 23rd Ed.,2017,4500 –P,D
9.	(NO_3^--N) (µmol/l)	2.1	3.1	1.9	2.9	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	BDL(MDL: 0.1)	0.6	0.2	0.2	APHA 23rd Ed.,2017,4500NO_2B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL :0.01)	BDL(MDL: 0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8	7.97	8.01	7.97	IS 3025(Part 11)1983
2.	Temperature ^{0}C	29	28.5	29	28.5	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	56	62	88	95	APHA 23rd Ed.,2017,2540-D
2.	Salinity	36.4	37.2	36.5	37.4	By Calculation
3.	Dissolved Oxygen (mg/l)	5.2	5.6	5.2	5.4	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.6	3.7	3.9	4.2	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	1980	2120	2080	2242	APHA 23rd Ed.,2017,4500-SO_4 E
6.	Ammonical Nitrogen (µmol/l)	BDL(MDL: 2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	BDL(MDL:2.0)	APHA 23rd Ed.,2017,4500-NH_3 B
7.	Total Nitrogen (µmol/l)	5.8	6	4.6	6.3	By Calculation
8.	PO_4^{3-}-P (µmol/l)	0.8	1.2	0.9	1.3	APHA 23rd Ed.,2017,4500 – P,D
9.	(NO_3^--N) (µmol/l)	2.4	2.5	2.3	3.4	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	0.4	0.5	0.5	0.6	APHA 23rd Ed.,2017,4500NO_2B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25°C	8.1	7.97	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	29	29	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids (mg/l)	57	64	APHA 23rd Ed.,2017,2540- D
2.	Salinity	36.6	37.3	By Calculation
3.	Dissolved Oxygen (mg/l)	5.2	4.9	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.9	4.0	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	2058	2130	APHA 23rd Ed.,2017,4500-SO_4 E
6.	Ammonical Nitrogen(µmol/l)	BDL(MDL:2.0)	BDL(MDL:2.0)	APHA 23rd Ed.,2017,4500-NH_3 B
7.	Total Nitrogen (µmol/l)	5.4	7.2	By Calculation
8.	PO_4^{3-}-P (µmol/l)	0.9	1.1	APHA 23rd Ed.,2017,4500 – P,D
9.	(NO_3^--N) (µmol/l)	2.2	3.2	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	0.3	0.7	APHA 23rd Ed.,2017,4500NO_2B
11.	Phenol (mg/l)	BDL (MDL:0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

3.1.1 Temperature: Marine water temperature was checked on-site during the sampling. Surface and bottom water temperatures observed in the study area were in a range between 28^{0}C to 29^{0}C. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity, and seasonality.

3.1.2 pH: The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area was in the range of 7.88 to 8.05 at the surface and bottom water.

3.1.3 Turbidity: Seawater turbidity is the cloudiness caused by large numbers of individual particles such as very fine clay and minute marine organisms. This also varies seasonally due

to intrusion of land runoff and/or sediment resuspension. Surface and bottom water turbidity observed in the study area was in a range between 0.1 to 1 NTU.

3.1.4 Total suspended solids (TSS): The suspended solids generally constitute silt and clay eroded from the land or shore erosions and suspension of the benthic layers from the seabed. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in a polluted area. On a seasonal basis, high TSS in seawater could be observed during the active monsoon season. Suspended solid concentration in the study area was a little variable. In surface water, TSS was 54 to 88 mg/l and in the bottom water, it was ranged from 62 to 95 mg/l.

3.1.5 Salinity: Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 37.6, which may vary with the riverine or inland influx, rains, or evaporation in the region. The salinity variation during the present sampling was 36.3 to 36.6 at surface and 37.2 to 37.9 at the bottom water.

3.1.6 DO and BOD: High DO level is an indication of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained through oxygen production during photosynthesis, dissolution from the atmosphere consumption by the respiration and decay of organic matter in a manner that DO levels are close to or above saturation value.

The DO level of the study area was varied from 5.8 to 5.9 mg/l at the water surface and 5.6 to 5.7 mg/l at the bottom water. The average DO value was 5.6 mg/l, which indicates the oxygenated conditions in the study region.

BOD is generally indicating the effective consumption of oxidizable matter in that water body. The industrial effluents contain high BOD levels. Thus, high BOD is also an indication of the intrusion of industrial polluted effluent into natural waters. BOD levels in the study area were varied from 3.1 to 3.9 mg/l at surface and 3.6 to 4.2 mg/l at bottom water.

3.1.7 Nutrients: Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton growth. The high nutrient concentrations in the seawater generally could be attributed to the anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. In the present study, Phosphate concentration was range from 0.7 to 0.9 µmol/l on the surface and 0.9 to 1.3 µmol/l bottom water. Nitrite concentration was range from 0.3 to 0.5 µmol/l on the surface and 0.2 to 0.7 µmol/l bottom water. Nitrate concentration was range from 1.9 to 2.4 µmol/l on the surface and 2.5 to 3.4 µmol/l bottom water.

3.1.8 PHc and phenol: The Phenol compounds and PHc were not detected in the present investigation.

4 SEDIMENT QUALITY MONITORING

The sediment quality at different sampling stations was measured during this investigation. The results are presented in Tables 4 and 5.

Table 4: Subtidal sediment quality parameters and their test methods.

No.	Parameters	SUBTIDAL SEDIMENT QUALITY(µgm/gm)					Test Method Permissible
		Station 1	Station 2	Station 3	Station 4	Station 5	
1	Texture	Silty sand	Silty-sand	Silty-sand	Silty-clay	Silty-clay	--
2	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	N.D.	Spectrophotometer Method
3	Cobalt as Co(µg/g)	6.8	7.04	6.41	4.88	2.44	AAS Method
4	Copper as Cu(µg/g)	10.9	12.06	10.51	9.72	10.5	EPA 7210 & EPA 3050B Method
5	Zinc as Zn	21.5	17.22	24.6	18.29	12.26	EPA 7950 & EPA 3050B Method
6	Mercury(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL:0.05)	EPA 7471 B VGA AAS Method
7	Phosphorous (Total)(µg/g)	440.6	542.6	524.3	462.1	562.4	IS 10158B (Stannous Chloride Method)
8	C(Org.) %	0.2	0.2	0.2	ND	0.1	--
9	Chromium(µg/g)	18.2	16.63	12.08	17.63	14.4	EPA 7190 & EPA 3050B Method
10	Nickel(µg/g)	16.1	18.24	15.4	14.08	15.62	EPA 7520 & EPA 3050B Method
11	Manganese	129.2	191.5	251.7	174.6	144.1	EPA 7460 & EPA 3050B Method
12	Iron%	2.3	2.1	3.2	2.4	2.6	EPA 7380 & EPA 3050B Method
13	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	N.D.	G.C. Method
14	Arsenic(µg/g)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL: 0.05)	BDL(MDL:0.05)	EPA 7061A SW-846 GTA AAS Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5: Intertidal sediment quality parameters and their test methods.

INTER TIDAL SEDIMENT QUALITY (µg/g)						
Sr. No	Parameters	Transect 1		Transect 2		Test Method Permissible
		High Tide	Low Tide	High Tide	Low Tide	
1.	Texture	Silty-sand	Silty-Sand	Silty-sand	Silty-sand	Spectrophotometer Method
2.	Aluminium as Al%	N.D.	N.D.	N.D.	N.D.	AAS Method
3.	Cobalt as Co(µg/g)	4.92	6.6	5.05	5.31	EPA 7210 & EPA 3050B Method
4.	Copper as Cu(µg/g)	18	22	19	16	EPA 7950 & EPA 3050B Method
5.	Zinc as Zn	19.22	21.62	25.97	22.36	EPA 7471 B VGA AAS Method
6.	Mercury(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 10158B (Stannous Chloride Method)
7.	Phosphorous (Total)(µg/g)	488.5	672.5	508.1	464.2	--
8.	C(Org.) %	N.D.	N.D.	N.D.	N.D.	EPA 7190 & EPA 3050B Method
9.	Chromium(µg/g)	21.24	25.33	23.24	25.33	EPA 7520 & EPA 3050B Method
10.	Nickel(µg/g)	18.5	19.18	18.11	18.79	EPA 7460 & EPA 3050B Method
11.	Manganese	389.4	398.4	474.6	285.2	EPA 7380 & EPA 3050B Method
12.	Iron%	3	3.1	2.7	1.7	G.C. Method
13.	PHc(µg/g)	N.D.	N.D.	N.D.	N.D.	EPA 7061A SW-846 GTA AAS Method
14.	Arsenic(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	Spectrophotometer Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Table 5: Continue…

Sr. No	Parameters	Transect 3		Test Method Permissible
		High Tide	Low Tide	
1.	Texture	Sandy	Sandy	Spectrophotometer Method
2.	Aluminium as Al%	N.D.	N.D.	AAS Method
3.	Cobalt as Co(µg/g)	4.94	7.41	EPA 7210 & EPA 3050B Method
4.	Copper as Cu(µg/g)	1.46	12.71	EPA 7950 & EPA 3050B Method
5.	Zinc as Zn	16.51	20.2	EPA 7471 B VGA AAS Method
6.	Mercury(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	IS 10158B (Stannous Chloride Method)

7.	Phosphorous (Total)(µg/g)	421.8	402.3	--
8.	C(Org.) %	N.D.	N.D.	EPA 7190 & EPA 3050B Method
9.	Chromium(µg/g)	22.04	30.44	EPA 7520 & EPA 3050B Method
10.	Nickel(µg/g)	18.71	19.62	EPA 7460 & EPA 3050B Method
11.	Manganese	369.5	279.3	EPA 7380 & EPA 3050B Method
12.	Iron%	2.1	2.3	G.C. Method
13.	PHc(µg/g)	N.D.	N.D.	EPA 7061A SW-846 GTA AAS Method
14.	Arsenic(µg/g)	BDL(MDL:0.05)	BDL(MDL:0.05)	Spectrophotometer Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

- The sediment in the subtidal region was mainly composed of silty sand to loamy sand. In the intertidal region, sediment texture was sandy.
- The Aluminium was not detected.
- The highest Cobalt content (7.04 µg/g) was recorded at ST-2 and lowest at ST-4 (4.88 µgm/gm). In the intertidal region, more Cobalt was not detected at IT-3 (LWL).
- At ST-2, the highest Copper content (12.06 µg/g) was recorded, whereas the lowest was detected at ST-4 (9.72 µg/g). In the intertidal region copper content (22 µg/g) was found at IT-1 (LWL).
- The Zinc content (24.6 µg/g) was highest at ST-3 and the lowest zinc content (18.29 µg/g) at ST-4. The zinc content in the intertidal region was within range of 25.97 µg/g to 16.51 µg/g.
- In the subtidal stations, the highest phosphorus content (556 µg/g) was recorded at ST-5 whereas the lowest was at ST-1 (440.6 µg/g). In the intertidal region highest phosphorus content (672.5 µg/g) was recorded at IT-1 (LWL) and lowest at (40.2.3 µg/g) IT-3(LWL).
- The highest Organic carbon content (0.2 %) was recorded at ST-1,2 and 3. In the intertidal region, the Organic carbon content was not detected.
- The Chromium content of marine sediment was ranged from 12.08 µg/g to 18.2 µg/g. The highest chromium content was recorded at ST-1 and the lowest at ST-3. In the Intertidal region, the chromium content was varied from 21.24 µg/g to 30.44 µg/g.
- The highest Nickel content (18.24 µg/g) was recorded at ST-2 and lowest (14.08 µg/g) at ST-4. In the intertidal region higher nickel content (19.62 µg/g) was found at IT-3 (LWL).

- In the subtidal region, the highest Manganese content was recorded at ST-3 (251.7 µg/g).
- The Iron content was higher at ST-3 (3.2 %) and lower at ST-2 (2.1%). In the Intertidal region, the highest iron content was recorded at IT-1(HWL) (3 %) and lowest at IT-2 (LWL) (1.7 %).
- The PHc, Arsenic & Mercury was not detected in the sediments during this study.

5 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)

Marine ecosystems are subject to a multitude of direct human pressures, such as overexploitation, eutrophication, pollution, and species introductions. These stressors can have synergistic effects on marine ecosystems, altering its functioning. Anthropogenic involvements constantly compromise the health of the marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors is an integral part of environmental assessment and monitoring study. During the present investigation at APMuL, the abundance and distribution of marine organisms (Plankton and benthos) were studied as part of routine environmental monitoring.

5.1 PLANKTONIC FORMS

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. As per definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into two broad functional groups i.e., Phytoplankton and Zooplankton.

5.1.1 Phytoplankton

Phytoplankton are microscopic, single-celled photosynthetic organisms that live suspended in all water niches, including oceans, freshwater, and marine niche. Like the terrestrial ecosystem where plants are an integral part of the ecosystem, phytoplankton play key role in the biogeochemistry of the oceans. As they are dependent on sunlight for energy, they mostly inhabit the euphotic zone. Therefore, they are responsible for production of half of the atmosphere’s oxygen and more than half of the primary production in the oceans. There are many species of phytoplankton, each of which has a characteristic shape, size, and function. Marine species of phytoplankton grow abundantly in oceans around the world and

are the foundation of the marine food chain. Marine phytoplankton are the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients, and function.

5.1.2 Zooplankton:

Zooplankton occupies second position in the food web of the marine niche. They are the primary consumer's organisms and generally feed on phytoplankton or small, microscopic group of organisms for they are nutritional needs. They are incapable of making their own food from sun-light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival.

5.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are vital to marine ecosystems. They are producers, or autotrophs, that form the foundation of most marine food webs. As photosynthetic organisms, they can convert solar energy into chemical energy and store it in form of sugars. They are responsible for half of the photosynthetic activity on the planet. The significance of zooplanktons is found in their role of transferring biological production from phytoplankton to large organisms in the marine food web and the seafloor. The microscopic protozoan, tunicates, copepods, and other crustaceans graze upon many phytoplankton species. These in turn become food for other animals further linking the food web. Therefore, variability in reproduction of copepods would affect the survival of young fish that feeds on them.

Table 6: Test methods for phytoplankton and zooplankton analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 23, Part 10000, 10200 F
2	Chlorophyll *a* and Pheophytin	APHA, Edition 23, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 23, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 23, Part 10000,10500 A-10500 D

5.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. During the sampling period (October 2022) the phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 36 phytoplankton genera (Table 7) belonging to diatoms (31 genera) and dinoflagellates (5 genera). Diatoms Species belonged to *Chaetoceros* sp. *Corethron* sp., *Coscinodiscus* sp., *Cyclotella* sp., *Cymbella* sp., *Ditylum* sp., *Guinardia* sp., *Odontella* sp., *Paralia* sp., *Rhizosolenia* sp., *Thalassiosira* sp., *Amphora* sp., *Asterionella* sp., *Bacillaria* sp., *Cylindrotheca* sp., *Diploneis* sp., *Gyrosigma* sp., *Lauderia* sp., *Leptocylindrus* sp., *Licmophora* sp., *Meunieri* sp., *Navicula* sp., *Nitzschia* sp., *Pinnularia* sp., *Pleurosigma* sp., *Pseudo-nitzschia* sp., *Surirella* sp., *Synedra* sp. and *Thalassionema* sp.

The phytoplankton abundance in the study region was ranged from 180 to 249 cells×10^2/L (Table 7, Figure 2). The highest phytoplankton abundance was observed at Station 2 in the surface (231 cells×10^2/L) and then at Station 5 in bottom water (249 cells×10^2/L). The lowest phytoplankton abundance (101 cells×10^2/L) was observed at Station 3 in bottom water (Table 7, Figure 2). The study shows that the marine water around was enriched with the diverse phytoplankton population.

Table 7: Phytoplankton abundance (cells×10^2/L) at different sampling stations in the coastal waters of APMuL, Mundra during October 2022.

Note: S=surface; B=bottom; St=station

Phytoplankton Genera	Sampling Stations									
	St-1	St-1	St-2	St-2	St-3	St-3	St-4	St-4	St-5	St-5
	S	B	S	B	S	B	S	B	S	B
Diatoms										
Chaetoceros sp.	1	2	0	1	1	0	1	0	1	2
Corethron sp.	0	0	0	0	2	0	0	0	0	1
Coscinodiscus sp.	30	26	42	18	18	8	22	10	1	4
Cyclotella sp.	0	2	2	0	0	4	0	0	0	1
Cymbella sp.	0	1	0	1	0	0	0	0	0	0
Ditylum sp.	5	6	3	1	0	1	11	8	1	1
Guinardia sp.	18	12	14	20	0	3	3	10	16	0
Odontella sp.	16	18	1	1	9	4	15	12	19	26
Paralia sp.	9	0	0	12	16	36	11	6	2	2
Rhizosolenia sp.	1	1	19	11	3	3	1	8	3	5
Thalassiosira sp.	1	1	20	10	2	0	3	0	0	1
Amphora sp.	1	0	0	3	7	1	1	0	7	4
Amphorprora sp.	1	0	0	0	1	2	23	1	0	1

sterionella sp.	30	26	62	20	20	3	19	3	50	46
Bacillaria sp.	2	1	0	4	10	2	2	0	4	4
Cylindrotheca sp.	1	0	0	0	3	1	0	4	0	2
Diploneis sp.	0	1	0	0	1	0	0	0	0	1
Gyrosigma sp.	2	1	0	0	2	0	0	0	0	0
Lauderia sp.	0	2	0	0	0	0	0	0	0	0
Leptocylindrus sp.	4	0	21	3	0	2	0	1	0	3
Licmophora sp.	0	3	2	0	0	1	0	2	3	0
Lithodesmium sp.	5	0	0	1	2	0	3	8	4	1
Navicula spp.	17	2	1	1	5	4	5	15	11	7
Nitzschia spp.	4	20	41	18	4	1	9	10	19	35
Pinnularia sp.	8	0	0	2	0	0	10	0	2	2
Pleurosigma spp	2	10	0	2	8	2	14	12	12	2
Pseudo-nitzschia sp.	0	0	2	1	0	1	4	4	2	0
Synedra sp.	1	1	0	0	0	1	2	0	2	1
Thalassionema sp.	15	20	0	1	18	16	10	14	8	16
Dinoflagellates										
Alexandrium sp.	0	0	1	0	0	0	1	0	0	2
Gymnodinium sp.	2	2	0	1	8	4	0	4	4	2
Protoperidinium sp.	4	2	0	0	2	1	0	0	1	0
Prorocentrum sp.	0	0	0	0	2	2	0	0	0	0
Total Phytoplankton (nos. x 10^2/L)	**180**	**161**	**231**	**132**	**144**	**101**	**170**	**122**	**166**	**249**

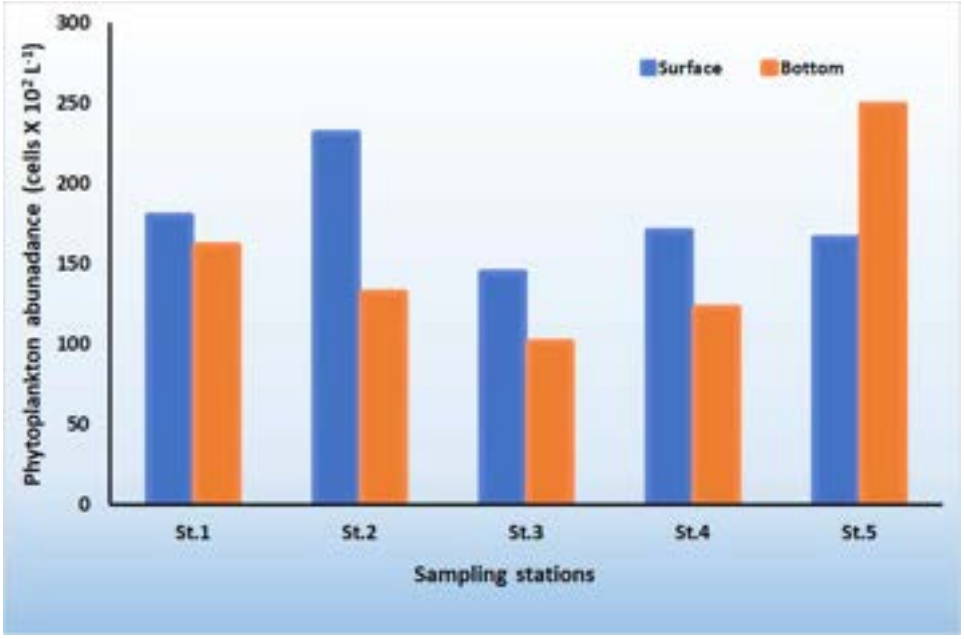
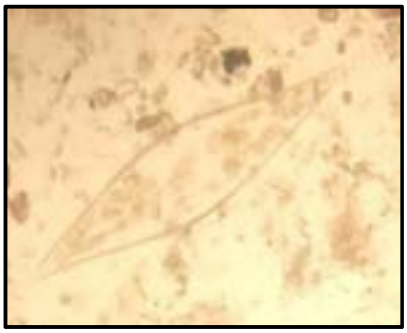


Figure 2: Phytoplankton abundance (cells×10^2/L) reported in the surface and bottom waters along the APMuL coast, Mundra during October 2022. Note: St=Station



***Navicula* sp.**

***Ceratium* sp.**

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APMuL, Mundra during October 2022.

5.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL *a* AND PHEOPHYTIN):

Marine phytoplankton contains essential as well as accessory pigments like that of terrestrial plants. Phytoplankton pigments capture sunlight. The resulting photosynthesis and its products, especially the oxygen and organic compounds, all rely on the light energy captured by the different phytoplankton pigments. Chlorophyll *a* is the major pigment for light harvesting, and plays a significant role in photosynthesis and photoprotection, by extending the light collection window and protecting the cell from the damage of high irradiance levels or high ultraviolet light exposure.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells. The nature of these degradation products depends on which part of the chlorophyll molecule is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the center of the molecule or the loss of the phytol tail. This results in the formation of the molecule, phaeophytin. Depending on the parent molecule several distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus, in addition to Chlorophyll *a* filtered seawater contains color degradation products of phytoplankton pigments.

5.4a CHLOROPHYLL *a* AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll *a* (Chl-*a*) and Pheophytin at selected stations in the coastal region of APMuL, Mundra is presented in Table

8. The Chl-*a* concentrations in the study region were ranged from 1.8 µg/L to 2.2 µg/L. The Pheophytin content was ranged from 0.5 µg/L to 1.0 µg/L. The Chl-a and Pheophytin concentrations were more in the surface water as compared to the bottom water. The variations observed between the surface and bottom waters could be due to several natural biological variability. The highest Chl-a and Pheophytin concentrations were observed at Station 1, 2 and 5 surface waters.

Table 8: Chlorophyll *a*, Pheophytin concentrations along with their ratios (Chl*a*: Pheophytin) in the marine waters of APMuL, Mundra during October 2022.

Sampling stations		Chlorophyll *a* (µg/L)	Phaeophtin (µg/L)	Chl *a*:Phaeophtin ratio
St-1	**Surface**	2.2	1.0	2.8
St-1	**Bottom**	1.8	0.9	1.6
St-2	**Surface**	2.2	1.0	2.1
St-2	**Bottom**	1.9	0.9	2.4
St-3	**Surface**	1.8	0.7	2.1
St-3	**Bottom**	2.0	0.5	2.0
St-4	**Surface**	2.1	1.0	2.0
St-4	**Bottom**	2.1	0.7	2.1
St-5	**Surface**	2.2	1.0	2.6
St-5	**Bottom**	2.1	0.8	2.0

Note: ST= Station

The concentration of Pheophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to a deterioration of Chl-*a*. The ratio from concentrations of Chl-*a* and Pheophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton life. In healthy environments, ratios of Chl-*a* to Pheophytin generally exceed 1.1. In the present study, this ratio was ranged from 1.6 to 2.8 (Table 8). The Chl-*a* and Pheophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl-*a* and Pheophytin concentration in the study region were generally high (>1), indicating that the appropriate conditions prevailed for the phytoplankton growth.

5.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of population and biomass revealed substantial spatial variation within all 5 stations (Table 9). The maximum zooplankton population (20.5 no×10^3/100 m^3) and biomass (3.3 ml/ 100 m^3) were recorded at station 1. The lowest zooplankton population (13.5 no×10^3/100 m^3) and biomass (1.8 ml/100 m^3) was observed at station 5 (Figure 4). Different groups of identified zooplankton groups are mentioned in the Table 9. A total of 14 groups of zooplankton including Copepods, Copepod nauplii, Brachyuran crab larvae, Anomuran crab larvae, Decapod (shrimps), Fish and shellfish eggs, Fish larvae, Gastropod larvae, Chaetognaths, Polychaete larvae, Siphonophora, Ostracods, Oikopleura and Amphipods were identified during this study (Table 9, Figure 5). Among these groups Copepod (83 %) and Copepods nauplii (14.6 %) were most dominant (Figure 6). Brachyuran crab larvae (3.6 %) and Anomuran crab larvae (4.3 %) were also contributed to zooplankton population (Figure 5). The occurrence of copepods and their nauplii together with decapods and fish larvae/eggs in zooplankton samples highlights the fair production potential of live food resources (organisms) to support the fish and crustacean population in the study region.

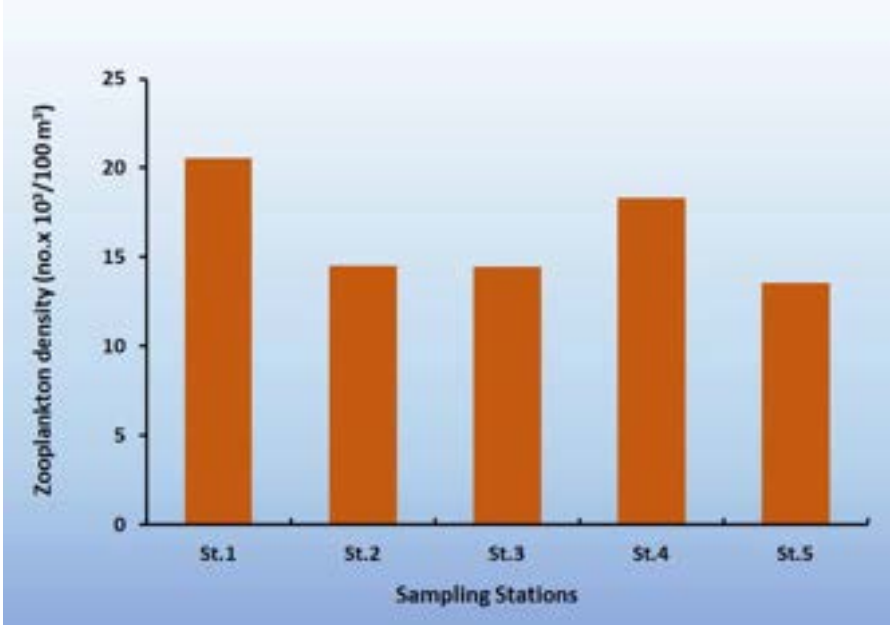


Figure 4: Zooplankton density (nos. ×10^3 /100 m^3) reported in the subtidal waters (Station 1 to 5) along the APMuL coast, Mundra during October 2022.

Table 9: Density (nos. ×10^3/100 m^3) and biomass (ml/100 m^3) of various zooplankton groups in the coastal waters at the APMuL, Mundra during October 2022.

Zooplankton Groups	St-1	St-2	St-3	St-4	St-5
Copepods	13.9	11.4	11.2	14.7	10.5
Copepod nauplii	3.4	1.9	1.9	2.3	1.7
Brachyuran crab larvae	1.2	0.4	0.5	0.4	0.4
Anomuran crab larvae	1.6	0.6	0.4	0.5	0.4
Decapod (shrimps)	0.0	0.0	0.1	0.0	0.0
Fish and shellfish eggs	0.4	0.2	0.3	0.3	0.5
Fish larvae	0.0	0.0	0.0	0.0	0.0
Gastropod larvae	0.1	0.0	0.0	0.0	0.0
Chaetognaths	0.0	0.0	0.0	0.0	0.0
Polychaete larvae	0.0	0.0	0.0	0.0	0.0
Siphonophora	0.0	0.0	0.0	0.0	0.0
Ostracods	0.0	0.0	0.0	0.0	0.0
Oikopleura	0.0	0.0	0.1	0.0	0.0
Amphipods	0.0	0.0	0.0	0.0	0.0
Population (nos.× 10^3/100 m^3)	**20.5**	**14.5**	**14.4**	**18.3**	**13.5**
Biomass (ml./100 m^3)	**3.3**	**1.8**	**2.0**	**3.1**	**1.8**

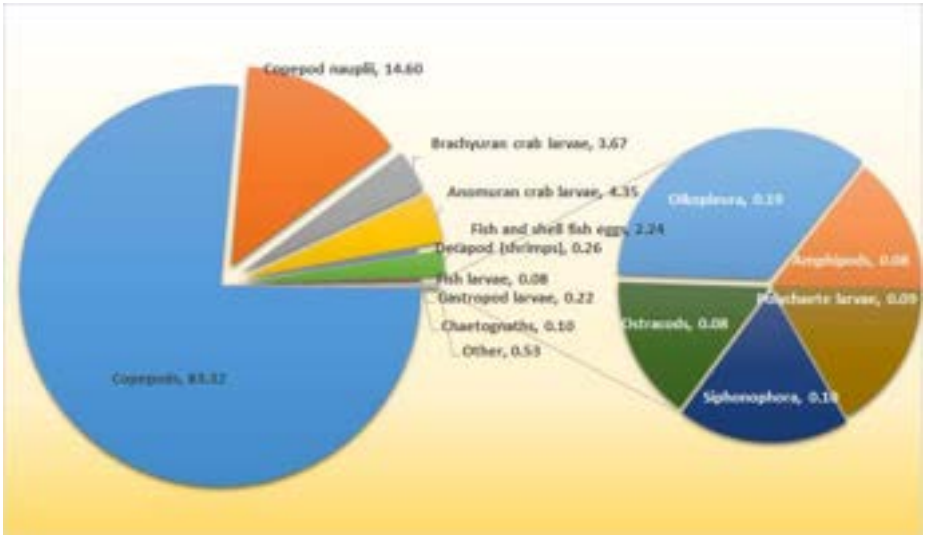
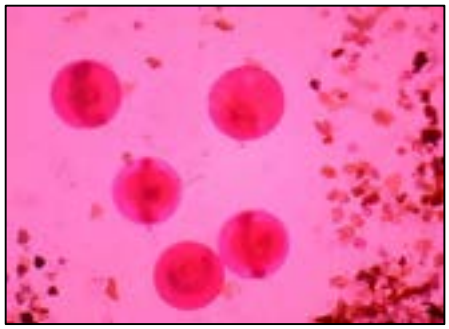


Figure 5: Dominant groups of Zooplankton reported from APMuL coast, Mundra during October 2022.



Fish Eggs

Fish Larvae

Copepod

Copepod nauplii

Figure 6: Microphotographs of zooplankton reported from APMuL coast, Mundra during October 2022

5.6 Microbenthic fauna

The benthic zone is the lowest ecological zone of a water body which usually involves the sediments at the seafloor. The benthic environment is divided into distinctive ecological zones based on depth, seafloor topography, and vertical gradients of physical parameters. These are the supralittoral, littoral, sublittoral, bathyal, abyssal, and hadal zones. The number of phyla and species of benthic animals exceeds those of pelagic species, at least partly because of the greater physical variety of benthic habitats. Benthic animals are separated into infaunal and epifaunal species, depending upon whether they live within sediments or on the surface of the seafloor, respectively. Size categories of the zoobenthos consist of the larger macrofauna (>0.5 mm), the small meiofauna which is characteristically found in sand and mud, and the microfauna which is made up mostly of protozoans.

Benthic organisms are morphologically different from those planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats, they can be considered

dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts of the water column. Since light does not penetrate very deep ocean water, the benthic organisms often depend on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms are scavengers or detritivores. These organisms under being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthos population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of water, the nature of the substratum, food, predation, and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

5.6.1 Significance of macrobenthic organisms

The biomass of microbenthic organisms in estuaries and coastal embayment is often high. It declines if communities affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbations) help to mix the sediment and enhance the decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macrobenthos. The loss of benthic suspension-feeders can further enhance turbidity levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (i.e., voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna is also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons, the benthic organisms are extremely important indicators of environmental change.

5.6.2 Benthic Diversity

5.6.2a Subtidal region:

During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APMuL, Mundra (Table 10). The macrobenthos

density ranged from 309 no/ m^2 to 527 no/m^2 at sampling stations (Table 10; Figure 7). The biomass of the macrobenthic community in the study region was ranged from 0.9 g/m^2 to 1.6 g/m^2 in the study region. The maximum abundance of benthic microorganisms was reported at Station 5 (527 no/m^2). The highest biomass of macrobenthic species was observed at Station 5 (1.6 g/m^2). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Pilargidae, Capitillidae, Cossuridae, *Sternaspis* sp., Ciratullidae, *Nephthys* sp., Heterospionidae, Lumbriconereis, Spionidae were abundant contributing ~78% to macrobenthic population. Overall, the presence of Polychaete, Sipuncula worms and amphipods suggest the availability of food organisms for benthic predators in the area.

Table 10: Faunal composition, density (no/m^2) and biomass (g/m^2) of the macrobenthos community in the subtidal region at APMuL, Mundra during October 2022.

Taxa	Stations				
	St-1	St-2	St-3	St-4	St-5
Phylum Polychaeta					
Paraonidae	70	135	35	11	35
Pilargidae	60	0	11	0	10
Capitillidae	50	110	80	85	10
Cossuridae	0	25	50	0	3
Sternaspis sp.	10	0	72	6	0
Ciratullidae	14	5	60	25	10
Nephthys sp.	5	0	0	87	155
Heterospionidae	4	0	75	5	0
Lumbriconereis	0	11	0	154	160
Spionidae	30	31	0	10	35
Phylum Mollusca					
Bivalvia	36	61	0	20	14
Gastropoda	30	0	40	0	20
Phylum Arthopoda					
Amphipoda	0	50	100	50	75
Total abundance (no/m^2)	**309**	**428**	**523**	**453**	**527**
Biomass (g/m^2)	**0.9**	**1.1**	**1.5**	**1.1**	**1.6**

Note: ST=Station

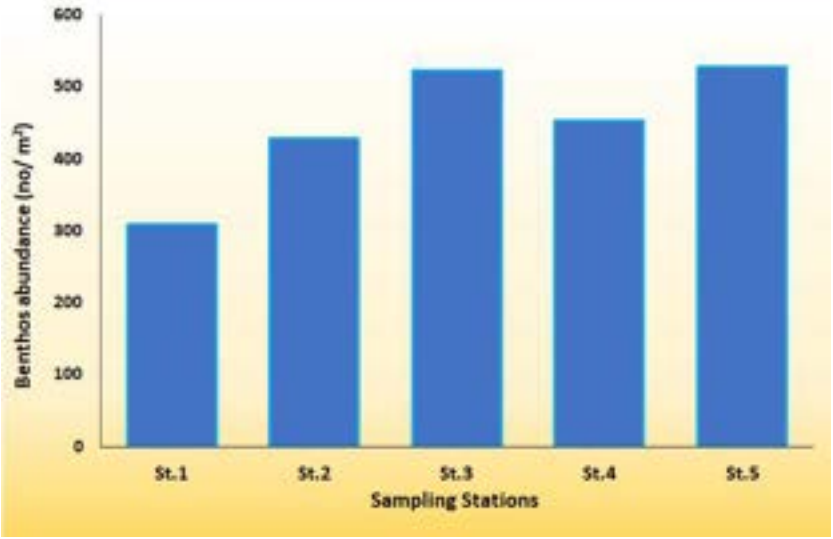


Figure 7: Subtidal macrobenthos abundance (no/m^2) at different sampling stations at APMuL, Mundra during October 2022

5.6.2b Intertidal region

The sandy substratum with low organic matter affects the occurrence of the microbenthic community in the intertidal region. Low macrobenthos biomass was measured (0.20 g/m^2 to 0.34 g/m^2) in the intertidal region at the APMuL (Table 11). The lowest density of macrobenthic organisms was reported at station IT-2 (HW) (88 no/m^2), whereas the highest density was reported at Station IT-1 (LW) (137 no/m^2). No macrobenthic community was observed at station 3 (HW and LW) may be due to sandy sediment.

Table 11: Faunal composition, density (no/m^2) of macrobenthos from the sediments collected at High tide water level (HW) and Low tide water level (LW) in the inter-tidal region at APMuL, Mundra during October 2022.
(Note: LW=low water during low tide; HW=high water during high tide; St=Station)

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
Phylum Annelida						
Polychaetes	62	62	30	30 82	-	-
Phylum Mollusca						
Bivalve	15	2	10	3	-	-
Phylum Arthropoda						
Amphipoda	57	32	31	21	-	-
Isopoda	1	41	0	20	-	-
Phylum Sipuncula						

Sipunculids	0	1	1	3	-	-
Total density (no/m^2)	**135**	**137**	**88**	**129**	-	-
Biomass (g/m^2)	**0.32**	**0.34**	**0.20**	**0.29**	-	-

Polychaet larvae

Figure 8: Microphotographs of microbenthic organisms observed in the sediment samples collected in the vicinity of APMuL, Mundra during October 2022.

6 CONCLUSIONS

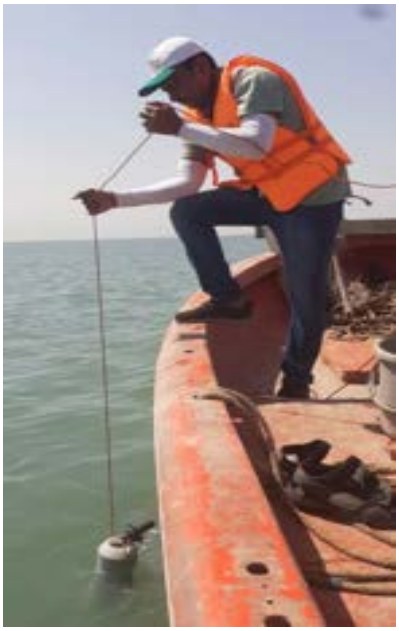
- The phytoplankton abundance in the study region ranged from 101 to 249 cells×10^2/ L. Highest phytoplankton abundance was observed at the Station 5 bottom water. A maximum 36 phytoplankton genera were identified from water samples collected in this region. The diverse phytoplankton population supported by the environmental cues emphasizes healthy ecosystem.
- In general, the Chl-*a* concentrations in the study region were ranged from 1.8 µg/L to 2.2 µg/L. The highest Chl-*a* (2.2 µg/L) and pheophytin (1.0 µg/L) content was recorded at Station 1,2 and 5.
- Zooplankton abundance was ranged in between 13.5 to 20.5 x 10^3/100 m^3. The highest zooplankton abundance (20.5 x 10^3/100 m^3) was reported at Station 1 and highest biomass (3.3 ml/ 100 m^3) at Station 1.
- In the sub-tidal region, the high macro benthos abundance and biomass were reported at station 5 (527 no. m^2) and Station 5 (1.6 g/m^2), respectively. The lowest abundance (309 no. m^2) and biomass (0.9 g/m^2) was recorded at station 1, respectively. The more abundance of macrobenthic community suggests the stable and enriched substratum

supports their growth. In turn benthic macrofauna could support the benthic feeder fish population in this region.

The present assessment reveals the influence of the environmental cues on the physicochemical and biological parameters along the study region. The diverse phytoplankton and zooplankton population indicates favourable water condition for their survival and growth along the region. This diverse planktonic flora together with enriched subtidal benthic fauna along the outfall channel region could substantially support the fishery population in the region. These observations are in line with our present bioassay study, where 90% survival of fish *Mugil cephalus* recorded in absolute outfall water as per compliance. For bioassay study, these fishes were collected from Kotadi Creek. 90% survival of the fish population in bioassay study together with the diverse biota at outfall channel from the present study emphasizes that the abiotic characteristics does not have the adverse biological impact of discharge water.

Table 12: Names of the Marine Monitoring Team Members

Sr. No.	Name of Person
1.	Mr. Vijay Thanki (Env. Chemist)
2.	Mr. Pravin Singh (Env. Chemist)
3.	Ms. Shweta A. Rana (Env. Microbiologist)
4.	Mr. Bhavin Patel (Env. Engineer)
5.	Dr. Ashwini Sanaye (Marine Biologist)



PHOTOGRAPHS OF DIFFERENT TYPES OF SAMPLING

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adani

MARINE MONITORING REPORT

January 2023

FOR

M/s. ADANI POWER (MUNDRA) LIMITED

At

Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
KUTCH, GUJARAT – 370 435

Prepared by

UniStar
Environment & Research Labs Pvt. Ltd.

PREFACE

M/s. Adani Power (Mundra) Limited (APMuL) is a subsidiary company of Adani Group engaged in imported coal-based thermal power generation located near village Tunda and Siracha, Taluka Mundra District Kutch, Gujarat. APMuL has commissioned the first supercritical 660 MW unit in the country. This is also the World's First supercritical technology project to have received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). Currently, the total power production capacity of the APMuL has increased to 4620 MW.

APMuL has engaged **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi** to **carry out the** seasonal Marine Monitoring Study along with the seawater intake and outfall (discharge) channels of Mundra power plant. This marine monitoring study involved the assessment of Physio-chemical parameters at the earlier prescribed locations. The distribution and diversity of marine flora and fauna were assessed through water sampling from sub-tidal regions. Furthermore, the distribution of the benthic community was evaluated from the sediment samples collected along the sub-tidal and inter-tidal regions. The overall objective of this study is to monitor the status of prevailing ecology along the intake and discharge (outfall) channels, in terms of water and sediment quality through assessment of physico-chemical parameters and marine biota. This marine monitoring report provides a comprehensive analysis of the Data obtained through a monitoring study undertaken during January 2023.

Date: 27/01/2023

M/S. UniStar Environment and Research Labs Pvt. Ltd.

White House, Char Rasta,

Vapi-396 191

Approved by

Mr. Jaivik Tandel
(Authorized By)

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 OVERVIEW

Adani Power (Mundra) Limited (APMuL) is an imported coal-based thermal power plant located near village Tunda and Siracha, Taluka Mundra, District Kutch, Gujarat, India. APMuL is the largest single location private coal-based power plant in India. Mundra plant capacity is 4620 MW, comprising of 9 units with 4 units of 330 MW (Phase I and II) and 5 units of 660MW (Phase III and IV). The 330 MW units are based on subcritical technology and the 660 MW units are based on supercritical technology. APMuL has created history by synchronizing the first super-critical technology-based 660 MW generating unit. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra project, which is based on supercritical technology, has received the 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC).

M/S. UniStar Environment and Research Labs Pvt. Ltd., Vapi, India have carried out the routine Marine Monitoring Study in the vicinity of the APMuL Mundra plant during 27 and 28 January 2023. The sampling was carried out along the integrated sea intake channel (2 stations) and at vicinity of discharge/outfall channel water mixing region (2 stations). One station was situated in between these two locations. This assessment involves the collection of Physico-chemical parameters from 5 subtidal locations (Table 1). The distribution and diversity of marine microflora (phytoplankton and pigments) and fauna (zooplankton) were assessed from water samples collected from 5 subtidal stations (Table 1). The assemblage of the microbenthic community was studied from 5 sub-tidal and 3 inter-tidal stations. The present report presents a detailed account of the results observed during the Marine Monitoring Study at the vicinity of the APMuL during January 2023.

1.2 OBJECTIVES

a) To analyses the Physico-chemical seawater parameter for understanding the water quality in the study area.

b) Evaluation of the prevailing status of marine biota through the quantitative and qualitative analysis of marine flora (phytoplankton and pigments) and fauna (zooplankton and macrobenthos).

c) To recommend adequate marine environmental management measures.

2. STUDY PROGRAM

2.1 STUDY PERIOD

The field investigation was carried out on 27 and 28 January 2023. The sampling strategy was planned in such a manner as to get a detailed characteristic of the marine environment of the study area. Sampling and analysis for the marine environment have been carried out by **M/s. UniStar Environment and Research Labs Pvt. Ltd, Vapi, India**.

2.2 SAMPLING LOCATIONS

Sampling was carried out at 5 subtidal stations and 3 intertidal transects along with the sea intake and outfall channels. Out of 5 subtidal stations, 2 were in the sea intake channel, 2 along the discharge mixing (outfall channel) region and remaining 1 in between these two locations. One intertidal station was located along the sea intake channel and 2 were along the discharge region. The detailed geographic coordinates of sampling stations are given in Table 1 and Figure 1.1.

Table 1: Geographic coordinates, water, and sediment parameters at the subtidal sampling stations, APMuL during January 2023.

Subtidal station							
Station	**Station code**	**Locations**	**Coordinates**		**Water depth**	**Tide**	**Sediment texture**
1	St-1	Intake point	22°48’30.’50”N	69°32’57.84”E	5 m	Flood	Silty-sand
2	St-2	Mouth of intake point	22°47’07.20”N	69°32’06.50”E	5.5 m	Flood	Silty-sand
3	St-3	West port area	22°45’27.70”N	69°34’50.63”E	5.2 m	Ebb	Silty-sand
4	St-4	Outfall area	22°44’40.56”N	69°36’26.61”E	4.5 m	Ebb	Silty clay
5	St-5	Outfall area	22°45’12.60”N	69°36’44.54”E	4.0 m	Ebb	Silty clay

Table 2: Geographic coordinates, water, and sediment parameters at the intertidal sampling stations, APMuL during January 2023.

Intertidal transect						
Station	**Station code**	**Tide Level**	**Coordinates**	**Water depth**	**Intertidal exposed area**	**Sediment texture**
I	IT-1 (HW)	High Tidewater level	22°47'07.55" N	69°32'16.91" E	5.2 m	Silty-sand
	IT-1 (LW)	Low Tide water level	22°47'06.38"N	69°32'11.62"E		Silty-sand
II	IT-2 (HW)	High Tide water level	22°45'58.72" N	69°34'35.41" E	5.3 m	Silty-Sandy
	IT-2 (LW)	Low Tidewater level	22°45'57.74" N	69°34'35.05" E		Silty-sand
III	IT-3 (HW)	High Tidewater level	22°44' 52.21" N	69°36'41.64"E	7.5 m	Sandy
	IT-3 (LW)	Low Tidewater level	22°44' 51.23" N	69°36'39.28" E		Sandy

Figure 1: Map of the study area illustrating the subtidal and intertidal sampling stations.

2.3 SAMPLING STRATEGY

2.3.1 Sampling frequency

A sampling at the subtidal stations was carried out during the flood to ebb tides. Surface and bottom water samples were collected in duplicate for assessing water quality and marine biota. Intertidal samples were collected in duplicate during low tide at each transect.

2.3.2 Sampling methodology

For estimation of Physico-chemical parameters and marine flora (phytoplankton and pigments), subsurface samples were collected using the Niskin water sampler (5-litre capacity) with a mechanism for closing at the desired depth. Surface water samples were collected using a clean polyethylene bucket. Phytoplankton samples were collected in clean polyethylene bottles (1 L) fitted with inert cap liners and preserved with 4% Lugol's iodine solution. For pigment analysis, water samples were stored in clean, dark polyethylene cans (5 L). Chemical parameters samples were collected in polyethylene or glass bottles. Samples for phenol were collected in polyethylene or glass bottles and Petroleum Hydrocarbon samples collected in glass bottles. Dissolve oxygen (DO) and Biological Oxygen Demand (BOD) samples were collected in glass BOD bottles. The temperature was measured on the field with a calibrated thermometer. Analysis of other parameters was carried out in the laboratory.

For zooplankton, oblique hauls were made using Heron Tranter net attached with calibrated flow meter. Samples were stored in clean polyethylene bottles (0.5 L) and fixed with 5% formaldehyde.

For the analysis of macrobenthos, subtidal sediment samples were collected using a Van Veen grab covering an area of 0.04 m^2. Intertidal samples were collected using a metal quadrant. Samples were sieved with a 500 µ metal sieve and preserved with Rose Bengal-formalin solution and stored in plastic zip-lock bags.

2.4 SAMPLE ANALYSIS METHODS

2.4.1 Physico-chemical parameter:

Samples were analysed by using different analytical methods for estimations of Temperature, Turbidity, PH, Suspended Solid (SS), Salinity, DO, BOD, COD, Phosphate, Total

nitrogen, Nitrite, Nitrate, Phenols and PHc. The standard methods used for the analysis of each parameter are given in Table 3.

2.4.2 Sediment Quality parameters:

Sediment texture, Petroleum Hydrocarbon (PHc), Phosphorus, Organic Carbon, Aluminium, Iron, Chromium, Nickel, Zinc, Lead, Copper, Cobalt, Cadmium, Mercury, Arsenic. The standard methods used for the analysis of each parameter.

2.4.3 Biological parameters:

2.4.3a Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

2.4.3b Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

2.4.3c Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

2.4.3d Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

3 WATER QUALITY MONITORING

3.1 RESULT OF PHYSICO-CHEMICAL WATER PARAMETER ANALYSIS

The samples collected during the field visit were brought to the laboratory for further analysis of Physico-chemical parameters. The standard methods used for the analysis of water quality parameters are given in Table 3

Table 3: Water quality parameters and their test methods.

Sr. No.	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.1	8.0	8.1	8.0	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	28.5	28	28.5	28	IS 3025(Part 9) 1984
3.	Turbidity (NTU)	1	1	1	1	IS 3025(Part 10) 1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	74	92	70	86	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.6	37.7	37.2	37.6	By Calculation
3.	Dissolved Oxygen (mg/l)	4.8	4.1	4.9	4.2	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.2	3.0	3.8	3.5	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	2164	2480	2292	2304	APHA 23rd Ed.,2017,4500- SO_4 E
6.	Ammonical Nitrogen (µmol/l)	0.8	0.8	0.7	0.6	APHA 23rd Ed.,2017,4500- NH_3 B
7.	Total Nitrogen (µmol/l)	4.3	4.2	3.5	5.0	By Calculation
8.	PO_4^{3-}-P (µmol/l)	1.0	1.0	0.7	0.9	APHA 23rd Ed.,2017,4500 –P,D
9.	(NO_3^--N) (µmol/l)	3.2	3.1	2.6	4.2	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	0.3	0.3	0.2	0.2	APHA 23rd Ed.,2017,4500 NO_2B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL: 0.01)	BDL(MDL:0 .01)	BDL(MDL: 0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 2)

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25°C	8.2	8.1	8.1	7.9	IS 3025(Part 11)1983
2.	Temperature ^{0}C	28.2	28	28.5	28	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	84	92	74	92	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.0	37.3	37.2	37.4	By Calculation
3.	Dissolved Oxygen (mg/l)	4.6	4.3	5.1	4.9	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.1	3.7	3.2	3.2	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	2684	3102	2586	2697	APHA 23rd Ed.,2017,4500- SO_4 E
6.	Ammonical Nitrogen (µmol/l)	0.6	0.6	0.5	0.4	APHA 23rd Ed.,2017,4500- NH_3 B
7.	Total Nitrogen (µmol/l)	4.1	4.5	4.2	4.7	By Calculation
8.	PO_4^{3-}-P (µmol/l)	0.7	0.8	0.6	0.7	APHA 23rd Ed.,2017,4500 –P,D
9.	(NO_3^--N) (µmol/l)	3.2	3.5	3.0	3.7	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	0.3	0.4	0.7	0.6	APHA 23rd Ed.,2017,4500NO_2B
11.	Phenol (mg/l)	BDL(MDL: 0.01)	BDL(MDL :0.01)	BDL(MDL :0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

Table 3 (Continued 3)

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25°C	8.1	7.9	IS 3025(Part 11)1983
2.	Temperature (^{0}C)	28.5	28.2	IS 3025(Part 9)1984
3.	Turbidity (NTU)	0.1	0.1	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids (mg/l)	88	102	APHA 23rd Ed.,2017,2540- D
2.	Salinity	37.2	37.6	By Calculation
3.	Dissolved Oxygen (mg/l)	4.8	4.2	APHA 23rd Ed.,2017,4500-O, B
4.	Biochemical Oxygen Demand (BOD) (mg/l)	3.3	3.9	IS 3025(Part 44)1993Amd.01
5.	Sulphate as SO_4 (mg/l)	2364	2653	APHA 23rd Ed.,2017,4500-SO_4 E
6.	Ammonical Nitrogen(µmol/l)	0.8	0.7	APHA 23rd Ed.,2017,4500-NH_3 B
7.	Total Nitrogen (µmol/l)	3.8	4.5	By Calculation
8.	PO_4^{3-}-P (µmol/l)	0.7	0.8	APHA 23rd Ed.,2017,4500 – P,D
9.	(NO_3^--N) (µmol/l)	2.6	3.6	APHA 23rd Ed.,2017,4500 NO_3-B
10.	(NO_2^--N) Nitrite (µmol/l)	0.4	0.2	APHA 23rd Ed.,2017,4500 NO_2B
11.	Phenol (mg/l)	BDL(MDL:0.01)	BDL(MDL:0.01)	IS 3025(Part 43)1992 Amd.02
12.	PHc (ppb)	N.D.	N.D.	GC Method

Note: MDL = Minimum Detection Limit and N.D. = Not detectable
Turbidity= 0.1=1 to 10 NTU; 1=10 to 40 NTU; 5=40-100 NTU

3.1.1 Temperature: Marine water temperature was checked on-site during the sampling. Surface and bottom water temperatures observed in the study area were in a range between 28^{0}C to 28.5^{0}C. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity, and seasonality.

3.1.2 pH: The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area was in the range of 7.9 to 8.2 at the surface and bottom water.

3.1.3 Turbidity: Seawater turbidity is the cloudiness caused by large numbers of individual particles such as very fine clay and minute marine organisms. This also varies seasonally due

to intrusion of land runoff and/or sediment resuspension. Surface and bottom water turbidity observed in the study area was in a range between 0.1 to 1 NTU.

3.1.4 Total suspended solids (TSS): The suspended solids generally constitute silt and clay eroded from the land or shore erosions and suspension of the benthic layers from the seabed. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in a polluted area. On a seasonal basis, high TSS in seawater could be observed during the active monsoon season. Suspended solid concentration in the study area was a little variable. In surface water, TSS was 70 to 88 mg/L and in the bottom water, it was ranged from 86 to 102 mg/L.

3.1.5 Salinity: Salinity is an indicator of (saline or freshwater) water masses intrusion within the region. The standard average salinity of seawater is 35, which may vary with the riverine or inland influx, rains, or evaporation in the region. The salinity variation during the present sampling was 37.0 to 37.6 at surface and 37.3 to 37.7 at the bottom water.

3.1.6 DO and BOD: High DO level is an indication of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained through oxygen production during photosynthesis, dissolution from the atmosphere consumption by the respiration and decay of organic matter in a manner that DO levels are close to or above saturation value.

The DO level of the study area was varied from 4.6 to 5.1 mg/L at the water surface and 4.1 to 4.9 mg/L at the bottom water. The average DO value was 4.6 mg/L, which indicates the oxygenated conditions in the study region.

BOD is generally indicating the effective consumption of oxidizable matter in that water body. The industrial effluents contain high BOD levels. Thus, high BOD is also an indication of the intrusion of industrial polluted effluent into natural waters. BOD levels in the study area were varied from 3.1 to 3.8 mg/L at surface and 3.0 to 3.9 mg/L at bottom water.

3.1.7 Nutrients: Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton growth. The high nutrient concentrations in the seawater generally could be attributed to the anthropogenic and industrial influx. This could lead to further eutrophication and further deterioration of the pristine ecosystem. In the present study, Phosphate concentration was range from 0.6 to 1.0 µmol/L on the surface and 0.7 to 1.0 µmol/L bottom water. Nitrite concentration was range from 0.2 to 0.7 µmol/L on the surface and 0.2 to 0.6 µmol/L bottom water. Nitrate concentration was range from 2.6 to 3.2 µmol/L on the surface and 3.1 to 4.2 µmol/L bottom water.

3.1.8 PHc and phenol: The Phenol compounds and PHc were not detected in the present investigation.

❖ **Biological parameters**:

Phytoplankton:

The Lugol's preserved samples were allowed to settle for 48-72 hrs. The identification and enumeration of phytoplankton cells were carried out under a compound microscope using the Sedgwick Rafter slide. Species were identified to the genus level.

Phytoplankton pigments:

For the estimation of Chlorophyll *a* (Chl *a*) and Pheophytin, a known volume of field-collected water samples were filtered through Whatman glass microfiber filters (GF/F). Then filter paper was macerated in 90% acetone and stored overnight in the dark at 4°C. For estimation of Chl *a* fluorescence of the extract was measured using Turner Fluorometer. For phaeophytin fluorescence was measured after acidification with 0.1 N HCl.

Zooplankton:

Formalin preserved sample was divided into 4 equal portions using the Folsom Plankton Splitter. One portion of the samples was used to determine biomass using the volume displacement method. Another portion was used for enumeration and identification of (25-50%) faunal composition.

For the quantification of zooplankton, 4-5 ml of the sample was taken in a zooplankton counting chamber. The identification was carried out under Stereomicroscope. The zooplankton were identified at the group level.

Benthos:

For enumeration and identification of the macrobenthos, the organisms were handpicked using forceps and a paintbrush. After sorting, organisms were preserved in 10% formalin. Identification of the organisms was done to the group level under a stereomicroscope.

4 BIOLOGICAL PARAMETERS (BIODIVERSITY STUDY)

Marine ecosystems are subject to a multitude of direct human pressures, such as overexploitation, eutrophication, pollution, and species introductions. These stressors can have synergistic effects on marine ecosystems, altering its functioning. Anthropogenic involvements constantly compromise the health of the marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors

is an integral part of environmental assessment and monitoring study. During the present investigation at APMuL, the abundance and distribution of marine organisms (Plankton and benthos) were studied as part of routine environmental monitoring.

4.1 PLANKTONIC FORMS

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. As per definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into two broad functional groups i.e., Phytoplankton and Zooplankton.

4.1.1 Phytoplankton

Phytoplankton are microscopic, single-celled photosynthetic organisms that live suspended in all water niches, including oceans, freshwater, and marine niche. Like the terrestrial ecosystem where plants are an integral part of the ecosystem, phytoplankton play key role in the biogeochemistry of the oceans. As they are dependent on sunlight for energy, they mostly inhabit the euphotic zone. Therefore, they are responsible for production of half of the atmosphere’s oxygen and more than half of the primary production in the oceans. There are many species of phytoplankton, each of which has a characteristic shape, size, and function. Marine species of phytoplankton grow abundantly in oceans around the world and are the foundation of the marine food chain. Marine phytoplankton are the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients, and function.

4.1.2 Zooplankton:

Zooplankton occupies second position in the food web of the marine niche. They are the primary consumer’s organisms and generally feed on phytoplankton or small, microscopic group of organisms for they are nutritional needs. They are incapable of making their own food from sun-light or inorganic compounds, and feed on organisms or the remains of other organisms to get the energy necessary for survival.

4.2 SIGNIFICANCE OF PHYTO- AND ZOOPLANKTONS

Phytoplankton are vital to marine ecosystems. They are producers, or autotrophs, that form the foundation of most marine food webs. As photosynthetic organisms, they can convert solar energy into chemical energy and store it in form of sugars. They are responsible for half of the photosynthetic activity on the planet. The significance of zooplanktons is found in their role of transferring biological production from phytoplankton to large organisms in the marine food web and the seafloor. The microscopic protozoan, tunicates, copepods, and other crustaceans graze upon many phytoplankton species. These in turn become food for other animals further linking the food web. Therefore, variability in reproduction of copepods would affect the survival of young fish that feeds on them.

Table 4: Test methods for phytoplankton and zooplankton analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 23, Part 10000, 10200 F
2	Chlorophyll *a* and Pheophytin	APHA, Edition 23, Part 10000, 10200 H (with some modification)
3	Zooplankton	APHA, Edition 23, Part 10000, 10200 G
4	Macro benthos	APHA, Edition 23, Part 10000,10500 A-10500 D

4.3 PHYTOPLANKTON DIVERSITY:

Phytoplankton sampling was carried out at 5 stations. At each station, water samples were collected from surface and bottom waters. During the sampling period (January 2023) the phytoplankton population in the coastal waters of APMuL, Mundra was diverse and represented with a total of 33 phytoplankton genera (Table 7) belonging to diatoms (29 genera) and dinoflagellates (4 genera). Diatoms Species belonged to *Chaetoceros* sp. *Corethron* sp., *Coscinodiscus* sp., *Cyclotella* sp., *Cymbella* sp., *Ditylum* sp., *Guinardia* sp., *Odontella* sp., *Paralia* sp., *Rhizosolenia* sp., *Thalassiosira* sp., *Amphora* sp., *Amphorprora* sp., *Sterionella* sp., *Bacillaria* sp., *Cylindrotheca* sp., *Diploneis* sp., *Gyrosigma* sp., *Lauderia* sp., *Leptocylindrus* sp., *Licmophora* sp., *Lithodesmium* sp., *Navicula* sp., *Nitzschia* sp., *Pinnularia* sp., *Pleurosigma* sp., *Pseudo-nitzschia* sp., *Synedra* sp. and *Thalassionema* sp. While

dinoflagellates belongs to *Alexandrium* sp., *Gymnodinium* sp., *Protoperidinium* sp. and *Prorocentrum* sp.

The phytoplankton abundance in the study region was ranged from 90 to 207 cells×10^2/L (Table 5, Figure 2). The highest phytoplankton abundance was observed at Station 2 in the surface (207 cells×10^2/L) and then at Station 5 in bottom water (171 cells×10^2/L). The lowest phytoplankton abundance (90 cells×10^2/L) was observed at Station 3 in bottom water (Table 5, Figure 2). The study shows that the marine water around was enriched with the diverse phytoplankton population.

Table 5: Phytoplankton abundance (cells×10^2/L) at different sampling stations in the coastal waters of APMuL, Mundra during January 2023.

Note: S=surface; B=bottom; St=station

Phytoplankton Genera	Sampling Stations									
	St-1	St-1	St-2	St-2	St-3	St-3	St-4	St-4	St-5	St-5
	S	B	S	B	S	B	S	B	S	B
Diatoms										
Chaetoceros sp.	2	5	6	3	6	4	3	1	7	1
Corethron sp.	0	0	1	0	0	0	1	0	0	1
Coscinodiscus sp.	24	19	31	20	25	10	25	8	21	3
Cyclotella sp.	0	2	4	0	0	4	0	0	6	1
Cymbella sp.	1	1	0	1	1	0	0	0	0	0
Ditylum sp.	5	4	3	1	0	1	11	8	7	1
Guinardia sp.	15	10	10	16	1	3	1	10	5	0
Odontella sp.	12	14	6	1	6	4	10	8	12	26
Paralia sp.	8	0	0	10	11	21	7	6	2	2
Rhizosolenia sp.	2	1	21	8	3	3	1	8	3	5
Thalassiosira sp.	2	0	14	7	6	0	11	0	0	1
Amphora sp.	0	0	1	3	3	1	1	0	7	5
Amphorprora sp.	0	0	0	0	2	2	5	1	0	1
sterionella sp.	25	18	30	15	13	3	12	3	31	21
Bacillaria sp.	4	1	0	1	4	2	0	0	4	4
Cylindrotheca sp.	2	0	0	0	5	1	0	4	0	2
Diploneis sp.	0	1	0	0	0	0	0	0	0	1
Gyrosigma sp.	4	2	0	0	4	0	2	0	1	0
Lauderia sp.	1	2	0	0	0	0	0	0	0	0
Leptocylindrus sp.	3	0	17	3	1	2	0	1	0	0
Licmophora sp.	0	3	1	0	0	1	0	2	0	0
Lithodesmium sp.	0	0	0	1	0	0	0	5	1	1
Navicula spp.	21	12	15	1	13	8	20	10	10	6
Nitzschia spp.	10	15	28	10	1	2	11	7	21	8
Pinnularia sp.	2	0	0	0	0	0	6	0	0	0
Pleurosigma spp	6	8	2	3	5	0	10	8	15	2
Pseudo-nitzschia sp.	0	0	2	0	0	1	2	4	1	1

Synedra sp.	1	1	1	0	3	1	0	0	1	1
Thalassionema sp.	12	7	10	2	11	10	15	10	11	7
Dinoflagellates										
Alexandrium sp.	1	1	0	0	1	0	0	1	1	1
Gymnodinium sp.	1	0	1	2	4	2	0	1	2	2
Protoperidinium sp.	2	1	2	1	1	2	2	2	1	1
Prorocentrum sp.	1	0	1	2	0	2	1	2	1	0
Total Phytoplankton (nos. x 10^2/L)	**167**	**128**	**207**	**111**	**130**	**90**	**156**	**110**	**171**	**105**

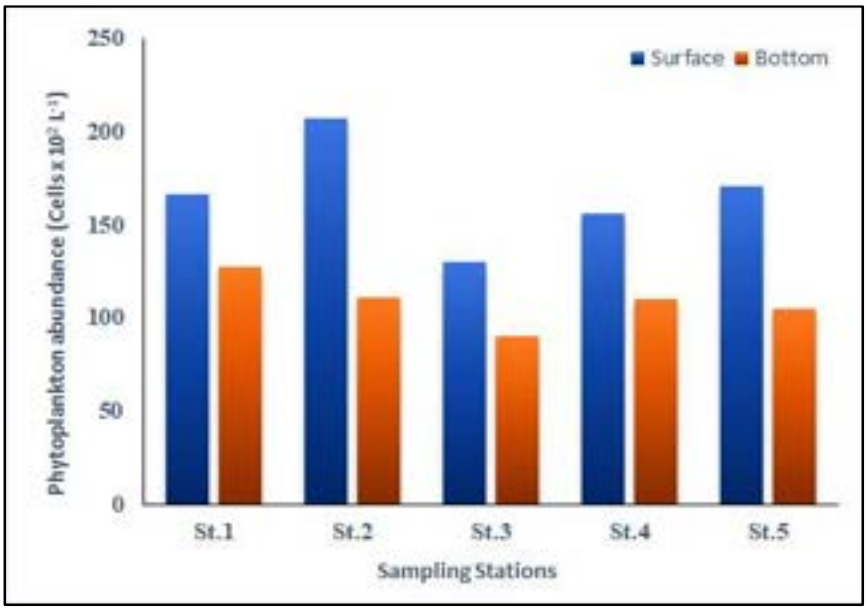


Figure 2: Phytoplankton abundance (cells×10^2/L) reported in the surface and bottom waters along the APMuL coast, Mundra during January 2023. Note: St=Station

Coscinodiscus sp.

Odontella

Figure 3: Microphotographs of phytoplankton reported in the coastal waters of APMuL, Mundra during January 2023.

4.4 PHYTOPLANKTON PIGMENTS (CHLOROPHYLL *a* AND PHEOPHYTIN):

Marine phytoplankton contains essential as well as accessory pigments like that of terrestrial plants. Phytoplankton pigments capture sunlight. The resulting photosynthesis and its products, especially the oxygen and organic compounds, all rely on the light energy captured by the different phytoplankton pigments. Chlorophyll *a* is the major pigment for light harvesting, and plays a significant role in photosynthesis and photoprotection, by extending the light collection window and protecting the cell from the damage of high irradiance levels or high ultraviolet light exposure.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells. The nature of these degradation products depends on which part of the chlorophyll molecule is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the center of the molecule or the loss of the phytol tail. This results in the formation of the molecule, phaeophytin. Depending on the parent molecule several distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus, in addition to Chlorophyll *a* filtered seawater contains color degradation products of phytoplankton pigments.

4.4a CHLOROPHYLL *a* AND PHAEOPHYTIN CONCENTRATIONS

The phytoplankton biomass distribution expressed in terms of Chlorophyll *a* (Chl-*a*) and Pheophytin at selected stations in the coastal region of APMuL, Mundra is presented in Table 6. The Chl-*a* concentrations in the study region were ranged from 1.6 µg/L to 2.2 µg/L. The Pheophytin content was ranged from 0.7 µg/L to 1.0 µg/L. The Chl-a and Pheophytin concentrations were more in the surface water as compared to the bottom water. The variations observed between the surface and bottom waters could be due to several natural biological variability. The highest Chl-*a* and Pheophytin concentrations were observed at Station 3, 4 and 5 surface waters.

Table 6: Chlorophyll *a*, Pheophytin concentrations along with their ratios (Chl*a*: Pheophytin) in the marine waters of APMuL, Mundra during January 2023.

Sampling stations		Chlorophyll *a* (µg/L)	Phaeophtin (µg/L)	Chl *a*:Phaeophtin ratio
St-1	**Surface**	2	1	2.2
St-1	**Bottom**	1.7	0.8	1.5
St-2	**Surface**	2.1	0.9	1.9
St-2	**Bottom**	1.9	0.8	2.5
St-3	**Surface**	2.2	0.7	2.1
St-3	**Bottom**	2	0.9	2
St-4	**Surface**	2.2	1	1.9
St-4	**Bottom**	1.9	0.8	2.2
St-5	**Surface**	2.1	1	2.4
St-5	**Bottom**	1.6	0.8	2

Note: ST= Station

The concentration of Pheophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to a deterioration of Chl-*a*. The ratio from concentrations of Chl-*a* and Pheophytin in an aquatic ecosystem suggests a balance between the growth and mortality of phytoplankton. In healthy environments, ratios of Chl-*a* to Pheophytin generally exceed 1.1. In the present study, this ratio was ranged from 1.5 to 2.5 (Table 8). The Chl-*a* and Pheophytin ratio showed marginally elevated levels in the surface waters as compared to the bottom waters. Overall, the ratios of Chl-*a* and Pheophytin concentration in the study region were generally high (>1), indicating that the appropriate conditions prevailed for the phytoplankton growth.

4.5 ZOOPLANKTON DIVERSITY:

Zooplankton standing stock in terms of population and biomass revealed substantial spatial variation within all 5 stations (Table 7). The maximum zooplankton population (17.16 no×10^3/100 m^3) and biomass (2.2 ml/ 100 m^3) were recorded at station 1. The lowest zooplankton population (12.12 no×10^3/100 m^3) and biomass (1.8 ml/100 m^3) was observed at station 5 (Figure 4). Different groups of identified zooplankton groups are mentioned in the Table 9. A total of 14 groups of zooplankton including Copepods, Copepod nauplii, Brachyuran crab larvae, Anomuran crab larvae, Decapod (shrimps), Fish and shellfish eggs, Fish larvae, Gastropod larvae, Chaetognaths, Polychaete larvae, Siphonophora, Ostracods, Oikopleura and Amphipods were identified during this study (Table 7, Figure 5). Among these groups

Copepod (74.28 %) and Copepods nauplii (15.63 %) were most dominant (Figure 6). Brachyuran crab larvae (2.64 %), Anomuran crab larvae (3.16 %) and fish & shellfish eggs (2.42 %) were also contributed to zooplankton population (Figure 5). The occurrence of copepods and their nauplii together with decapods and fish larvae/eggs in zooplankton samples highlights the fair production potential of live food resources (organisms) to support the fish and crustacean population in the study region.

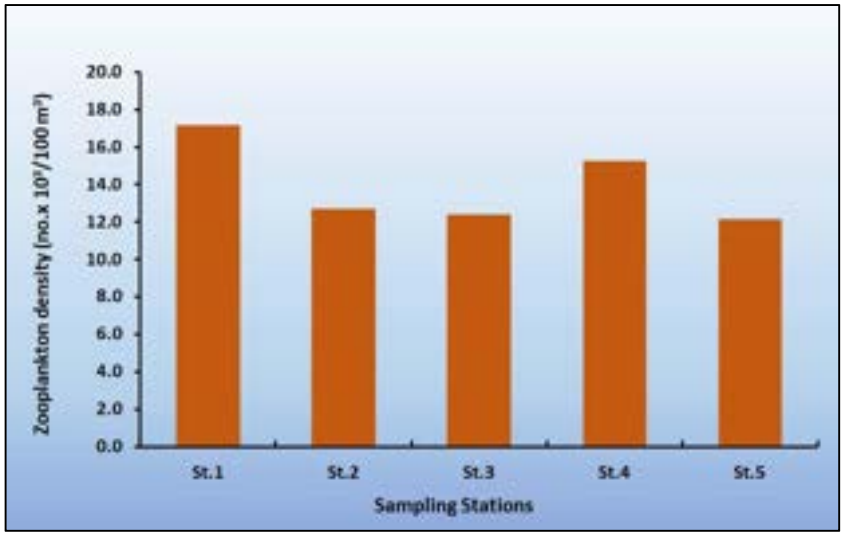


Figure 4: Zooplankton density (nos. ×10^3 /100 m^3) reported in the subtidal waters (Station 1 to 5) along the APMuL coast, Mundra during January 2023.

Table 7: Density (nos. ×10^3/100 m^3) and biomass (ml/100 m^3) of various zooplankton groups in the coastal waters at the APMuL, Mundra during January 2023.

Zooplankton Groups	St-1	St-2	St-3	St-4	St-5
Copepods	11.92	9.74	9.85	12.15	8.24
Copepod nauplii	3.02	2.09	1.65	1.69	2.42
Brachyuran crab larvae	0.68	0.23	0.29	0.48	0.25
Anomuran crab larvae	0.88	0.24	0.25	0.48	0.45
Decapod (shrimps)	0.05	0.03	0.07	0.05	0.00
Fish and shellfish eggs	0.41	0.26	0.16	0.29	0.54
Fish larvae	0.00	0.00	0.00	0.02	0.02
Gastropod larvae	0.06	0.02	0.03	0.05	0.08
Chaetognaths	0.05	0.03	0.03	0.03	0.05
Polychaete larvae	0.02	0.02	0.00	0.00	0.02
Siphonophora	0.05	0.02	0.02	0.00	0.02
Ostracods	0.00	0.02	0.00	0.02	0.00
Oikopleura	0.03	0.02	0.03	0.02	0.05

Amphipods	0.02	0.00	0.00	0.00	0.00
Population (nos.× 10^3/100 m^3)	**17.17**	**12.70**	**12.38**	**15.24**	**12.12**
Biomass (ml./100 m^3)	**2.2**	**1.9**	**1.9**	**1.8**	**1.9**

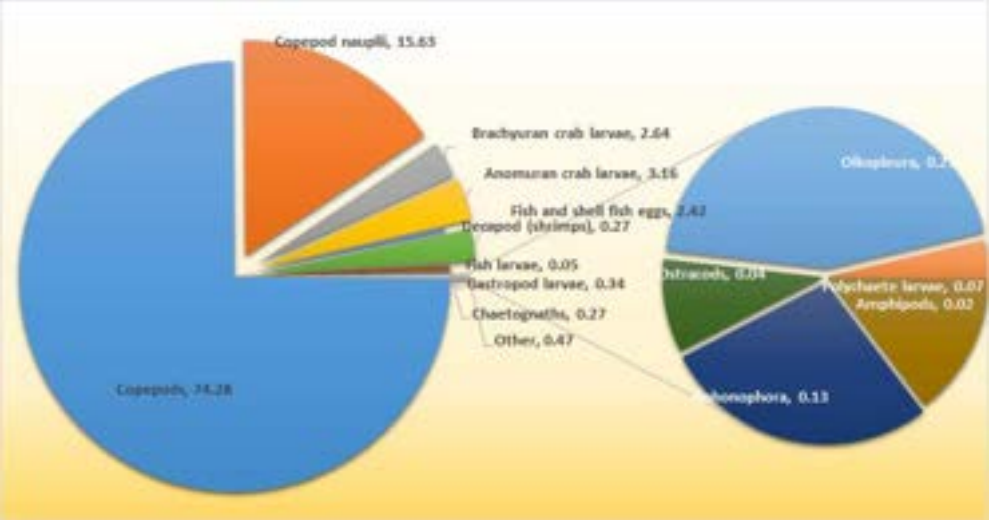


Figure 5: Dominant groups of Zooplankton reported from APMuL coast, Mundra during January 2023.

Copepod

Ostracods

Copepod nauplii

Anomuran crab larvae

Figure 6: Microphotographs of zooplankton reported from APMuL coast, Mundra during January 2023

4.6 Microbenthic fauna

The benthic zone is the lowest ecological zone of a water body which usually involves the sediments at the seafloor. The benthic environment is divided into distinctive ecological zones based on depth, seafloor topography, and vertical gradients of physical parameters. These are the supralittoral, littoral, sublittoral, bathyal, abyssal, and hadal zones. The number of phyla and species of benthic animals exceeds those of pelagic species, at least partly because of the greater physical variety of benthic habitats. Benthic animals are separated into infaunal and epifaunal species, depending upon whether they live within sediments or on the surface of the seafloor, respectively. Size categories of the zoobenthos consist of the larger macrofauna (>0.5 mm), the small meiofauna which are characteristically found in sand and mud, and the microfauna which consists mostly of protozoans.

Benthic organisms are morphologically different from those planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats, they can be considered dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts of the water column. Since light does not penetrate very deep ocean water, the benthic organisms often depend on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms are scavengers or detritivores. These organisms under being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthos population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of water, the nature of the substratum, food, predation, and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

4.6.1 Significance of macrobenthic organisms

The biomass of microbenthic organisms in estuaries and coastal embayment is often high. It declines if communities affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbation) help to mix the sediment and enhance the decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macrobenthos. The loss of benthic suspension-feeders can further enhance turbidity

levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (i.e., voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna is also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons, the benthic organisms are extremely important indicators of environmental change.

4.6.2 Benthic Diversity

4.6.2a Subtidal region:

During the present study, more macrobenthos abundance and biomass were reported at subtidal stations than at intertidal stations at APMuL, Mundra (Table 8). At sub-tidal stations, the macrobenthos density ranged from 475 nos./m^2 to 969 nos./m^2 at sampling stations (Table 8; Figure 7). The biomass of the macrobenthic community in the study region was ranged from 0.67 g/m^2 to 6.91 g/m^2 in the study region. The maximum abundance of benthic microorganisms was reported at Station 4 (969 no/m^2). The highest biomass of macrobenthic species was observed at Station 4 (6.91 g/m^2). In species composition, Polychaete species (Phylum Annelida) belonging to the family Paraonidae, Orbiniidae, Cossuridae, Eunicidae, Nereidae, Capitellidae, Spinonidae, Sabellidae, Syllidae and Nephtyidae were abundant contributing ~68% to macrobenthic population. Overall, the presence of Polychaete, Sipuncula worms and amphipods suggest the availability of food organisms for benthic predators in the area.

Table 8: Faunal composition, density (no/m^2) and biomass (g/m^2) of the macrobenthos community in the subtidal region at APMuL, Mundra during January 2023.

Taxa	Stations				
	St-1	St-2	St-3	St-4	St-5
Phylum Polychaeta					
Paraonidae	50	150	375	669	575
Orbiniidae	0	0	0	100	25
Cossuridae	0	0	25	0	25
Eunicidae	0	25	0	25	0
Nereidae	25	0	25	0	25
Capitellidae	25	25	50	50	25
Spionidae	75	0	0	0	0
Sabellidae	0	0	0	0	0
Syllidae	25	50	0	0	0

Nephtyidae	25	0	0	0	0
Phylum Protozoa					
Foraminifera	25	25	0	25	50
Phylum Mollusca					
Gastropoda/Bivalvia	25	50	25	25	0
Phylum Arthopoda					
Amphipoda	100	125	150	25	25
Isopoda	25	0	0	0	0
Phylum Sipuncula					
Sipunculids	125	25	75	50	0
Total abundance (no/m^2)	**525**	**475**	**725**	**969**	**750**
Biomass (g/m^2)	**0.86**	**0.67**	**4.13**	**6.91**	**3.12**

Note: ST=Station

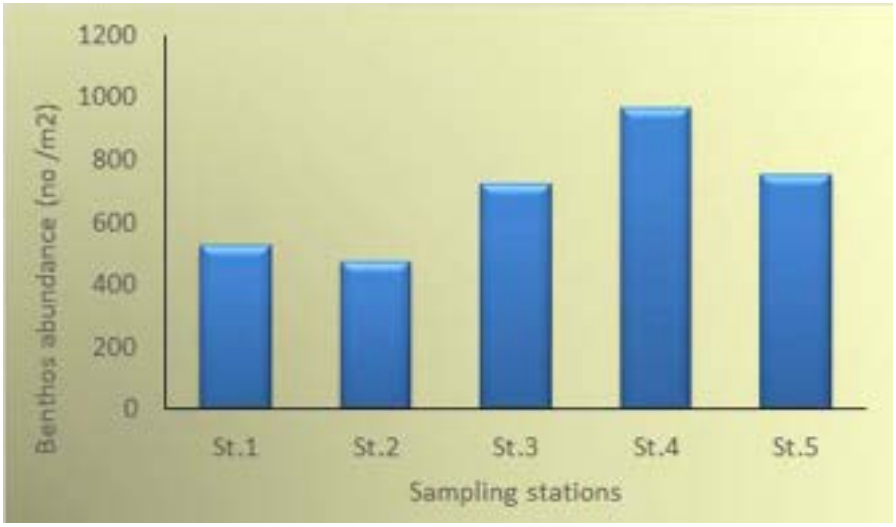


Figure 7: Subtidal macrobenthos abundance (no/m^2) at different sampling stations at APMuL, Mundra during January 2023

4.6.2b Intertidal region

The sandy substratum with low organic matter affects the occurrence of the microbenthic community in the intertidal region. Low macrobenthos biomass was measured (0.24 g/m^2 to 0.52 g/m^2) in the intertidal region at the APMuL (Table 9). The lowest density of macrobenthic organisms was reported at station IT-2 (HW) (100 nos./m^2), whereas the highest density was reported at Station IT-1 (LW) (250 nos./m^2). No macrobenthic community was observed at station 3 (HW and LW) may be due to sandy sediment.

Table 9: Faunal composition, density (no/m^2) of macrobenthos from the sediments collected at High tide water level (HW) and Low tide water level (LW) in the inter-tidal region at APMuL, Mundra during January 2023.

(Note: LW=low water during low tide; HW=high water during high tide; St=Station)

Faunal groups	Intertidal stations					
	IT-1 (HW)	IT-1 (LW)	IT-2 (HW)	IT-2 (LW)	IT-3 (HW)	IT-3 (LW)
Phylum Annelida						
Polychaetes	100	150	75	75	-	-
Phylum Mollusca						
Bivalve	0	25	0	0	-	-
Phylum Arthropoda						
Amphipoda	25	50	25	25	-	-
Isopoda	25	25	0	25	-	-
Phylum Sipuncula						
Sipunculids	0	0	0	25	-	-
Total density (no/m^2)	**150**	**250**	**100**	**150**	-	-
Biomass (g/m^2)	**0.48**	**0.53**	**0.25**	**0.45**	-	-

Amphipoda

Bivalvia

Figure 8: Microphotographs of microbenthic organisms observed in the sediment samples collected in the vicinity of APMuL, Mundra during January 2023.

5 CONCLUSIONS

A diversified planktonic and benthic population was observed during the current study along the APMuL's integrated seawater intake and outfall channels, developed by APSEZ. The diverse phytoplankton and zooplankton population indicates that the water conditions along the channels are favourable for their survival and growth.

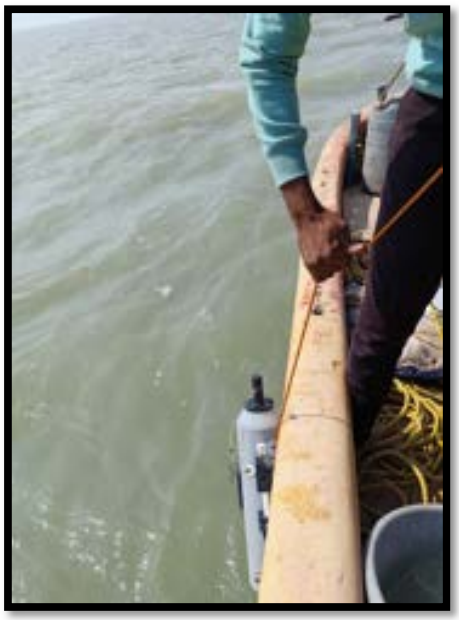
This enriched planktonic flora, together with subtidal benthic fauna, especially along the outfall channel region, could substantially support the fishery population in this area. These findings are consistent with the results of our recent bioassay investigation, which

demonstrated that fish of the species *Mugil cephalus* had a 90% survival rate in absolute outfall water. For bioassay study, these fishes were collected from Kotadi Creek. 90% survival of the fish population in bioassay and the diverse biota near outfall channel (present study) indicate that the abiotic characteristics, mainly temperature, of discharge water does not have the adverse biological impact. The well-constructed 11km long outfall channel with aqueduct over the Kotadi Creek enables cooling of outfall water, avoid mixing and facilitate the natural flow of creek water as per the compliance condition.

Overall, the physicochemical and biological characteristics of the marine environment did not significantly deviate from the baseline monitoring data, according to these seasonal marine monitoring studies.

Table 10: Names of the Marine Monitoring Team Members

Sr. No.	Name of Person
1.	Mr. Vijay Thanki (Env. Chemist)
2.	Mr. Pravin Singh (Env. Chemist)
3.	Ms. Shweta A. Rana (Env. Microbiologist)
4.	Mr. Bhavin Patel (Env. Engineer)
5.	Dr. Ashwini Sanaye (Marine Biologist)



PHOTOGRAPHS OF DIFFERENT TYPES OF SAMPLING

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Annexure – 8

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2020 – 21	2021 – 22	2022 – 23	2022 – 23
1.	Environmental Study / Audit and Consultancy	6.2	6.82	7.32	11.05
2.	Legal & Statutory Expenses	10.58	10.52	12.32	12
3.	Environmental Monitoring Services	19.17	14.31	15.32	33
4.	Hazardous / Non-Hazardous Waste Management & Disposal	83.55	107.09	104.035	127.72
5.	Environment Days Celebration and Advertisement / Business development	5.3	4.04	2.53	8.00
6.	Treatment and Disposal of Bio-Medical Waste	2.09	2.14	2.29	2.04
7.	Mangrove Plantation, Monitoring & Conservation	32.59	53.6	35.0	35.0
8.	Other Horticulture Expenses	689	921	956	979
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	148.49	252.27	141.33	164.46
10.	Expenditure of Environment Dept. (Apart from above head)	89.11	149.8	90.136	75.79
	Total	**1086.08**	**1371.79**	**1366.28**	**1448.06**

Annexure – 9

CONTRACT OF INSURANCE

INSURED NAME: ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

INSURER: IFFCO TOKIO General Insurance Company Limited

Policy Type - Public Liability - Act

Policy Period - (01/04/2023 to 31/03/2024)

Servicing Branch :	AHMEDABAD
Policy Issuing Office :	IFFCO TOKIO GEN INSU. CO. LTD. Ground Floor, IFFCO Bhavan Bh Maruti Arcade, Shivranjani Cross Rd, Satellite AHMEDABAD , GUJARAT - 380015
Issuing Office GSTIN :	24AAACI7573H1ZI
Corporate Office :	IFFCO TOKIO GEN INSU. CO. LTD.4th - 5th Floor, IFFCO TowersPlot No 3, Sector 29, GURGAON (HARYANA) - 122001
Policy No :	41078198
Unique Invoice No :	41078198
Invoice Date :	14/04/2023
SAC :	997139
Intermediary Details :	ACE INSURANCE BROKERS PVT LTD

POLICY SCHEDULE CUM TAX INVOICE

Insured	ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
GSTIN	24AAACG7917K1ZH
Address	Navinal Island Mundra, Kachchh Gujarat, 370421 - India Mundra (ct) Pin Code 370421
Place of Supply	GUJARAT
Business Description	Port operation, cargo handling, stevedoring
Policy Period	01/04/2023- 31/03/2024
Co Insurance Details	NA
Limit of Liability	Cover 50,000,000 per occurrence and 150,000,000 in the aggregate
Deductible	NA
Territorial Limits	INDIA
Jurisdiction	INDIA
Turnover Details	INR 63,807,000,000
Policy Type	Occurrence Based
Premium	Premium Excluding Taxes: INR 6,725.00 CESS (0%): INR 0.00 GST - SGST (9%): INR 605.25 - UGST (0%): INR 0.00 - CGST (9%): INR 605.25 - IGST (0%): INR 0.00 ERF Amount: INR 6,725.00 Total Premium / Invoice Value : INR 14,660.00
GST Related Declarations	**Whether GST is Payable on Reverse Charge Basis- No** **We hereby declare that though our aggregate turnover in any preceding financial year from 2017-18 onwards is more than the aggregate turnover notified under sub-rule (4) of rule 48, we are not required to prepare an invoice in terms of the provisions of the said sub-rule.**
Other Terms and Conditions	All Other terms & conditions as per Policy Wordings attached.

Disclaimer:

The issuance of this Insurance Policy is subject to satisfactory verification of KYC documentation of the Client/ Policyholder as per IRDAI Master Circular dated 1st August 2022 on AML/ CFT. In case, if any discrepancy is found in KYC Verification of the Client/ Policyholder, it is agreed by the Client/ Policyholder to complete/ rectify the discrepancy found in the KYC documents/information for the generation of CKYC Number, failing which the policy will be considered ineffective/suspended/ cancelled and no claim will be payable under this Insurance Policy.

Toll Free: 1-800-103-5499; SMS "claim" to 56161 SAC Code: 9971 Regd. Office: IFFCO SADAN, C1 Distt Centre, Saket, New Delhi -110017 Corporate Identification Number (CIN) U74899DL2000PLC107621, IRDA Reg. No. 106 Consolidated Stamp Duty Deposited as per the order of Government of National Capital Territory of Delhi	For IFFCO-Tokio General Insurance Company Limited Authorised Signatory Regd. Office : IFFCO Sadan C-1 Dist, Centre, Saket, New Delhi-110017 CIN: U74899DL2000PLC107621

Signature valid
Digitally signed by SUBRATA MONDAL
Date: 2023.04.14 11:48:05 IST
Reason: Valid Policy Copy
Location: IFFCO Tokio General Insurance Company Ltd, India

POLICY FORM
(PUBLIC LIABILITY INSURANCE – ACT ONLY POLICY)

1. OPERATIVE CLAUSE

Whereas the Insured Owner, named in the Schedule hereto and carrying on business described in the said Schedule, has applied to IFFCO-TOKIO General Insurance Co. Ltd. (hereinafter called the Company) for the indemnity hereinafter contained and has made a written proposal and declaration which shall be the basis of this contract and is deemed to be incorporated herein and has paid the premium and statutory contribution towards the Environment Relief Fund as per the provisions of the Public Liability Insurance Act and the rules framed thereunder.

NOW THIS POLICY WITNESSETH that subject to the terms, exceptions and conditions contained herein or endorsed hereon , the company will indemnify the insured owner against the statutory liability arising out of accidents occurring during the currency of the policy due to handling hazardous substances as provided for in the said act and the rules framed thereunder.

2. DEFINITIONS

a) "Act" unless otherwise specifically mentioned shall mean the Public Liability Insurance Act, 1991.

b) "Accident" means an accident involving a fortuitous or sudden or unintentional occurrence while handling any hazardous substance resulting in continuous, intermittent or repeated exposure to death of, or injury to any person or damage to any property but does not include an accident by reason only of war or radio-activity.

c) "Handling" in relation to any hazardous substance, means the manufacture, processing, treatment, package, storage, transportation by vehicle, use, collection, destruction, conversion, offering for sale, transfer or the like of such hazardous substance.

d) "Hazardous Substance" means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act, 1986, and exceeding such quantity as may be specified, by notification, by the Central Government.

e) "Owner" means a person who owns, or has control over handling any hazardous substance at the time of accident and includes:-

(i) in the case of a firm, any of its partners;

(ii) in the case of an association, any of its members, and

(iii) in the case of a company, any of its directors, managers, secretaries or other officers who is directly in-charge of and is responsible to the company for the conduct of the business of the company.

(f) "Turnover" shall mean –

i) Manufacturing units – Annual Gross Sales including all levies and taxes.

ii) Godown/warehouse owners – Annual rental receipts.

iii) Transport Operators – Annual freight receipts

iv) Others – Annual gross receipts

3. EXCLUSIONS

This Policy does not cover liability:

(1) arising out of willful or intentional non-compliance of any Statutory Provisions.

(2) in respect of fines, penalties, punitive and/or exemplary damages.

(3) arising under any other legislation except in so far as is provided for in Section 8 Sub-Section (1) and (2) of the Act.

(4) arising out of damage to property owned, leased or hired or under hire purchase or on loan to the Insured or otherwise in the Insured's control, care or custody.

(5) directly or indirectly occasioned by, happening through or in consequence of war, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection or military or usurped power.

(6) directly or indirectly caused by or contributed to by

a) ionizing radiations or contamination by radio activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel.

b) the radioactive, toxic, explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof.

4. CONDITIONS

(1) The Insured Owner shall give written notice to the Company as soon as reasonably practicable of any claim made against the Insured Owner or any specific event or circumstance that may give rise to a claim. The Insured shall immediately give to the Company copies of notice of application(s) forwarded by the Collector and all such additional information and or assistance that the Company may require.

(2) No admission, offer, promise or payment shall be made or given by or on behalf of the Insured owner under this policy without the written consent of the Company.

(3) The Company shall not be liable for any claims for relief made after five years from the date of occurrence of the accident.

(4) The Insured Owner shall keep record of annual turnover, and at the time of renewal of insurance declare such turnover and all other details as may be required by the Company. The Company shall at all reasonable times have full rights to call for and examine such records.

(5) If at the time of happening of any accident, resulting in a claim under this policy, there be any other insurance covering the same liability, then the Company shall not be liable to pay or contributes more than its ratable proportion of such liability.

(6) This Policy may be cancelled by the Insured Owner by giving 30 days notice in writing to the Company in which event the Company will retain premium at short period scale subject to there not having occurred an accident during the policy period which may give rise to a claim(s), failing which no refund of premium shall be allowable.

(7) This Policy may also be cancelled by the Insurer by giving 30 days notice in writing to the Insured Owner in which event the Company shall be liable to repay on demand a rateable proportion of the premium for the unexpired term from the date of cancellation.

(8) If the Company shall disclaim liability to the Insured Owner for any claim hereunder and such claim shall not within 12 calendar months from the date of such disclaimer have been made the subject matter of a suit in a competent court of law, then the claim for all practicable purposes shall be deemed to have been abandoned and shall not thereafter be recoverable hereunder or be made the subject matter of any suit.

(9) The Company shall not be liable to make any payment in respect of any claim if such claim shall be in any manner fraudulent or supported by any person on behalf of the Insured and/or if the insurance has been continued in consequence of any material mis-statement or non-disclosure of any material information by or on behalf of the Insured. In such a case, if the Company pays any amount to the claimant due to any statutory provisions, such amount shall be recoverable from the Insured.

(10) The Policy and the Schedule shall be read together as one contract and any word or expression to which a specific meaning has been assigned in the Act and the Rules framed thereunder or this Policy shall bear such specific meaning.

(11) Any dispute regarding interpretation of the terms, conditions and exceptions of this Policy shall be determined in accordance with the law and practice of a court of competent jurisdiction within India.

April 23, 2023

Mundra Lpg Terminal Private Limited

Adani Corporate House, Shantigram Nr. Vaishno Devi Circle, S
G Highway, Ahmedabad,Gujarat, Gandhi Nagar,
Gujarat-382421

Dear Customer,

Sub: Business Public Liability Insurance (Under PLI Act 1991) Policy No: 3133204621956601000

We thank you for having preferred us for your *Insurance* requirements. We at HDFC ERGO General Insurance believe ***"Insurance"*** as not only to be an assurance to indemnify in the event of unfortunate circumstances, but one that signifies protection and support, which you can count on when you need it most.

The Insurance Policy enclosed herewith is a written agreement providing confirmation of our responsibility towards you that puts insurance coverage into effect against stipulated perils.

Please note that the policy has been issued based on the information contained in the proposal form and / or documents received from you or your representative / broker.

Name of the Intermediary: Ace Insurance Brokers Pvt Ltd
Intermediary Code: 21037952

Where the proposal form is not received, information obtained from you or your representative /broker, whether orally or otherwise, is captured in the policy document.

If you wish to contact us in reference to your existing policy and /or other general insurance solutions offered by us, you may write to our correspondence address as mentioned below. Alternatively, you may visit our website www.hdfcergo.com. To enable us to serve you better, you are requested to quote your Policy Number in all correspondences.

Thanking you once again for choosing HDFC ERGO General Insurance Company Limited and looking forward to many more years of association.

Yours sincerely,

Authorised Signatory

Public Liability Insurance (Under PLI Act 1991)

S C H E D U L E

Policy No: 3133204621956601000

Item 1.	**Insured**	:	Mundra Lpg Terminal Private Limited
Item 2.	**Producer**	:	Ace Insurance Brokers Pvt Ltd
Item 3.	**Financial Interest**	:	Not Applicable
Item 4.	**Mailing address of the Insured**	:	Adani Corporate House, Shantigram Nr. Vaishno Devi Circle, S G Highway, Ahmedabad,Gujarat, Gandhi Nagar, Gujarat, 382421.
Item 5.	**Pan Card Number**	:	AANCA7329N
Item 6.	**Business**	:	LPG Terminalling Services
Item 7.	**Policy Period**	:	From 00:01 hours : 01 April 2023 To (Midnight) : 31 March 2024
Item 8.	**Premium**	:	Rs. 6,969.00
Item 9.	**Premium & Coverage Statement** 9.1 Premium Computation 9.2 Insurance Limits & Excess	:	Refer to Page 2

Item 10. Clauses, Conditions & Warranties :

Form Number	Form Name	Effective Date	Date Issued
PL-02-0032	Policy Schedule	1 April 2023	23 April 2023
PL-02-0031	Insurance Contract	1 April 2023	23 April 2023

Subject otherwise to terms and conditions of Public Liability Insurance Policy.

Signed for and on behalf of HDFC ERGO General Insurance Company Limited, on 23 April 2023

Authorised Signatory

GST Registration No: 24AABCL5045N1ZE. The contract will be cancelled ab intio in case; the consideration under the policy is not realized.

" The stamp duty of ₹ 0.50 paid by Demand Draft, vide Receipt/Challan no. NO.LOA/CSD/477/2022/4252 dated 29/09/2022 as prescribed in Government of Maharashtra Order No. Mudrank-2017/CR.97/M-1, dated the 09th January 2018".

Note: Where the proposal form is not received, information obtained from insured, whether orally or otherwise, is captured in the policy document. Discrepancies, if any, in the information contained in the policy document may be pointed out by an insured within 15 days from the policy issue date after which information contained in the policy document shall be deemed to have been accepted as correct.

I/ We hereby declare that though our aggregate turnover in any preceding financial year from 2017-18 onwards is more than the aggregate turnover notified under sub-rule (4) of rule 48, we are not required to prepare an invoice in terms of the provisions of the said sub-rule

Branch	206, Sec Fl. Shopper Plaza Iv,Opp. Bsnl Tel Exch Rd, Navarangpura Ahmedabad, 380006. Tel.: +91-79-39883600

Warranties :

"Warranted that there are no known losses and /or circumstances that may lead to losses or claims under this policy (except the claims and / or circumstances already reported to HDFC ERGO General Insurance Co. Ltd.).

This policy is issued basis the information and representations provided by or on behalf of the insured (whether by way of a proposal form or otherwise), and it is thus warranted that such information/representations are true, accurate, and complete, and that no other material information has been withheld.

If the policy document, schedule or endorsement contains any inadvertent error or omission in regards the information provided to us, you are requested to inform us within 15 days of receipt of the policy document so that we can correct any such error or omission."

Broker Name : Ace Insurance Brokers Pvt Ltd
Broker Code : 21037952

Premium & Coverage Statement

(Item. 9 of Schedule, Attached to and forming part of Policy No: **3133204621956601000)**

9.1 Premium Computation

Premium Details	Amount (Rs.)
Net Premium	3,197.00
GST 18% : Central Tax 9% (Rs. 287.73) + State Tax 9% (Rs. 287.27)	575.00
Add: Contribution to Environment Relief Fund	3,197.00
Total Premium	6,969.00
Invoice Number :	3042300162321
GSTN :	24AANCA7329N1Z6
Place of Supply	**Gujarat**
SAC Code	**997139**

9.2 Insurance Limits & Excess

Insurance Limits

Details	Amount (Rs.)
Each Accident Insurance Limit	50,000,000.00
Aggregate Insurance Limit	150,000,000.00

Excess

Compulsory Excess	Not Applicable
Voluntary Excess	Not Applicable

Public Liability Insurance (Under PLI Act 1991)

1. OPERATIVE CLAUSE

WHEREAS the Insured named in the Schedule hereto and carrying on the business described in the said schedule has applied to HDFC ERGO GENERAL INSURANCE COMPANY LIMITED (hereinafter called `the Company') for the indemnity hereinafter contained and has made a written proposal and declaration which shall be the basis of this contract and is deemed to be incorporated herein and has paid the premium and statutory contribution towards the Environment Relief Fund as consideration for or on account of such indemnity in accordance with the manner prescribed under Section 64VB of the Insurance Act, 1938 and as per the provisions of the Public Liability Insurance Act and the rules framed there under.

NOW THIS POLICY WITNESSETH that subject to the terms, conditions and exclusions herein contained or endorsed or otherwise expressed herein, to indemnify the Insured or Owner against the statutory liability arising out of accidents occurring during the currency of the policy due to handling of hazardous substances as provided for in the said Act and the Rules framed thereunder.

2. DEFINITIONS

For the purpose of this policy, the following terms shall have the meaning as set forth hereunder:

(i) "Act" unless otherwise specifically mentioned shall mean the Public Liability Insurance Act 1991 as amended from time to time;

(ii) "Accident" means an accident involving a fortuitous, sudden or unintentional occurrence while handling any hazardous substance resulting in continuous, intermittent or repeated exposure to death of, or injury to any person or damage to any property but does not include an accident by reason only of war or radioactivity;

(iii) "Handling" in relation to any hazardous substance means the manufacture, processing, treatment, package, storage, transportation by vehicle, use, collection, destruction, conversion, offering for sale, transfer or the like of such hazardous substance;

(iv) "Hazardous Substance" and group means any substance or preparation which is defined as hazardous substance under the Public Liability Insurance Act, 1991 and the Rules framed thereunder;

(v) "Owner" or "Insured" means a person who owns, or has control over handling of any hazardous substance at the time of accident and includes:

(a) in the case of a firm, any of its partners
(b) in the case of an association, any of its members, and
(c) in the case of a company, any of its directors, managers, secretaries or other officers who is/are directly in charge of, and is/are responsible to the company for the conduct of the business of the company;

(vi) "Turnover" shall mean

(a) In case of Manufacturing Units - Entire annual gross sales turnover including all levies and taxes of manufacturing units handling hazardous substance as defined in the Public Liability Insurance Act, 1991. For the purpose of this insurance, the term "Units" shall mean all operations being carried out in the manufacturing complex in one location.

(b) In case of Godowns/ Warehouse Owners – Total annual rental receipts of premises handling hazardous substance as defined in the Public Liability Insurance Act, 1991.

(c) In case of Transport Operators – Total annual freight receipts

(d) In all other cases – Total annual gross receipts

3. EXCLUSIONS

The Company shall not be liable:

(i) for any wilful or intentional non-compliance of any statutory requirements;

(ii) in respect of fines, penalties, punitive and /or exemplary damages;

(iii) under any law or legislation except in so far as provided for in Section 8 (1) & 8 (2) of the Act;

(iv) in respect of damage to property owned, leased or hired or under hire purchase or on loan to the Insured or otherwise in the Insured or Owner's control, care or custody;

(v) for any liability directly or indirectly occasioned by, happening through or in consequence of war, invasion, act of foreign enemy, hostilities (whether war be declared or not) civil war, rebellion, revolution, insurrection or military or usurped power;

(vi) for any liability directly or indirectly caused by or contributed to by:

(a) Ionising radiation or contamination by radioactivity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel

(b) the radioactive, toxic, explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof;

(vii) for matter outside the scope of Public Liability Insurance Act, 1991.

(viii) in respect of losses/liability arising outside India.

4. CONDITIONS

1) The Insured Owner shall give written notice to the Company as soon as reasonable practicable of any claim made against the Insured Owner or of any specific event or circumstance that may give rise to a claim. The Insured Owner shall immediately give to the Company copies of notice of application forwarded by the Collector and all such additional information and/or assistance that the company may require.

2) No admission, offer, promise or payment shall be made or given by or on behalf of the Insured owner under this policy without the written consent of the Company.

3) The Company shall not be liable for any claim for relief made after five years from the date of occurrence of the accident.

4) The Insured Owner shall keep record of annual turnover, and at the time of renewal of insurance declare such turnover and all other details as may be required by the Company. The Company shall at all reasonable times have full rights to call for and examine such records.

5) If at the time of happening of any accident resulting in a claim under the policy there be any other insurance covering the same liability,

then the Company shall not be liable to pay or contribute more than its rateable proportion of such liability.

6) The Company may cancel this policy by giving seven days' notice in writing of such cancellation to the Insured's last known address and in such an event the Company will return a pro-rata portion of the premium (subject to a minimum retention of 25 per cent of the annual premium) for the unexpired part of the insurance.

The policy may also be cancelled by the Insured by giving thirty days' notice in writing to the Company, in which event the Company will retain premium at short period scale as set forth in the table below, provided there is no claim under the policy during the Policy Period.

In case of any claim under the policy no refund of premium shall be allowed.

The Company shall have no obligation to give notice that the policy is due for renewal or renew this policy upon expiration or termination.

Table of Short Period Scales

Period of Risk(Not exceeding)	Premium to be retained by the Company (% of the Annual Rate).
1 week	10%
1 month	25%
2 months	35%
3 months	50%
4 months	60%
6 months	75%
8 months	85%
Exceeding 8 months	Total Annual Premium

7) If the Company shall disclaim by the Insured Owner for any claim hereunder and such claim shall not within 12 calendar months from the date of such disclaimer have been made the subject matter of a suit in a component Court of Law. Then the claim for all practical purpose shall be deemed to have been abandoned and shall not thereafter be recoverable hereunder or be mad the subject matter of any suit.

8) The Company shall not be liable to make any payment in respect of any claim if such be in any manner fraudulent or support by any person on behalf of the insured Owner and/or if the insurance has been continued in consequence of any material misstatement or non-disclosure of any material information by or on behalf of the Insured Owner. In such a case if the Company pays any amount to the claimant due to any statutory provision such amount shall be recoverable from the Insured Owner.

9) The policy and the Schedule shall be read together as one contract and any word or expression to which a specific meaning has been assigned in the Act and the Rules framed there under or this policy shall bear such as specific meaning.

10) Any dispute regarding interpretation of the terms, conditions and exceptions of the Policy shall be determined in accordance with the law and practice of a court of competent jurisdiction within India.

11) Any person who has a grievance against the Company, may himself or through his legal heirs make a complaint in writing to the Insurance Ombudsman in accordance with the procedure contained in The Redressal of Public Grievance Rules, 1998 (Ombudsman Rules). Proviso to Rule 16(2) of the Ombudsman Rules however, limits compensation that may be awarded by the Ombudsman, to the lower of compensation necessary to cover the loss suffered by the insured as a direct consequence of the insured peril or Rs. 20 lakhs Rupees Twenty Lakhs Only) inclusive of ex-gratia and other expenses. A copy of the said Rules shall be made available by the Company upon prior written request by the Insured.

GRIEVANCE REDRESSAL PROCEDURE

If you have a grievance that you wish us to redress, you may contact us with the details of your grievance through:

- Call Centre : 022-62346234/ 0120-62346234
- Emails - care@hdfcergo.com
- Designated Grievance Officer in each branch.
- Company Website - www.hdfcergo.com
- Courier : Any of our Branch office or corporate office

You may also approach the Complaint & Grievance (C&G) Cell at any of our branches with the details of your grievance during our working hours from Monday to Friday.

If you are not satisfied with our redressal of your grievance through one of the above methods, you may contact our Head of Customer Service at

The Complaint & Grievance Cell ,
HDFC ERGO General Insurance Company Ltd.
Customer Happiness Center,
D-301, 3rd Floor, Eastern Business District (Magnet Mall),
LBS Marg, Bhandup (West),MUMBAI - 400078.
State : Maharashtra, City : Mumbai
Pincode : 400078
Email: grievance@hdfcergo.com

In case you are not satisfied with the response / resolution given / offered by the C&G cell, then you can write to the Principal Grievance Officer of the Company at the following address

The Chief Grievance Officer
HDFC ERGO General Insurance Company Limited
Customer Happiness Center,
D-301, 3rd Floor, Eastern Business District (Magnet Mall),
LBS Marg, Bhandup (West),Mumbai - 400078.
State : Maharashtra, City : Mumbai
Pincode : 400078
E Mail: cgo@hdfcergo.com

You may also approach the nearest Insurance Ombudsman for resolution of your grievance. The contact details of Ombudsman offices are mentioned below if your grievance pertains to:

- Insurance claim that has been rejected or dispute of a claim on legal construction of the policy
- Delay in settlement of claim
- Dispute with regard to premium
- Non-receipt of your insurance document

Names of Ombudsman and Addresses of Ombudsmen Centers	
Jurisdiction	**Office Address**
Gujarat, Dadra & Nagar Haveli, Daman and Diu	AHMEDABAD - Shri Kuldip Singh Office of the Insurance Ombudsman,Jeevan Prakash Building, 6th floor,Tilak Marg, Relief Road,Ahmedabad - 380 001. Tel.: 079 - 25501201/02/05/06 Email: bimalokpal.ahmedabad@ecoi.co.in (mailto:bimalokpal.ahmedabad@ecoi.co.in)
Karnataka	BENGALURU - Smt. Neerja Shah Office of the Insurance Ombudsman, Jeevan Soudha Building,PID No. 57-27-N-19 Ground Floor, 19/19, 24th Main Road,JP Nagar, Ist Phase,Bengaluru - 560 078. Tel.: 080 - 26652048 / 26652049 Email: bimalokpal.bengaluru@gbic.co.in (mailto:bimalokpal.bengaluru@ecoi.co.in)
Madhya Pradesh, Chattisgarh	BHOPAL - Shri Guru Saran Shrivastava Office of the Insurance Ombudsman,Janak Vihar Complex, 2nd Floor,6, Malviya Nagar, Opp. Airtel Office,Near New Market,Bhopal - 462 003. Tel.: 0755 - 2769201 / 2769202 Fax: 0755 - 2769203 Email: bimalokpal.bhopal@ecoi.co.in (mailto:bimalokpal.bhopal@ecoi.co.in)
Orissa.	BHUBANESHWAR - Shri Suresh Chandra Panda Office of the Insurance Ombudsman,62, Forest park,Bhubneshwar - 751 009. Tel.: 0674 - 2596461 /2596455 Fax: 0674 - 2596429 Email: bimalokpal.bhubaneswar@ecoi.co.in (mailto:bimalokpal.bhubaneswar@ecoi.co.in)
Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, Chandigarh	CHANDIGARH - Dr. Dinesh Kumar Verma Office of the Insurance Ombudsman,S.C.O. No. 101, 102 & 103, 2nd Floor,Batra Building, Sector 17 - D,Chandigarh - 160 017. Tel.: 0172 - 2706196 / 2706468 Fax: 0172 - 2708274 Email: bimalokpal.chandigarh@ecoi.co.in (mailto:bimalokpal.chandigarh@ecoi.co.in)
Tamil Nadu, Pondicherry Town and Karaikal (which are part of Pondicherry).	CHENNAI - Shri M. Vasantha Krishna Office of the Insurance Ombudsman,Fatima Akhtar Court, 4th Floor, 453,Anna Salai, Teynampet,CHENNAI - 600 018. Tel.: 044 - 24333668 / 24335284 Fax: 044 - 24333664 Email: bimalokpal.chennai@ecoi.co.in (mailto:bimalokpal.chennai@ecoi.co.in)
Delhi	DELHI - Shri Sudhir Krishna Office of the Insurance Ombudsman,2/2 A, Universal Insurance Building,Asaf Ali Road,New Delhi - 110 002. Tel.: 011 - 23232481/23213504 Email: bimalokpal.delhi@ecoi.co.in (mailto:bimalokpal.delhi@ecoi.co.in)
Assam, Meghalaya, Manipur, Mizoram, Arunachal Pradesh, Nagaland and Tripura.	GUWAHATI - Shri Kiriti .B. Saha Office of the Insurance Ombudsman,Jeevan Nivesh, 5th Floor,Nr. Panbazar over bridge, S.S. Road,Guwahati - 781001(ASSAM). Tel.: 0361 - 2632204 / 2602205 Email: bimalokpal.guwahati@ecoi.co.in (mailto:bimalokpal.guwahati@ecoi.co.in)

Andhra Pradesh, Telangana, Yanam and part of Territory of Pondicherry.	HYDERABAD - Shri I. Suresh Babu Office of the Insurance Ombudsman,6-2-46, 1st floor, "Moin Court",Lane Opp. Saleem Function Palace,A. C. Guards, Lakdi-Ka-Pool,Hyderabad - 500 004. Tel.: 040 - 67504123 / 23312122 Fax: 040 - 23376599 Email: bimalokpal.hyderabad@ecoi.co.in (mailto:bimalokpal.hyderabad@ecoi.co.in)
Rajasthan	JAIPUR - Smt. Sandhya Baliga Office of the Insurance Ombudsman,Jeevan Nidhi - II Bldg., Gr. Floor,Bhawani Singh Marg,Jaipur - 302 005. Tel.: 0141 - 2740363 Email: Bimalokpal.jaipur@ecoi.co.in (mailto:bimalokpal.jaipur@ecoi.co.in)
Kerala, Lakshadweep, Mahe-a part of Pondicherry.	ERNAKULAM - Ms. Poonam Bodra Office of the Insurance Ombudsman,2nd Floor, Pulinat Bldg.,Opp. Cochin Shipyard, M. G. Road,Ernakulam - 682 015. Tel.: 0484 - 2358759 / 2359338 Fax: 0484 - 2359336 Email: bimalokpal.ernakulam@ecoi.co.in (mailto:bimalokpal.ernakulam@ecoi.co.in)
West Bengal, Sikkim, Andaman & Nicobar Islands.	KOLKATA - Shri P. K. Rath Office of the Insurance Ombudsman,Hindustan Bldg. Annexe, 4th Floor,4, C.R. Avenue, KOLKATA - 700 072. Tel.: 033 - 22124339 / 22124340 Fax : 033 - 22124341 Email: bimalokpal.kolkata@ecoi.co.in (mailto:bimalokpal.kolkata@ecoi.co.in)
Districts of Uttar Pradesh : Laitpur, Jhansi, Mahoba, Hamirpur, Banda, Chitrakoot, Allahabad, Mirzapur, Sonbhabdra, Fatehpur, Pratapgarh, Jaunpur,Varanasi, Gazipur, Jalaun, Kanpur, Lucknow, Unnao, Sitapur, Lakhimpur, Bahraich, Barabanki, Raebareli, Sravasti, Gonda, Faizabad, Amethi, Kaushambi, Balrampur, Basti, Ambedkarnagar, Sultanpur, Maharajgang, Santkabirnagar, Azamgarh, Kushinagar, Gorkhpur, Deoria, Mau, Ghazipur, Chandauli, Ballia, Sidharathnagar	LUCKNOW -Shri Justice Anil Kumar Srivastava Office of the Insurance Ombudsman,6th Floor, Jeevan Bhawan, Phase-II,Nawal Kishore Road, Hazratganj, Lucknow - 226 001. Tel.: 0522 - 2231330 / 2231331 Fax: 0522 - 2231310 Email: bimalokpal.lucknow@ecoi.co.in (mailto:bimalokpal.lucknow@ecoi.co.in)
Goa, Mumbai Metropolitan Region excluding Navi Mumbai & Thane.	MUMBAI - Shri Milind A. Kharat Office of the Insurance Ombudsman,3rd Floor, Jeevan Seva Annexe,S. V. Road, Santacruz (W),Mumbai - 400 054. Tel.: 022 - 26106552 / 26106960 Fax: 022 - 26106052 Email: bimalokpal.mumbai@ecoi.co.in (mailto:bimalokpal.mumbai@ecoi.co.in)
State of Uttaranchal and the following Districts of Uttar Pradesh: Agra, Aligarh, Bagpat, Bareilly, Bijnor, Budaun, Bulandshehar,Etah, Kanooj, Mainpuri, Mathura, Meerut, Moradabad, Muzaffarnagar, Oraiyya, Pilibhit, Etawah, Farrukhabad, Firozbad, Gautambodhanagar, Ghaziabad, Hardoi, Shahjahanpur, Hapur, Shamli, Rampur, Kashganj, Sambhal, Amroha, Hathras, Kanshiramnagar, Saharanpur.	NOIDA - Shri Chandra Shekhar Prasad Office of the Insurance Ombudsman,Bhagwan Sahai Palace 4th Floor, Main Road,Naya Bans, Sector 15, Distt: Gautam Buddh Nagar, U.P-201301. Tel.: 0120-2514250 / 2514252 / 2514253 Email: bimalokpal.noida@ecoi.co.in (mailto:bimalokpal.noida@ecoi.co.in)
Bihar, Jharkhand.	PATNA - Shri N. K. Singh Office of the Insurance Ombudsman,1st Floor,Kalpana Arcade Building,Bazar Samiti Road,Bahadurpur, Patna 800 006. Tel.: 0612-2680952 Email: bimalokpal.patna@ecoi.co.in (mailto:bimalokpal.patna@ecoi.co.in)

Maharashtra, Area of Navi Mumbai and Thane excluding Mumbai Metropolitan Region.	PUNE - Shri Vinay Sah Office of the Insurance Ombudsman,Jeevan Darshan Bldg., 3rd Floor,C.T.S. No.s. 195 to 198,N.C. Kelkar Road, Narayan Peth,Pune - 411 030. Tel.: 020-41312555 Email: bimalokpal.pune@ecoi.co.in (mailto:bimalokpal.pune@ecoi.co.in)

Annexure – 10

adani
Ports and Logistics

Compliance Report of EMP & Mitigation Measures

Sr. No.	Suggested Measures	Compliance Status
✍ **Construction Phase:**		
1	Proper care is warranted while dredging which should be in a controlled manner. It should also be insured that reclamation, dredging, widening and slop stabilization measures do not significantly alter the stabilized erosional-accretional regime and prevailing rate of exchange of water between the outer area of the intricate creek system as well as the free flow of tidal water, to protect the mangroves.	All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. Please refer condition no. 8 & 9 of the CRZ recommendation compliance report for further details.
2	Good sanitation, water and fuel should be made available to the work force. Labour colonies should be set-up landward of the HTL and away from mangrove.	Most of the construction labours resides in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. are provided by APSEZ. Details were submitted as a part of compliance report submission for the period Apr'17 to Sep'17. Please refer general condition no. ii of the EC & CRZ clearance for further details.
✍ **Operation Phase:**		
1	Wastewater such as generated during cleaning of jetties, floor washing, domestic use etc. should be collected in a settling pond and released to marine environment only after ascertaining that it is free from oil and SS. The toilets on the jetties must have compact sewage treatment facilities.	Entire quantity of sewage generated from APSEZ premises is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
2	Dust should be routinely monitored at the vantage points and corrective measures such as water sprinkling should be practiced if it increases beyond permissible limits.	Ambient Air Quality (twice in a week) monitoring is being carried out by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Adequate safeguard measures are being taken for abatement of dust emissions.

Sr. No.	Suggested Measures	Compliance Status
		Please refer specific condition no. xi of the EC & CRZ clearance or further details.
3	It should be ensured that the effluent released into the Gulf meets the prescribed GPCB criteria at all times.	Entire quantity of effluent / sewage generated from APSEZ premises is being treated in designated ETP / STP and treated water is being utilized on land for Horticulture purposes after compliance with GPCB standards. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
4	Appropriate spill response scheme (Tier-1 to Tier-3) should be in place to minimize impacts on marine environment, should a spill occur.	Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. Oil spill contingency response plan updated on 31.07.2022 is in place and implemented. Updated Oil spill contingency response plan was submitted in the last compliance period Apr'22 to Sep'22.
5	MPSEZL should commit mangrove restoration programme through afforestation in a defined time frame over larger and promising areas and should monitored periodically and protect from anthropogenic pressures.	APSEZ has carried out mangrove afforestation in 3890 ha. area across the coast of Gujarat. Please refer specific condition no. i & vii of the EC & CRZ clearance or further details.
6	A comprehensive marine quality monitoring programme with periodic investigations at predetermined locations should be undertaken by a specialized agency.	Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Please refer specific condition no. ix of the EC & CRZ clearance or further details.
7	The dust and noise levels at pre-decided locations including the jetty sites should be periodically monitored and remedial action taken if the levels exceed the prescribed norms.	Ambient Air Quality (twice in a week) and Noise (once in a month) monitoring are being carried out by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. Please refer specific condition no. xi of the EC & CRZ clearance or further details.
8	MPSEZL should establish an Environment Management Cell	M/s APSEZL has a well-structured Environment Management Cell, staffed

Sr. No.	Suggested Measures	Compliance Status
	(EMC) directly under the control of the Chief Executive.	with qualified manpower for implementation of the Environment Management Plan at site. Site team report to Sr. Manager (Environment) at Corporate, who heads the Environment Management Cell who directly reports to the top management. Environment Management Cell Organogram were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21. And there is no further change.

Annexure – 11

डॉ. एम. सुरेश कुमार /Dr. M. Suresh Kumar
मुख्य वैज्ञानिक तथा प्रमुख/Chief Scientist & Head
प्रोफेसर एसीएसआईआर/Professor AcSIR
पर्यावरणीय प्रभाव एवं संधारणीय प्रभाग
Environmental Impact & Sustainability Division
Ph/Off : (91) (712) 2247844
EPABX : (91) (712) 2249885-90(Ext.354)
Fax : (91) (712) 2249896
E.Mail : ms_kumar@neeri.res.in
eisd@neeri.res.in

सीएसआईआर–राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
नेहरू मार्ग
नागपुर 440 020
(भारत)

CSIR-National Environmental Engineering Research Institute
Nehru Marg
Nagpur 440 020
INDIA

No: ECCA-AP&SEZ/CSIR-NEERI/07

Date: 06/03/2023

To,
Head-Environment,
M/s. Adani Ports and Special Economic Zone Limited,
Adani House, P.O. Box No.1,
Mundra, Kutch - 370421.

Sub: Status of SEZ Environment Clearance Compliances
Ref:

1. SEZ Environment Clearance bearing MoEF letter No. 10-138/2008-I A.III, dated 15th July, 2014 (Specific Condition No. vii)
2. SO No. 5702004926, dated: 27.01.2022
3. Site Visit dated 19-20.01.2023

With reference to the above stated subject and references, work has been awarded to us for studies through Environment Clearance compliance audit at Multi Product SEZ of M/s. Adani Ports & SEZ Limited, Mundra with reference to EC Specific Condition No. (vii).

Accordingly, the site visit was conducted on 19th to 20th January, 2023 and the compliance report (April 2022 - September, 2022) was reviewed by us. It was further assessed from the monitoring reports submitted to us and site visit carried out, as part of the compliance report that all the environmental norms meet the applicable standards.

It has been concluded all the conditions stipulated in Environment Clearances are being complied and there is no violation of any condition. The existing practices shall be continued in future as well to ensure meeting with the applicable norms.

With Regards,

(M. Suresh Kumar)

Annexure – 12

Expense Details for Fisherfolk Amenitites work in different core areas										
Sr. No.	Details	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	TOTAL	AMT IN LACS
	Expenditure Details (Amount in Rs.)									
1	Vidya Deep Yojana	2,069,300	193,000	2,087,000	1,771,000	110,225	580,103	969,660	7,780,288	77.80
2	Vidya Sahay Yojana	552,580	495,000	691,000	708,000	504,336	659,709	847,013	4,457,638	44.58
3	Adani Vidya Mandir – Shaping Lives	4,200,000	4,030,000	3,472,000	6,434,020	1,593,805	3,737,700	5,950,854	29,418,379	294.18
4	Senio Citizen Health Card	--	8,430,000	1,750,000	2,975,000	1,750,000	-	-	14,905,000	149.05
5	Financial Support to Poor Patients	4,439,507	1,275,000	813,000	1,296,063	763,800	1,255,000	1,691,410	11,533,780	115.34
6	Machhimar Kaushalya Vardhan Yojana	188,708	200,000	397,000	73,000	--	226,000	134,070	1,218,778	12.19
7	Machhimar Sadhan Sahay Yojana	--	--	315,000	522,000	--	-	-	837,000	8.37
8	Machhimar Awas Yojana	4,592,106	1,165,000	--	2,311,000	2,424,016	2,480,000	712,000	13,684,122	136.84
9	Machhimar Shudhh Jal Yojana	2,236,050	2,700,000	2,038,000	1,773,000	2,348,300	1,936,575	2,096,050	15,127,975	151.28
10	Sughad Yojana	1,367,300	170,000	--	192,000	30,000	-	-	1,759,300	17.59
11	Machhimar Akshay kiran Yojana	860,850	100,000	68,000	--	--	-	-	1,028,850	10.29
12	Machhimar Ajivika Uparjan Yojana-Mangroves plantation	1,558,800	500,000	1,382,000	1,400,000	1,900,272	2,069,432	1,914,432	10,724,936	107.25
13	Bandar Svachhata Yojana	106,400	50,000	--	--	367,000	145,000	25,000	693,400	6.93
14	Cricket league and Cycle Marathon	432,000	657,119	638,000	610,800	--	-	-	2,337,919	23.38
15	Sports Material For Children & Youth at Vasahats	197,797	--	--	--	--	-	-	197,797	1.98
16	New Pilot Initiative for Polyculture	398,240	160,000	--	--	--	-	-	558,240	5.58
17	New Pilot Initiative for Cage farming Asian Seabass & Lobster	864,000	660,000	--	--	--	-	-	1,524,000	15.24
18	Sea Weed Culture Project	--	--	--	200,000	--	-	-	200,000	2.00
19	Mangrove Biodiversity Project	--	--	1,890,000	684,000	499,210	997,642	1,135,000	5,205,852	52.06
20	Approach Road restoration at 9 vasahat	--	--	--	--	599,000	942,780	1,011,000	2,552,780	25.53
21	Community trening Centor & Maintenance work						6,022,000	2,051,000	8,073,000	80.73
	TOTAL	**24,063,638**	**20,785,119**	**15,541,000**	**20,949,883**	**12,889,964**	**21,051,941**	**18,537,489**	**133,819,034**	**1,338.19**

Annexure – 13

adani
Ports and Logistics

Compliance Report of CIA Study Environment Management Plan

S. No.	Identified environmental and social impacts for the fully developed scenario (year 2030)	Type of Impact & Magnitude1	Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.	Additional Risk Mitigation Measures/ESMP	Responsible agency	Timeframe for implementation	Compliance
1	**Land Use Change**						
1.1	It is predicted that the built up land in the rural areas would increase by an order 50% from the baseline 2015. New settlements near the SEZ area might create slums. Unorganized urban development leading to poor sanitation and proliferation	Level - 1	APSEZ has developed two townships (Shantivan and Samudra) presently accommodating 1668 households. Necessary permissions from concerned authorities were already obtained for the development of townships and Associated infrastructure facilities.	The existing townships will be expanded to accommodate about 4 lakh people when the APSEZ is fully developed.	APSEZ	As and when Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2045 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 96.87% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 71 nos. of industries (processing & non-processing) are present within the SEZ (54 nos. are in operation). Township facilities are also made by some of SEZ industries within Mundra town for their employees with basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities. The existing social infrastructure facilities are adequate for present development at APSEZ. The existing townships with associated facilities will be

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	of vectors and disease.						expanded as per requirement. APSEZ has also been granted permission for receiving domestic sewage @ 2.5 MLD from Mundra village (which was earlier discharged into open area within Mundra region) into wastewater treatment plant for treatment and disposal. APSEZ has already started receiving of domestic sewage from Mundra, which abates the poor sanitation and unhygienic condition within Mundra region. Total project cost for laying domestic sewage underground pipeline with other associated facilities from Mundra to APSEZ is 362 Lacs.
1.2	Once the project is fully developed, due to increase in built up land in the APSEZ area, there will be an increase in the storm water runoff from the facility.	Level-1	The study area experiences scanty rainfall less than 400 mm/year. Considering the natural gradient, ASPEZ have designed and implemented storm water	Technical feasibility study can be carried out to explore the possibility of developing storm water collection ponds to utilize maximum possible storm water runoff for dust suppression in the coal yard areas during non-rainy days.	APSEZ	Technical Study - one time, Implementation - Continual process	Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies, At present all existing coal yards are designed with drain, for collection of water during water sprinkling and rainfall, which is carried away to dump pond. Supernatant water from dump pond is being collected and used for dust suppression activities or after sedimentation, discharged to sea. Details of drain and dump pond has been submitted in along with EC compliance report (Oct 19 to March 20). Analysis of said water discharging into sea during monsoon season is being carried out (twice in a year during monsoon) through NABL / MoEF&CC accredited laboratory. Analysis report of the same shows there is

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			drains in the existing facility to meet the peak daily rainfall of 440 mm/hr. Hence flooding of water in the neighboring areas is not envisaged.				no any contamination. The report was submitted in the last compliance period Apr'22 to Sep'22. During compliance period FY 2022-23, total recorded rain fall was **1025 mm** observed, which was much less than the design capacity of existing storm water drainage system. So our existing storm water management facility is adequate to handle the storm water runoff from the area. Hence flooding of water in the neighboring areas is not envisaged.
			As per the directions given in the environmental clearance issued for the proposed Multi-Product SEZ and CRZ clearance for Desalination, sea water intake, outfall	The channel depth in all the natural streams shall be maintained to accommodate peak flood flow during the monsoon and periodical de-silting activities in the natural steams passing through the APSEZ area	APSEZ, District Administration* and Irrigation department	As and When Required	Presently there is no Desalination plant, sea water intake and outfall facility developed as part of EC & CRZ clearance of Multiproduct SEZ. The project will be designed and implemented as per requirement without disturbing the natural flow of rainwater in all the seasonal streams.

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			facility and pipeline project, the master plan of the project was designed and being implemented without disturbing the natural flow of rainwater in all the seasonal streams.				
1.3	Due to conservation and protection of mangroves in the designated conservation area, it has been predicted	Positive Impact with ecological benefits	In addition to conservation of the identified 1254 ha mangrove areas around Mundra port and SEZ, APSEZ has taken up large scale	APSEZ will continue mangrove afforestation as per the commitment made with concerned regulatory authority	APSEZ	Short Term	APSEZ has carried out mangrove afforestation in 3890 ha. area across the coast of Gujarat till date. Total expenditure for the same till date is INR 1070.8 lakh. No further mangrove afforestation is pending w.r.t. commitment made with concerned regulatory authority for APSEZ, Mundra project. As per study conducted by NCSCM, Chennai in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an

<table>
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<tr><td></td><td>that the current mangrove footprint area would marginally increase in next 15 years due to natural growth. This will enhance the overall biodiversity in the local coastal eco-system.</td><td></td><td>mangrove afforestation activities in an area of more than 2800 ha at various locations across the coast of Gujarat state in consultation with various organizations</td><td></td><td></td><td></td><td>overall growth of 246 ha. The cost for said study was INR 3.15 Cr.

Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between March 2017 (Total 2340) and September 2019 with an extent of 256 Ha (Total 2596 Ha Area) which is about 10.94% rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period.

Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019.

Analysis of data between categories indicated that there was an increase in dense mangroves along with the conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.

As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
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<tr><th>Sr. N</th><th>Recommendations</th><th>Compliance</th></tr>
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							No.		
							1.	Mangrove mapping and monitoring in and around APSEZ	• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island. • As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September 2019 to the extent of 256 Ha, which is about 10.7%. • This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that

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									there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ.
							2.	Tidal observation in creeks in and around APSEZ	• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves.

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									• The cost of the said activity was INR 1.0 Lacs.
							3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 2.35 Lacs during the FY 2022-23. The details of Removal of Algal and Prosopis growth from mangrove areas is attached as **Annexure –1** during the FY 2022-23.
							4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116

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							Cattels / 3008 farmers and hence enhancing cattle productivity during last FY 2022-23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 200.89 Lacs during FY 2022-23 which was incurred by APSEZ. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in 190-acre area and produce 3800 Fodder Tons Yield annually,

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									lead to save Approx Rs 52 Lacs of farmers. • **Grass Land development**: AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into Fodder Sustain village with Community participation and responsibility for maintain and Monitoring. • Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value More than 2250 Cattle will sustain with Improving quality and Quantity of Milk. • Other than this dedicated security guard with gate system deployed by APSEZ

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							across the coastal area and no unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The photographs of celebration were submitted in previous compliance period Apr'22 to Sep'22. • Refer CSR report attached as **Annexure – 2**. To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no

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							proper response from NCSCM side regarding resolution, the work order has been revoked. After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work is 23.60 Lacs (Including Taxes), which will be paid by APSEZ.. Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE,
1.4	Development activities along the coast might cause		Detailed hydro-dynamic modelling and	It is recommended to map the coastal morphology (Shoreline) at	APSEZ	Continual Process	Shore line change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study is as below.

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	certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		shoreline change prediction for a fully developed APSEZ facility has been studied. The study reveals that the erosion and accretion in the study area at the end of 15th year will be within the designated criteria of ± 0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would	least once in three years			To estimate the shoreline change due to the earlier approved waterfront development plan, a historical shoreline change assessment has been undertaken using the satellite imagery for a period of 2008 to 2018. In order to avoid any major errors in estimating the shoreline, the satellite data for similar tidal condition was considered for 2008, 2013 and 2018. AMBUR Methodology was used to study the historical analysis 10km radius stretch of shoreline on either side of the APSEZ project boundary has been considered for assessing the historical shoreline change scenario. The baseline shoreline change assessment depicts the influence of both natural causes and also possible changes in the shore due to various development activities in the study area during the designated period. For the purpose of this study, shoreline on left side of APSEZ is termed as West Side Shoreline and that of the right side as East Side Shoreline for ease of recognition. The maximum accretion and erosion rate of the west side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 4.78 m/yr and 1.93 m/yr respectively. The maximum accretion and erosion rate of the east side shoreline over a period of 10 years during the year 2008 – 2018 are observed to be 05 m/yr and 0.82 m/yr respectively.

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			pose insignificant impact on the Mundra shoreline.				APSEZ had also awarded work to the agency namely M/s. Gujarat Institute of Desert Ecology, Bhuj for carrying out Shoreline Change Assessment Study for Mundra region vide P.O. No. 4802013270 dated 30.03.2022. The cost of said study is INR 17.39 Lacs. Shore line change study was carried out by M/s. Gujarat Institute of Desert Ecology, Bhuj as a part of the Environmental Management Plan (EMP) compliance with the CIA study. In the present study, the rate of shoreline changes statistics on a time series of multiple shoreline positions of a totally 43 km coastline stretches (16 km on the west side and 27 km on the east side of Adani main port) on either side of Adani Ports and Special Economic Zone Ltd (APSEZL) has been taken into account for the calculation by using satellite images. As a part of the NGT direction, the shoreline change analysis has been carried out out for the years 2015-2022 to study the immediate changes after the commissioning of the port and initiation of the activities (September 2015) for short-term variation for the year 2015-2022 using EPR method has been carried out. The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are

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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>summarized in below table.
<table><tr><th rowspan="2">Period</th><th rowspan="2">Name of the block</th><th rowspan="2">Average Shoreline Change(M /Year)</th><th colspan="2">Shoreline Change(M)</th></tr><tr><th>Maximum Accretion</th><th>Maximum Erosion</th></tr><tr><td rowspan="2">2015-2022</td><td>West Port</td><td>-11.43</td><td>39.86</td><td>-78.68</td></tr><tr><td>Eastern side</td><td>-26.60</td><td>191.32</td><td>-165.19</td></tr></table>
The Shoreline Change Assessment Study report of GUIDE is attached as Annexure- 5.</td></tr>
<tr><td>2</td><td colspan="7">Regional Traffic Management Plan</td></tr>
<tr><td>2.1</td><td>The projected traffic data as per the EIA Report of Multi-Product Special Economic Zone, the peak vehicular traffic from the port and SEZ</td><td>Level-1</td><td>As per the master plan of APSEZ, eight artillery roads will be connected to either state highway or national highway for evacuating the goods from APSEZ. None of these roads</td><td>Additional road as per master plan will be built in future based on the overall progress of the project.
Currently about 25% of cargo from APSEZ is transported by Rail and the same will be enhanced to 40% when the facility</td><td>APSEZ</td><td>As and When Required</td><td>Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies,

Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has increased to ~34.28%, thereby reducing the usage of road.

Additional road facilities will be built as per master plan considering future development.

The facilities for transportation of cargo other than road will be enhanced considering future development, which will reduce the traffic volumes on the regional road Network.</td></tr>
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	operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively. There could be a possible increase in traffic congestions on village-highway intersections and road accidents.		are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500 PCU/hr.	is fully developed in future. This will further reduce the traffic volumes on the regional road network.			

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			Out of eight artillery roads considered in APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training Programs to all their contractors to enhance awareness on road safety.	APSEZ can undertake technical feasibility of implementing Intelligent Transport System (ITS) for the freight carriers associated with their development activities.	APSEZ & GSRDC*	Long Term	APSEZ is being imparting the regular in-house training awareness program in different mode i.e., classroom, on-job training, virtual platform & Assessment by internal & external trainer to all drivers and employees on below topics: ✓ ✓ Basic induction Training for drivers ✓ ITV Driver Training ✓ ITV Driver Induction for Supervisor ✓ Defensive Driving for LMV & HMV ✓ Defensive Driving & BBS ✓ Driver Assessment ✓ Road accident & rescue ✓ Traffic Management & Road Signage ✓ Driving safety training ✓ RORO Driver training ✓ Road Safety

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							✓ Defensive Driving & Emergency Action Plan ✓ Drivers Responsibilities & Safe driving ✓ Emergency Rescue (Vehicle) Training Approx. 9307 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period Oct'22 to Mar'22. The same will be continued in future also. APSEZ has also implemented the Remote traffic management system (RTMS) to manage the traffic movements and capturing the violations to further improve the system. Following steps were taken by APSEZ to reduce the accidents. ✓ Handling and escorting of the ODC for ensuring the smooth movement on the roads. ✓ Traffic Awareness programs for the drivers and regular briefing of the drivers in the parking areas. ✓ Incident handling and root cause analysis for taking necessary action in order to avoid such incidents. ✓ BAC checks for the drivers in order to identify the intoxicated drivers and necessary action is being taken against them. ✓ Water spray drive at gates are being conducted on regular basis during night hours to avoid doziness by the driver while driving.

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							✓ RTMS devices are being installed at 08 critical locations in order to capture speed violations and enforcing road safety regulations. ✓ Display of traffic signages and lane markings on road in coordination with the Civil team for ensuring road safety rules are being followed by the road users. ✓ We have approx. 100+ cameras which are being utilized for monitoring of traffic movement through CCTV and timely response in order to avoid any congestion and during traffic incidents. ✓ Regular traffic checks by Traffic Marshalls in order to ensure road safety rules (Wearing seat belt/Wearing helmet/Carrying driving license/Speed checks/Documents) is being followed by the drivers. ✓ Installation of Road furniture's (Cones/Water filled barriers/Cats eye/Spring Posts/Jersey Barriers) for lane segregation, Channelizing the traffic, at Junctions and indicating Caution for the road users.
3	**Water resources Management and sewage treatment & disposal Plan**						
3.1	For a fully developed APSEZ facility, water demand will be in the	No-Impact	APSEZ is meeting the current water demand through Narmada	As per the master plan and permissions granted under EC, APSEZ will be developing progressively	APSEZ	As and When Required	Presently there are two fresh water sources available with APSEZ. **Desalination Plant** – 47 MLD **Narmada water through GWIL** – 9 MLD (sanctioned capacity). Current water demand for APSEZ along with SEZ

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	order of 4,30,000 m3/day (430 MLD). APSEZ will be sourcing majority of the water from the captive desalination plants, which will be developed in progressive manner.		water supply scheme and 47 MLD captive desalination plant at site. Necessary water allocation from concerned authorities was obtained and the same will be renewed from time to time as per the directions of state government.	4,50,000 m3/day (450 MLD) of desalination plants to meet the future demand. Hence stress on regional water resources due to these developmental projects will be less significant.			industries including Adani Power Plant is an avg. of 23.86MLD. So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ including member units. The desalination plant of additional capacities will be installed on modular basis considering future requirement of APSEZ.
3.2	Existing water demand in the Mundra taluk is estimated	Level-2	Adani Foundation has been contributing to various watershed	Adani Foundation is planning to implement the various water resource	APSEZ and CGWB*	Long Term	Water needs of APSEZ is being met through existing Desalination Plant of APSEZ and GWIL which may be further enhanced on modular basis. At present Ground water is not utilized for any activities within APSEZ. However various works are being carried out by Adani

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	as 8500 m3/day (@55 lpcd) and the potable and sanitation water needs would increase to 37,000 m3/day (@125 lpcd) in future when the area is fully grown into larger municipality due to induced economic growth. Water demand of the local communities is met through		development projects in the Mundra region to enhance ground water resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.	conservation programs in next ten years under various schemes.			Foundation continuously under Water Conservation Work to achieve water security in Mundra region by Adani Foundation. Following works are carried out as a part of water conservation work since April – 2018. Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under

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	Narmada water supply system to some extent, but largely depending on the ground water in the study area. Mundra block is reported to be a safe ground block as on date. Due to influx of people and rapid urbanization due to the economic development, there could be						Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rain Water Harvesting 145 Nos. (40 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Bore well 208 Nos which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1506 Farmers benefitted in coordination with Gujrat Green Revolution Company till date • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • Pond Pipe line work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground

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	some stress on the ground water resources in future.						water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Adani foundation has spent approx. INR 7574.54 lakhs from April – 2018 to Mar– 2023 for CSR activities which also includes water conservation projects as mentioned above.
3.3	It is estimated that about 60,000 m3/day (60 MLD) of sewage will be generated from the APSEZ facility when the project is fully developed.	No Impact	Seven sewage treatment plants with an aggregate capacity of 3.1 MLD have already built at APSEZ. Treated sewage is utilized for greenbelt development and sewage is not discharged into either seasonal natural streams or	APSEZ is permitted to develop decentralized sewage treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized	APSEZ	As and When Required	Current installed capacity of wastewater treatment plants is 6.255 MLD (ETP, STPs & CETP) for treatment of effluent & sewage generated at various locations of APSEZ excluding wastewater treatment plants installed within induvial member units. Out of 54, only 4 operational industries within the SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming to CETP inlet norms for further treatment and final disposal. Other SEZ industries have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per specific permission granted by SPCB. APSEZ also granted permission to treat 2.5 MLD of sewage generated from Mundra village through CETP and STP. Presently avg. 2.13 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for

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			marine environment.	for greenbelt development.			horticulture purpose within APSEZ premises during Oct'22 to Mar'23. Existing wastewater treatment plants are adequate to treat and handle the total effluent / sewage load considering current development. Existing wastewater treatment facilities will be augmented, or new plants will be developed on modular basis considering future requirement.
4	**Air quality management Plan**						
4.1	Although all the regulated activities in the study area will be adopting promulgated emission norms, total air emission mass discharge from the study area would increase.	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate and have been operating the facilities as per the emission norms stipulated in respective consent	All existing and new industrial establishments will obtain requisite consents from GPCB and adhere to the stipulated emission norms regulations and guidelines issued by authorities from time to time.	APSEZ And Other Industries	Continual Process	APSEZ has been granted requisite permissions from the concerned authorities with stipulated norms for air emission (flue gas as well as ambient air). Ambient Air Quality monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi for APL as per NAAQ standards, 2009. Stack emission monitoring is also being carried out on regular basis. Reports of the same are being submitted to the concerned authorities on regular basis. Adani power plant has installed continuous emission and air quality monitoring instruments as per CPCB Directive and submitting the reports also. Another power plant of CGPL is outside APSEZ area. The AAQM summary for last six months (Oct'22 to

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>orders. APSEZ and other two power plants are monitoring the ambient air quality on regular intervals as per GPCB/CPCB guidelines and the data is analyzed and presented to GPCB on monthly basis. Both the thermal power plants located within the study area have installed continuous</td><td></td><td></td><td></td><td>Mar'23) are as below.

Locations: 16 Nos. (APSEZ – 13 + APL – 3 including 4 villages)
Frequency: Twice in a week
<table>
<tr><th>Parameter</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th><th>Perm. Limit[$]</th></tr>
<tr><td>PM_{10}</td><td>µg/m^3</td><td>41.79</td><td>89.86</td><td>75.53</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m^3</td><td>14.19</td><td>49.12</td><td>33.05</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m^3</td><td>8.80</td><td>36.63</td><td>22.40</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m^3</td><td>11.30</td><td>43.65</td><td>29.48</td><td>80</td></tr>
</table>
[$] as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Approx. INR 15.32 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2022-23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

Other industries located within the SEZ have obtained requisite permissions from the competent authorities for their respective plant and they also carried out environmental monitoring within their premises to comply with the permission granted. The same has been ensured by APSEZ as well as SPCB during their regular visits. APSEZ carries out regular</td></tr>
</table>

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			emission and air quality monitoring instruments as per CPCB directive.				visits/inspections of member industries within SEZ and last visit was conducted during February to March, 20223 for EMS & compliance verification. During compliance verification, it was verified that monitoring of air emission was well within the permissible standards based on analysis reports. Same will be continued in future also. The monitoring reports of industries within SEZ are also being submitted to the regulatory authorities as a part of half yearly Compliance report of EC for Multi-Product SEZ.
				A common air quality management committee may be framed under the guidance of the State Pollution Control Board and district administration to manage regional level emission inventory data that can help to manage regional	APSEZ and Other Industries, Stakeholders, District Administration and GPCB*	Long Term And Continual	APSEZ will co-operate and comply with the directions from concerned regulatory authorities for air quality management within APSEZ area. However, at present, APSEZ has formed Internal Environment Monitoring Committee, involving officials from APSEZ, Adani Power Limited and other SEZ member units with following role and responsibilities: • Identification of sources of air & noise emission and its dispersion in surrounding villages • Remedial measures to eliminate, control, reduce or capture air & noise emission • Identify available resource to abate the air and noise emission • Required additional resources for control of air and noise emission

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				level air quality management goals.			• Drinking water and its testing of all the available fresh water sources in surrounding villages • Identify any surrounding villages affected by organization's improper waste disposal mechanism. Last committee meeting was conducted on dated 11/04/2023 and below was the point of discussion for way forward. • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & proper cleaning of the common storm water drainage system. • Discussed about proper segregation & disposal of solid waste material. • Discussed about to increase more green belt area inside plant premises of SEZ units

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							APSEZ and all the industries within SEZ are complying to NAAQS and same is being ensured by APSEZ. The monitoring reports of industries within SEZ are being submitted to the regulatory authorities as part of half yearly Compliance report of EC for Multi-Product SEZ.
4.2	Release of particulate emissions from handling and storage of coal at the port and power plants would influence PM10 and PM2.5 concentration in the background air. This could pose some health impacts such as asthma and	Health Impact	APSEZ has been implementing the following management plan to control emissions as per the applicable regulations and similar practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water	All industries located in the APSEZ shall adhere to the emissions norms and minimum stack height guidelines issued by CPCB and consent to operate issued by Gujarat Pollution Control Board from time to time.	APSEZ and Other Industries	Continual Process	Following safeguard measures are taken by APSEZ for abatement of dust emissions. • Adequate stack heights to the Boilers, D.G. Sets, TFHs & HWGs for proper dispersion of pollutants within APSEZ • Using of liquid & Gaseous fuels instead of solid fuels in Boilers, Thermic fluid heaters and hot water generators. • Regular sprinkling on road and other open area • Regular cleaning of roads • Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts • Use of water mist canon • Closed type conveyor belts • Regular sprinkling on coal heaps • Covering other types of dry bulk cargo heaps • Installation of wind breaking wall • Development of greenbelt along the periphery of the storage yards/back up area • Mechanized handling system for coal and other dry bulk cargo • Wagon loading and truck loading through closed

<table>
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<tr><td></td><td>COPD etc. among the local communities.</td><td></td><td>sprinkling on road and other open areas, regular cleaning of roads, dry fog dust suppression systems (DSS) in hoppers, transfer towers and conveyor belts, use of water mist canon, covered conveyor belts, regular sprinkling on coal heaps,</td><td></td><td></td><td></td><td>silo

Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions are implemented within the thermal power plant.

The stack monitoring summary for last six months (Oct'22 to Mar'23) are as below.

Total Nos. of Stacks: 23 Nos.
Frequency: Monthly / Half Yearly
<table>
<tr><th>Parameter</th><th>Unit</th><th>GPCB Limit</th><th>Min</th><th>Max</th><th>Avrg.</th></tr>
<tr><td>PM</td><td>mg/ Nm^3</td><td>150</td><td>13.49</td><td>26.68</td><td>21.35</td></tr>
<tr><td>SO_2</td><td>Ppm</td><td>100</td><td>6.18</td><td>17.36</td><td>8.52</td></tr>
<tr><td>NO_x</td><td>ppm</td><td>50</td><td>15.24</td><td>28.58</td><td>21.93</td></tr>
</table>
Values recorded confirms to the stipulated standards.

Approx. INR 15.32 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2022-23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

All other industries located within SEZ are adhere to provide adequate stack height and pollution control measures for proper dispersion of pollutants as per respective permissions granted by the board. The same</td></tr>
</table>

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							is being inspected and ensured by APSEZ as well as SPCB officials on regular basis.
			covering of other types of dry bulk cargo heaps by protective materials, installation of wind breaking wall, development of greenbelt along the periphery of the storage yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and	An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively co-ordinate the approach to coal dust management and monitoring	APSEZ and Other Industries, Concerned Stake holders, District Administration*	Long Term	As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, with specific role and responsibilities as defined above. The dry cargo is being handled by mechanized system and transported by covered conveyer system, trucks and rail wagons. Wind breaking wall is provided around the coal storage yards of APSEZ as well as Adani Power Plant. Adequate air pollution control measures like ESPs, FGDs, Bag Filters, etc. and adequate stack heights provisions within the thermal power plant for proper dispersion of pollutants. Green belt / plantation is provided around the periphery of dry cargo storage area and regular water sprinkling is also being done to abate the dust emission from coal hips. Last committee meeting was conducted on dated 11/04/2023 and below were the point of discussion for way forward.

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			truck loading through closed silo. Both thermal power plants in the study area have installed electrostatic precipitators on the boilers and are meeting the emission norms as per the respective ECs granted. Due to installation of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due				• Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & proper cleaning of the common storm water drainage system. • Discussed about proper segregation & disposal of solid waste material. • Discussed about to increase more green belt area inside plant premises of SEZ units

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			to release of emissions from two power plants is insignificant.				
4.3	Ships are one of the significant sources of SO2 and NOX emissions in the study area. Marine diesel engines on the ships often utilize fuel oils that might contain higher sulphur content. As per the international best	Level-2	A Standard Operating Procedure (SOP) has be developed to be included as a part of APSEZ environment management plan to verify that all ships anchored at the port are adopting the MARPOL4 regulations.	The current global limit for Sulphur content of ships fuel oil is 3.5 % m/m (mass by mass). According to MARPOL, the new global cap on sulphur in the marine vessel fuels will be 0.50% m/m by the 1st January 2025. APSEZ should explore the possibility of providing shore power to the ships at the port	APSEZ and Ship Owners	Long Term	The ships coming to the APSEZ is complying with MARPOL and other shipping rules and regulations. APSEZ has already started providing shore power supply to the tugs (11 Nos.), dredgers (2 Nos.) and barges (1 No.). The feasibility of shore power will be explored and implemented on large scale for the visiting vessels to reduce idling stage ship emissions.

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	practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due to lower stack heights of the marine diesel engine, ship emissions often gets dispersed in the local environment and might pose risk of			to reduce idling stage ship emissions.			

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	fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
4.4	Road vehicle emissions will be other major contributors to the air pollution in the region when the facility is fully developed.	Level-2	Not Applicable	Due to implementation of Bharat VI fuels (MoEF&CC)6 in near future the vehicular and diesel engine emissions will be reduced by about 50% from the current national levels. APSEZ should develop a robust contractor environmental policy to ensure that Bharat	APSEZ and All Industries	Short Term	Presently, cargo evacuation through rail / conveyer / pipeline has increased to ~34.28 %, thereby reducing the usage of road. Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area. In future, APSEZ will also explore the feasibility of using Electric Vehicles for internal cargo movement. APSEZ, has procured 183 nos. of Electrical Vehicle for internal cargo movement and will increase more nos. of E-ITVs in phase wise as per business requirement. As well as procured 05 nos. LMV E-Vehicles for manpower movement and proceed for 10 nos. of more E-Vehicle procurement.

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				Stage VI emission norms are adopted by all their contractors and sub-contractors.			Electrification of Rail Corridor from Dhrub Railway Station to Adipur Railway Station is going on and approx. 85% work has completed & balance work will be completed at earliest. Electric Locomotive will help to reduce the gaseous emission and increase efficiency of transportation by rail.
5	**Noise emissions**						
5.1	Noise emissions are envisaged from port operations, industrial operations and power plants in the study area. Any increase in noise levels beyond three	Level-1	Due to adoption of various mechanized operations at the waterfront development, the noise emissions from the port cargo handling will be minimal. An adequate greenbelt is being developed by	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to demonstrate the compliance with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the	APSEZ	Continual Process	Below Safeguard measures are already taken for abatement of noise emissions. • Development of greenbelt along the periphery of the operational area. • D.G. Sets having Acoustic enclosures. • Maintenance of plant machineries and equipment's on regular frequency. Noise monitoring is being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi as per permission granted and reports are being submitted to the concerned authorities on regular basis. The noise monitoring summary for last six months (Oct'22 to Mar'23) are as below.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td>decibels from the background levels would be perceived as noise nuisance (USEPA)7.</td><td></td><td>APSEZ to further reduce any residual impacts due to noise emissions from the facility. Periodic noise level monitoring programs were adopted by APSEZ. Predicted noise levels were found to be well within the designated noise standards for Industrial facilities.</td><td>community grievances, when ever required. To assess the overall site wide compliance and also to address any community grievances related to noise issues due to operation of APSEZ facilities.</td><td></td><td></td><td>Locations: 13 Nos.
Frequency: Once in a month (24 hourly)
<table>
<tr><th>Noise</th><th>Unit</th><th>Leq Max</th><th>Leq Min</th><th>Leq Avr.</th><th>Leq Perm. Limit$</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>69.9</td><td>57.9</td><td>64.59</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>64.8</td><td>52.6</td><td>59.43</td><td>70</td></tr>
</table>
$ as per GPCB standards

Approx. INR 15.32 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2022-23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.

All the results are well within the standards. From this it can be inferred that there no impacts on the surrounding community.

All other industries located in the APSEZ are adhere to monitor and control the ambient noise level as per permission granted by SPCB and same is being confirmed by APSEZ as well as SPCB on regular basis.

Further, till date APSEZ has not received any grievances/notice for noise issues from any of the stakeholders.</td></tr>
</table>

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				In order to address the public grievances related to noise from the facility, an internal Noise Management Committee can be formed by APSEZ to investigate the root cause and to develop and implement noise mitigation plans in the specific zones.	APSEZ	Continual Process	As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited & other member units, having role and responsibilities as defined above. Last committee meeting was conducted on dated 11/04/2023 and below were the point of discussion for way forward. • Brief introduction about the Environment Management Plan (EMP) • All members conveyed his environment management practices, issue & suggestions • Discussed about the various ways to improve existing practice to control the emission in terms of Air, Water and Noise. • Discussed about the proper management of the canteen waste. • Discussed about the cleaning of outside of the SEZ units. • Discussed about the management of rain water & proper cleaning of the common storm water drainage system. • Discussed about proper segregation & disposal of solid waste material. • Discussed about to increase more green belt area inside plant premises of SEZ units

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							No grievance received for noise related issues, and it is observed that ambient noise level are well within the permissible standards.
6	**Surface water quality (Terrestrial and Marine)**						
6.1	In general, release of untreated wastewater from industrial facilities would pose threat to water quality of streams, estuaries and marine water bodies.	Level -1	As per the master plan of APSEZ, 67 MLD of wastewater is expected to be generated from the fully developed project scenario, for which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP	As per the master plan of APSEZ, the existing CETP shall be augmented to 67 MLD in progressive manner based on the future demand. The facility should limit the marine discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.	APSEZ	As and When Required	APSEZ has installed Common Effluent Treatment Plant (CETP) having 2.5 MLD capacities for treatment of partially treated effluent and sewage generated from industries within SEZ. Currently, CETP receives 914.24KLD (Avg.) hydraulic load and considering the current development scenario, existing CETP is adequate to treat and handle the total effluent load coming from industries within SEZ. Out of 54 only 4 industries within SEZ are sending their partially treated industrial as well as domestic effluent to the CETP confirming CETP inlet norms for further treatment and final disposal. Other industries within SEZ have their own STPs / ETPs for treatment of wastewater generated from their industrial operation and discharging the treated water on land for horticulture purpose within their premises as per permission granted by SPCB. The capacities of CETP will be enhanced on modular basis as per future requirement.

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			capacity of 2.5 MLD is in place. Presently member units treat their effluents to meet the CETP inlet norms and then send it to CETP. Treated wastewater from CETP meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				Presently avg. 2.13 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period Oct'22 to Mar'23 and no discharge is made to any other source.
			Online wastewater quality	Efforts shall be made to recycle complete treated	APSEZ	Based on outcome Techno-feasibility Study	Online continuous effluent monitoring system (CEQMS) installed at the discharge point of CETP to track any deviation from discharge norms. CEQMS is

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			monitoring systems are installed at CETP to ensure quality of treated effluent meets the requisite discharge norms. No wastewater from CETP is discharged into natural bodies as on date..	wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility study.			connected with CPCB/GPCB server & data is continuous transferring in both servers. Presently entire quantity of treated water from CETP is used for gardening / horticulture purpose within APSEZ premises.
			Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond)	Storm water runoff from the facility during the first rain shall be sampled and analyzed for the presence of heavy metals or other criteria pollutants to	APSEZ	Continual	There are provision of drains around coal stack yard to carry to runoff water to dump ponds. This water is either used for dust suppression or after sedimentation (to remove residual dust), is allowed disposal to sea. Presently Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi for APSEZ & APL both. The analysis reports of the same are being submitted to the

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>to remove any residual dust particulates for further disposal into sea</td><td>adopt corrective and preventive actions to protect the marine water quality.
All red and hazard category industry within APSEZ shall adopt spill prevention and control program and no effluents shall be discharged into storm water-drains.</td><td></td><td></td><td>concerned authorities on regular basis.

The marine water quality monitoring summary for last six months (Oct'22 to Mar'23) is as per below.

Locations: 14 Nos. (APSEZ – 9 + APL – 5)
Frequency: Once in a Month / Half Yearly
<table>
<tr><th rowspan="2">TEST PARAMETERS</th><th rowspan="2">UNIT</th><th colspan="3">Cumulative Surface</th><th colspan="3">Cumulative Bottom</th></tr>
<tr><th>Min</th><th>Max</th><th>Average</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH</td><td>--</td><td>7.68</td><td>8.14</td><td>7.99</td><td>7.92</td><td>8.28</td><td>8.12</td></tr>
<tr><td>BOD</td><td>mg/L</td><td>BDL(MDL:1.0)</td><td>4.2</td><td>3.66</td><td>2.4</td><td>3.9</td><td>3.21</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>62</td><td>148</td><td>98.44</td><td>54</td><td>162</td><td>101.07</td></tr>
<tr><td>DO</td><td>mg/L</td><td>4.1</td><td>6.22</td><td>5.31</td><td>4.6</td><td>6.32</td><td>5.52</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>35.56</td><td>37.9</td><td>36.88</td><td>35.02</td><td>37.6</td><td>36.28</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35108</td><td>3721</td><td>35914</td><td>35614</td><td>3784</td><td>36437</td></tr>
<tr><td>Temperature</td><td>oC</td><td>28</td><td>30.2</td><td>29.04</td><td>28.2</td><td>30.3</td><td>29.3</td></tr>
</table>
BDL – Below Detection Limit
MDL – Minimum Detection Limit

Approx. INR 15.32 Lakhs is spent by APSEZ for</td></tr>
</table>

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							environmental monitoring activities during the FY 2022-23, which also includes ambient air quality monitoring for overall APSEZ, Mundra.
			Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices, sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As part of	Good dredging practices shall be adopted by APSEZ: (i).Improving the dredging accuracy (ii).Improving onboard automation and monitoring, (iii). Reduce spill and loss, (iv). evaluating the need for installing silt screens near mangrove areas during the dredging phase operations, (v). Environment friendly dredging activities can be undertaken in such a way that	APSEZ	Long Term	No capital dredging has been done, since Apr 2015. Dredged material generated during maintenance dredging is being disposed at designated locations within deep sea as identified by NIO. Dredging Management plan is adopted for carrying out dredging and management of dredge material. Presently there are 3 nos. (2 Nos. Cutter suction + 1 No. Trailer suction) of dredgers are in operation for dredging. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. The analysis reports of the same are being submitted to the concerned authorities on regular basis. Summary of marine water for the last six months is as mentioned above. The same practice will be continued in future also as per direction by MoEF&CC as well as GPCB. Monitoring will be focused near ecological sensitive area in case of need to carryout capital dragging near such areas.

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			the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly basis.	the overall turbidity levels near the mangrove and ecologically sensitive zones shall not exceed 100 NTU or 200 mg/l of TSS (10% lethal level of fish) Existing marine monitoring program shall be continued as per the directions of MoEF&CC and GPCB.			
7	**Groundwater quality and salinity ingress**						
7.1	While Mundra block is enjoying safe ground water status as on date (based on the data	Level-2	APSEZ is not utilizing ground water for any type of use. APSEZ is meeting the current water	A dedicated desalination plant of capacity 4,50,000 m3/day (450 MLD) will be developed in progressive manner to meet the APSEZ	APSEZ	As and When Required	Present source of water for various project activities is desalination plant of APSEZ and/or through Gujarat Water Infrastructure Limited (GWIL) and same is sufficient to meet the present water demand. APSEZ does not draw any ground water. The desalination plant of additional capacities will be installed on modular basis considering future

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	published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra region. This might increase the TDS and chloride levels in the ground water in future.		demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	requirements.			development and requirement.
7.2	Due to induced growth in	Level-2	Ground water is not drawn by	The Govt. of Gujarat, Narmada, Water	District Administratio	Long Term	APSEZ will co-operate and comply with the directions from concerned regulatory authorities.

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	the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.		APSEZ for its operations. Natural streams (seasonal rivers) passing through the APSEZ area will not be disturbed, the micro-watershed in the area will not be disturbed. Due to the above reasons, the possibility of salinity ingress due to APSEZ development is not envisaged. Mundra and Anjar blocks	Resources, Water Supply & Kalpsar Dept.,(WRD)12 has been implementing various salinity ingress prevention projects	n*		APSEZ does not draw any ground water for the fresh water requirement. However, Adani Foundation – CSR arm of Adani Group has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Water conservation Projects i.e. Roof Top Rain Water Harvesting, Desilting of Check dams, Bore Well Recharge and Pond deepening were taken up in past years, review and monitoring of all water harvesting structures had been taken up. To make connections between human actions and the level of biological diversity found within a habitat and/or ecosystem, this year Adani Foundation launch project "Sanrakshan" in coordination with GUIDE and Sahjeevan. Since, 10 years considerable Water Conservation Work carried out in Mundra Taluka. Due to satisfactory rain in current year 1.11 mtr ground water table increased as per increased in coastal belt of Mundra as per Government Figures. **Our water conservation work is as below.** • Large number of water harvesting structure (18 Nos. of check dams in coordination with salinity department) and Augmentation of 3 check dams

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			fall under fresh water to medium salinity zones. It can be observed that little variation was observed in the ground water salinity levels from year 2013 to 2016 across the Mundra and Anjar blocks. This aspect confirms that the overall salinity ingress from the shore into the land due to existing APSEZ				• Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers • New Pond Deepening Under Ajadi ka Amrut Mahotsav done in Goyarsama village Approx Deepening Capacity is 12000 Cum. • Roof Top Rain Water Harvesting 145 Nos. (40 Nos current year) which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Bore well 208 Nos which is best ever option to direct recharge the soil. • Drip Irrigation approx. 1506 Farmers benefitted in coordination with Gujrat Green Revolution Company till date • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year.Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • .

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			facilities and power plant outfalls are less significant.				With the objective of to preserve the rainwater to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water. Narmada Water Resources, Water Supply & Kalpsar Dept., (WRD)1 has been implementing various salinity ingress prevention projects. Under Sardar Sarovar canal project, Govt. of Gujarat has proposed to implement about 8200 Km stretch of water canal and the project is at various stages of implementation. Under this project about 112,000 ha of land in about 180 villages will be benefitted with irrigation needs. This will significantly reduce the pressure on the ground water resources in the region.
				While the individual industries in the study area will continue to undertake ground water quality	All Concerned Stakeholders, District Administration and CGWB*	Continual Process	APSEZ (9 Locations – half yearly) & Adani Power Ltd. (5 Locations – quarterly) is carrying out ground water sampling and reports of the same are being submitted to the regulatory authorities on regular basis. The summary of APSEZ ground water quality monitoring for last six months (Oct'22 to Mar'23) are as below.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td>monitoring as per the environmental clearances issued for the respective projects, a regional level ground water conservation action committee can be formed under the guidance of state ground water board and district Administration.</td><td></td><td></td><td>Nos. of Location: 09
<table>
<tr><th>Parameters</th><th>Unit</th><th>Min</th><th>Max</th><th>Average</th></tr>
<tr><td>pH @ 25 ° C</td><td>--</td><td>7.06</td><td>8.44</td><td>7.78</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>0.79</td><td>21.38</td><td>6.12</td></tr>
<tr><td>Oil & Grease</td><td>mg/L</td><td>BDL(MDL: 2.0)</td><td>BDL(MDL:2.0)</td><td>BDL(MDL:2.0)</td></tr>
<tr><td>Hydrocarbon</td><td>mg/L</td><td>Not Detected</td><td>Not Detected</td><td>Not Detected</td></tr>
<tr><td>Lead as Pb</td><td>mg/L</td><td>0.03</td><td>0.07</td><td>0.05</td></tr>
<tr><td>Arsenic as As</td><td>mg/L</td><td>BDL(MDL: 0.01)</td><td>BDL(MDL:0.01)</td><td>BDL(MDL:0.01)</td></tr>
<tr><td>Nickel as Ni</td><td>mg/L</td><td>0.04</td><td>0.37</td><td>0.13</td></tr>
<tr><td>Total Chromium as Cr</td><td>mg/L</td><td>0.01</td><td>0.06</td><td>0.04</td></tr>
<tr><td>Cadmium as Cd</td><td>mg/L</td><td>0.05</td><td>0.19</td><td>0.11</td></tr>
<tr><td>Mercury as Hg</td><td>mg/L</td><td>BDL(MDL: 0.001)</td><td>BDL(MDL:0.001)</td><td>BDL(MDL:0.001)</td></tr>
<tr><td>Zinc as Zn</td><td>mg/L</td><td>0.12</td><td>0.27</td><td>0.18</td></tr>
<tr><td>Copper as Cu</td><td>mg/L</td><td>0.07</td><td>0.07</td><td>0.07</td></tr>
<tr><td>Iron as Fe</td><td>mg/L</td><td>0.12</td><td>1.12</td><td>0.64</td></tr>
<tr><td>Insecticides/Pesticides</td><td>µg/L</td><td>Absent</td><td>Absent</td><td>Absent</td></tr>
<tr><td>Depth of Water Level from Ground Level</td><td>meter</td><td>1.90</td><td>2.30</td><td>2.11</td></tr>
</table>
BDL – Below Detection Limit
MDL – Minimum Detection Limit</td></tr>
</table>

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							Approx. INR 15.32 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2022-23, which also includes ambient air quality monitoring for overall APSEZ, Mundra. The freshwater requirement of all the industries within SEZ is being satisfied through APSEZ. All the industries are encouraged to monitor ground water quality as per the permissions granted by competent authorities. As mentioned above, presently, APSEZ has formed Internal Environment Monitoring Committee, involving Officials of APSEZ, Adani Power Limited and other member units, having role and responsibilities as defined above. APSEZ will co-operate and comply with the directions from concerned regulatory authorities for ground water management.
8	**Waste Management**						
8.1	Solid waste will be generated from industrial activities of APSEZ and other	Level-2	APSEZ has been adopting Zero waste Initiatives and the entire waste generated	APSEZ will continue to adopt Zero Waste Initiative and wastes will be segregated at source and disposed to	APSEZ	Continual Process	Presently APSEZ has implemented Zero waste Initiatives as per 5R (Reduce, Reuse, Recycle, Recover & Reprocess) principles of waste management. At present, APSEZ has developed material recovery facility for 6.0 TPD capacities. A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost manufacturing and/or biogas

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	permitted facilities in the study area including Mundra town. These wastes would contain recyclable material, construction debris, organic waste, inert material and e-waste etc. In the absence of any organized source segregation programs and material recycling strategies		from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	various recycling vendors, co-processing in cement plants. This initiative helps not only to reduce the waste to landfill significantly, but also to recycle the materials there by avoiding ecological impacts.			generation for cooking purpose. The compost is further used by in house horticulture team for greenbelt development. Whereas dry recyclable waste is being sorted in various categories. Presently manual sorting is being done for sorting of different types of solid waste. Segregated recyclable materials such as Paper, Plastic, Cardboard, PET Bottles, Glass etc. are then sent to respective recycling units, whereas remaining non-recyclable waste is bailed and sent to cement plants for Co-processing as RDF (Refused Derived Fuel). The same practice will be continued in future also. APSEZ has also been recognized for Zero Waste to Landfill certification from reputed organization. APSEZ, Mundra is certified for Zero Waste to Landfill management system (ZWTL MS 2020) by TUVRheinland India Pvt. Ltd. (valid up to 31.05.2024). Details of the same were submitted as part of compliance report submission for the duration of Apr'21 to Sep'21. APSEZ is being done proper solid waste management in his operational area with 5R principale as per Waste Management Plan.

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	and infrastructure facilities, these wastes will enter into environment and would pose long term health impacts.						
8.2	Considering an average solid waste generation of 0.25 Kg/person/day, the estimated solid waste from facilities within APSEZ will be in the order of 100	Level-2	APSEZ has made a provision for central waste management facilities within the existing site based on the future needs. As part of the Zero Waste Initiatives, no landfill facilities will	The existing waste segregation and material recycling facilities will be augmented to dispose safely the wastes generated from APSEZ areas. Solid Waste Management Program shall be adopted and implemented as per Municipal	APSEZ	Continual Process	Industries located within the SEZ area are also complying with the waste management rules stipulated by statutory authorities and same is also being confirmed by APSEZ as well SPCB on regular basis.

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	TPD (36,500 TPA).		be installed at APSEZ.	Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016			
8.3	About 35 TPD (13,000 TPA) of solid waste would be generated from the proposed industrial areas located outside the APSEZ area.	Level-2	As per the MSW Rules 2016 all the industrial facilities and SEZs are required to adopt waste segregation facilities at the respective properties and non-recyclable waste shall be disposed to landfill sites.	Solid Waste Management Program shall be adopted and implemented as per Municipal Solid Waste Management Rules 2016 and Construction Waste Management Rules 2016	All Industries	Continual Process	

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9	**Ecological aspects (terrestrial and marine)**						
9.1	About 1576 ha of shrub forest land contiguous to APSEZ area is applied for land diversion for various developmental activities. This might have certain level of changes in the biodiversity in the study area.	Level -1	It is noted that the designated forest land is free from any native vegetation and comprises of Prosopis juliflora. It is also noted that no endangered species are present at the shrub forests that are applied for land diversion. It is also noted that	APSEZ has approached concerned authorities for diversion of designated forest land. Suitable compensatory afforestation plan shall be adopted based on the recommendations and directions of the concerned authorities. Due to adoption of compensatory afforestation program through a scientific manner, the overall ecological footprint in the district will be increased.	APSEZ/State Forest Department*	Long Term	ToR accorded by MoEF&CC on 30.11.2021 Additional studies as a part of ToR compliance completed by GUIDE and final report received. Draft EIA is being prepared by NABET Accredited consultant L&T Infrastructure PVT LTD. Draft CRZ maps received from NCESS, Kerala and the same is under review.

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			no forest produce is reported from this designated forest land parcel due to lack of economic importance of plant species reported in the shrub forest. It is also noted that no tribal lands are located in the designated forest land parcel. Hence there will not be any change in	Due to plantation of native tree species as part of greenbelt development, the overall biodiversity of the region will increase considerably when the project is fully developed.			

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			biodiversity due to the proposed diversion.				
9.2	Mangrove conservation areas are located adjacent to the APSEZ area. Accidental discharges of industrial effluents into the marine environment would pose certain ecological risk.	Level -1	No development activities will be undertaken within mangrove conservation areas. APSEZ has taken up large scale mangrove afforestation activities in an area of more than 2800 ha at various locations across the coast of Gujarat state in	Mangrove footprint and health status shall be monitored annually	APSEZ	Continual Process	As per study conducted by NCSCM in 2017, mangrove cover in and around APSEZ, Mundra has increased from 2094 Ha to 2340 ha (as compared between 2011 to 2017). The analysis has shown an overall growth of 246 ha. The cost for said study was INR 3.15 Cr. Recently study was carried out in the year 2019 and based on that there is an increase of mangrove cover between **March 2017 (Total 2340) and September 2019** with an extent of **256 Ha (Total 2596 Ha Area)** which is about **10.94%** rise in growth rate, also It reveals that the mangrove and the tidal system in the creeks remained undisturbed over this period. Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is **502 Ha** between 2011 and 2019. Analysis of data between categories indicated that there was an **increase in dense mangroves** along with the conversion of scattered into sparse, that shows the growth of mangroves in a progressive direction.

<table>
<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td>consultation with various organizations
The Adani Foundation introduced 'Mangrove Nursery Development and Plantation' scheme in the area as an alternative income generating activity for the people of the region.</td><td></td><td></td><td></td><td>As a part of GCZMA recommendations and NCSCM mangrove conservation action plan, APSEZ has undertaken following activities.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
<tr><td>1.</td><td>Mangrove mapping and monitoring in and around APSEZ</td><td>• APSEZ entrusted NCSCM, Chennai to carry out Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island.
• As a part of this study, overall growth of mangroves in the creeks in and around APSEZ was assessed comparing Google earth images of 2017 & 2019 and it is observed that there was increase in mangrove cover between March 2017 and September</td></tr>
</table></td></tr>
</table>

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							2019 to the extent of 256 Ha, which is about 10.7%. • This suggests that the mangroves and the tidal system in the creeks remain undisturbed over this period. Analysis of data between categories indicated that there was an increase in dense mangroves and also conversion of scattered to sparse which also shows that the growth of mangroves in a progressive direction. • Hence, there is an overall growth of mangroves in creeks in and around APSEZ, Mundra is 502 Ha between 2011 and 2019. • The cost of the said study was INR 23.56 Lacs incurred by APSEZ.

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							2.	Tidal observation in creeks in and around APSEZ	• APSEZ carried out the tidal observations at locations similar to 2017 in Kotdi, Baradimata, Navinal, Bocha and Khari creeks under the guidance of NCSCM. • The observed tidal ranges indicate that the creeks experience normal tidal ranges, adequate for the growth of mangroves. • The cost of the said activity was INR 1.0 Lacs.
							3.	Removal of Algal and Prosopis growth from mangrove areas	• Algal and Prosopis growth monitoring was done in and around mangrove area and algal encrustation was found in some of the mangrove areas, which has been removed manually. • The cost of the said activity was INR 2.35 Lacs during the FY 2022-23. The details of algal &

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									prosopis removal is attached as **Annexure – 1.**
							4.	Awareness of mangroves importance in surrounding communities	• Adani Foundation – CSR Arm of Adani group has done awareness camps/activities created in the community regarding importance of mangroves. • Adani Foundation provides good Quality dry and green fodder to 24 Villages. Project is covering total 14116 Cattels / 3008 farmers and hence enhancing cattle productivity during last FY 2022-23. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 200.89 Lacs

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							during FY 2022-23 which was incurred by APSEZ. • **Individual Fodder Cultivation:** Farmers were Aware, Convince and trained to cultivate super Napier Grass as on farm projects to reduce their Fodder Dependency and expense. With that effort 192 farmers have Adopted and Cultivated Super NAPIER Grass in 190-acre area and produce 3800 Fodder Tons Yield annually, lead to save Approx Rs 52 Lacs of farmers. • **Grass Land development**: AF converted 205 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara and siracha village to transform into

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							Fodder Sustain village with Community participation and responsibility for maintain and Monitoring. • Among that 18 Acre of Guchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value More than 2250 Cattle will sustain with Improving quality and Quantity Of Milk.. • Other than this dedicated security guard with gate system deployed by APSEZ across the coastal area and no any unauthorized persons allowed within coastal as well as mangrove areas. • APSEZ has celebrated the International Day for the Conservation of the

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							Mangrove Ecosystem on July 26th to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The photographs of celebration were submitted in previous compliance period Apr'22 to Sep'22. • Refer CSR report attached as **Annexure – 2**. To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, APSEZ earlier awarded work order to NCSCM, Chennai vide order no. 4802018994, dated 29/07/2022 with cost 23.77 Lacs for mangrove mapping in and around APSEZ, but due to some financial disputes and no proper response from NCSCM side regarding resolution, the work order has been revoked. After that as suggested by Joint Review Committee in its report that mangrove related studies may be undertaken by different agencies on a rotation basis

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							for a better review of the mangroves, APSEZ issued work order to the Gujarat Institute of Desert Ecology (GUIDE), Bhuj vide order no. 4802027981, dated 10/04/2023 for mangrove mapping in and around APSEZ, Mundra. The cost of said work is 23.60 Lacs (Including Taxes), which will be paid by APSEZ. Other than this Adani Foundation – CSR Arm of Adani Group at Mundra-Kutch has initiated multi-species plantation of mangroves in Luni village in association with GUIDE, Gujarat. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha area coastal stretches have been planted with species. During current FY 2022-23, 04 Hector plantation has been planted with various species. Total 20 Ha. multi-species mangrove plantation has been carried out till March-23 association with M/s. GUIDE, Mangrove plantation done at Luni sea coast with fisher folk community during World Environment Day Celebration. Web talk show was organized on the occasion of "World Mangrove days On Multi species Mangrove bio diversity with Joint effort of GUIDE and Adani Foundation, Mundra. 8th June is celebrated as world ocean day. Adani foundation had celebrated the world ocean day by coastal cleaning activity at Juna Bandar, Luni Bandar and Bavadi Bandar.

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<tr><th>S. No.</th><th>Identified environmental and social impacts for the fully developed scenario (year 2030)</th><th>Type of Impact & Magnitude1</th><th>Environment management plans adopted or being adopted by APSEZ as per permits, clearances, applicable regulations and guidelines etc.</th><th>Additional Risk Mitigation Measures/ESMP</th><th>Responsible agency</th><th>Timeframe for implementation</th><th>Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Mangroves nursery is developed in a Khari creek behind IOCL & 125000 Nos. of new saplings were planted in creek area by APSEZ.</td></tr>
<tr><td>9.3</td><td>Outfall from the thermal power plants desalination and CETP would pose certain level of impact on the marine environment.</td><td>Level-1</td><td>A detailed marine hydro-dynamic and dispersion modelling of the study area indicates that the background temperature and salinity at mangrove conservation area will not increase from the prevailing background levels as the outfalls are located far away. APSEZ and</td><td>All approved marine outfalls shall be monitored for salinity, temperature and other designated parameters as per consent to establish issued by GPCB. Existing marine environmental monitoring program shall be continued.</td><td>APSEZ and Concerned Industry</td><td>Continual Process</td><td>Presently marine monitoring is being carried out by the Adani power plant at the marine outfall locations and reports are being submitted to the concerned authorities on regular basis.

APSEZ is carrying out Marine monitoring once in a month at 9 locations in deep sea by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. The analysis reports of the same are being submitted to the concerned authorities on regular basis.

Adani power plant is also doing marine water quality at 5 locations (2 locations at outfall location) in deep sea by NABL and MoEF&CC accredited agency namely M/s. Unistar Environment & Research Labs Pvt. Ltd. The analysis reports of the same are being submitted to the concerned authorities on regular basis. The summary of marine water quality is shown above.

The comparison of marine water results between CIA and current monitoring data are as below.
<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Max</th><th colspan="2">Min</th></tr>
<tr><th>CIA</th><th>Present</th><th>CIA</th><th>Present</th></tr>
<tr><td>Temp.</td><td>^{0}C</td><td>30.2</td><td>30</td><td>28</td><td>29</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>41.8</td><td>36.6</td><td>34.9</td><td>35.2</td></tr>
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			respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated environmental and ecological parameters.				As per above results, it can be seen that there is no major deviation in the concentration of parameters and thus indicates that impacts are insignificant.
9.4	**Terrestrial Ecology:** Study area doesn't have any notified national parks or ecological sanctuaries. Since the	Level-1	APSEZ has developed greenbelt in an area of 550ha as against the committed area of 430ha. A dedicatenursery is set up to promote	The compensatory afforestation area to be monitored annually to check the survival rate of the plantation.	APSEZ	Continual Process	APSEZ has developed its own "Dept. of Horticulture" which is taking measures/ steps for terrestrial plantation/greenbelt development. APSEZ, Individual SEZ Industries and Adani Power Plant has developed approx. 700 Ha. area as greenbelt within the APSEZ area including SEZ industries & Adani Power Plant. Dedicated horticulture department is maintaining and monitoring the terrestrial green belt development on regular basis to check the survival rate of plantation. Total expenditures of the horticulture dept. of APSEZ

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	area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in the area is very small.		plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.				during the FY 2022-23 within APSEZ is INR 956 lakhs.
10	**Socio-economic aspects**						
10.1	Population growth in the Mundra region was reported to be in the order of 85% during the past decade (2001-2011). Further expansion of the urban	Level-1	Dedicated townships are developed within APSEZ area with necessary community infrastructures such as hospital, school, recreational facilities,	The existing townships will be expanded to accommodate about 4lakh people when the project activity is fully developed.	APSEZ	As and When Required	APSEZ has developed two townships (Shantivan and Samudra) accommodating 2045 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 96.87% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 54 nos. of industries (processing & non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within

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	area could be possible due to induced economic growth in the region. Increase in population will have a additional need for public infrastructure in the region.		sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the principal themes such as education, community health, sustainable livelihood and rural infrastructure. About Rs. 97 Cr has been spent on various CSR activities in the Mundra region since 2010. Similar community				Mundra town for their employees having basic infrastructure facilities and requirements. Most of the employees working in SEZ industries are residing in Mundra township having all basic requirements and associated facilities. The existing social infrastructure facilities are adequate to accommodate the people considering present APSEZ development. The existing townships with associated facilities will be expanded as per requirement. Other infrastructure facilities have been developed for people are as follows. • Multi-Specialty Hospital • School • Commercial complex • Religious place APSEZ is actively working with local community (including fishermen community) around the project area and provides required support for their livelihood and other concerns through the CSR arm – Adani Foundation in the main five persuasions is mentioned below. • Community Health • Sustainability Livelihood – Fisher Folk • Education • Rural Infrastructures

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			development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				Adani foundation has spent approx. INR 7574.54 lakhs from April – 2018 to March – 2023 for CSR activities which also includes cost of rural infrastructure projects. Major works carried out since April 2018 as a part of CSR activities are as below. **<u>Current FY 2022-23 infrastructure development activities:</u>** • 40 RRWHS structure have been completed • 208 Bore-well recharging activity is completed. • Percolation well Recharging work at Bhadiya & Mota Kandgra village. • Sluice gate Construction to Control Flood during Flooding at Khoydivadi Vistar Bhujpur. • Pond Beatification and Bund Strengthening at Bhujpur village. • Check dam gate valve construction at Bhujpur which controlled more than 350 MCFT water to go into sea and get recharged current year. • commissioning of Community Training Centre at Shekhadiya. • Two Pond Deepening at Zarpara under Amrut Sarovar Yojna. • Ground recharge activities (pond deepening work for 61 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan.

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							• Pond Pipeline work at Prasla Vistar Zarpara which increase recharge capacity more than 25% in 100 hector area. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • 3 Re-strengthening of Approach Road. • Renovate Blood storage Lab CHC Mundra Renovation Blood storage Lab CHC Mundra. • Constructed 2 nos. of CC Road of 700 mtr. • Constructed Community Training center Shekadiya. • Constructed 2 nos. Disable Widow Toilet Block • Installed R.O. Plant at Mokha with capacity 1000ltr /HR. • Constructed 4 nos. Common gathering Open Shed • Constructed 03 nos. of Water Tank at Luni Bandar. • Developed of Cricket Ground at Hatdi Village • Pond Deepening work at Vadala & Mota Bhadiya • Artificial recharge borewell in Borana, Mangara & Dhrub village. • Under Dignity of Drivers Project, Adani Foundation has constructed Resting Shed for Drivers entering in SEZ Premises. Total 50 beds are constructed, drinking water and sanitation plus recreational – TV Facilities. **Past years infrastructure development activities:**

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							• Construction of 45 Toilet block and proper bathing place for labours. • RO Plant – Samaghogha, Siracha village & Vallabh Vidyalaya at Mundra • Basic sanitation facility (18 Nos) at Balvadi, medical centre and retiring places at labour settlements • Ground recharge activities (pond deepening work for more than 56 ponds) individually and 26 ponds under Sujlam Suflam Jal Abhiyan were built leading to a significant increase in water table and higher returns to the farmers. • Roof Top Rainwater Harvesting 145 Nos which is having 10,000 litre storage which is sufficient for one year drinking water purpose for 5 people family. • Recharge Borewell 201 Nos which is best option to • Drip Irrigation 1158 Farmers (180 formers are supported with 15% of amount of total cost for maximum 4.0 lac. during FY 2021-22) • Participatory Ground Water Management in ten villages with holistic approach for Kankavati Sandstone Aquifer Programme. • Bund construction on way of Nagmati River could save more than 575 MCFT water quantity which recharged in ground due to which bore well depth

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							decreased by 50-100 Ft in Zarpara, Bhujpur and Navinal Vadi Vistar. • Development of Prisha Park at Mundra. • Pond Bund strengthening at Zarpara Village • Approach Road Restoration at all Fisher folk vasahat. • Garden Development at Primary School Rampar village • Shed Development at Shukhpurvah Mundra • Under Gram Utthan Project, Adani Foundation is supporting home biogas to farmers to Uthhan Villages phase wise. till the date supported 225 home biogas in Dhrub, Zarpara and Navinal Villages. • Adani Foundation at Mundra-Kachchh has initiated multi-species plantation of mangroves in Kachchh in association with GUIDE. During 2018-2019 (Phase-I) multi-species mangrove plantation was carried out in 10 ha, during Phase-II (2019-2020) it was 02 ha and during Phase III (2020-2021) it is 01 ha. During FY 2021-22, 03 ha with M/s. GUIDE, Gujarat. Current year 4 Hector plantation is in progress which will be resulted in 20 Hector. • Sea Weed Culture - A pilot cultivation facility (5 KL tanks in 6 nos) for the farming of different economically important seaweeds in the tanks on the onshore has been established and commenced the cultivation trials with red sea weeds

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							Kappaphycus alvarezii, Gracilaria dura and green sea weed Ulva. The initial trials have given very promising results and harvested 6-7 times the seeded material in a 40-45 days cultivation period. • Development Approach Road Prasala vadi vistar Gogan Pachim at Zarpara. • Earthen bund Repairing work at Pond, Luni. • Pre-monsoon activity Approach repairing, Village Pond Lake strengthen, and river cleaning (babul cutting) work is ongoing in Various Villages • Approach Road repairing at Various Fishermen Vasahat (ARC). Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.
10.2	The overall sex ratio was found to reduce by 28% in the Mundra taluk (study area) during the period 2001 - 2011. This could be attributed to increase in	Level-2	Adani foundation is taking up several girl child education programs as part of CSR activities to create awareness	Suitable regional level awareness programs on the girl child protection and encouragement programs in line with state and national policies shall be adopted under Corporate Social Responsibility	APSEZ, Other development projects and District Administration*	Long Term	Major works carried out since April 2018 as a part of CSR activities to create awareness about girl child protection are as below. • The Adani Foundation provided scholarship support to motivation and encouragement of fishermen boys and girls for higher education under this program. APSEZ provide 100% fees support to girls as a scholarship. • Under Projects Uthhan More than 9106 Students are Getting benefit Of Education through 51 Government school Of Mundra Block.

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	influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced economic growth in the region.		about girl child protection.	programs in association with district authorities.			• Uthhan Project promotes girl child education, creating awareness through various Govt schemes i.e. Vahali Dikri Yojana, Sukanya Samriddhi Yojana etc. till date covered more than 1200 girl child to get benefit out of it. • AVMB School Bhadreswar where Free of Cost education is provide to Poor and Needy Family Child up 10 standards More than 500 Students are benefiting every year. • Separate sanitation facilities for girl child in schools. • Beti Vadhavo Programme was organized in 32 Villages in the presence of Village Sarpanch and other leaders in year 2017-18. We explained people about the various topics i.e. importance of girl child, Sex Ratio, Gender Equality and laws regarding Child abortion. This initiative was well accepted by community and we have observed a visible change in their mindset. We have facilitated 560 daughters with Kit (Small Bed sheet, Mosquito net, Soap and Cream with nutritious food for mother) To create awareness about health, personal hygiene, child education and nutritional diet in fishermen community, various awareness programs have been organized. • During the year various activity like, Covid-19 awareness in village & Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National

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							Deworming Day, National Nutrition Month had been celebrated. • Project Suposhan is initiated with the Motive to focus on adolescent and Reproductive age women nutrition part. Till date covered more than 12500 women and 8700 adolescents under this Project and brought them to considerable status. Curb malnutrition amongst Children, Adolescent girls and Women in our CSR villages. ✓ 100 beneficiaries covered in Menstrual Hygiene Day - with slogan called "RED-ACHHA HAI" ✓ 204 beneficiaries covered in Breastfeeding Week ✓ 320 beneficiaries covered in National Deworming Day ✓ 20 villages covered in celebration of NATIONAL NUTRITION MONTH ✓ 42 FAMILY COUNSELLING ✓ 2059 Women participated in celebration of Women's Day week. • To reduce malnutrition and anemia amongst Children 95 % & adolescent girls and pregnant & lactating women by 70 % in three years • Reduction IMR and MMR • Support Awareness & Cover 100 % Vaccination taken by Child & women. • SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other

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							dignitiaries remained present and appreciated the efforts to overcome malnourishment in Mundra and Bitta. • The National girl child day was celebrated with ICDC Department with Vahli Dikri Yojna form filling, paediatric health camp and Baby health kit distribution at Mundra. Mrs. Ashaben-CDPO Mundra was remain present in this event. Total 61 forms has received approval letter from GOG and 15 forms filled upon the same day. • Adani Foundation is working with 15 Self-help group and supporting to develop entrepreneur skills to become self reliant, sourcing more than 350 women to absorb in various job –this will give them identity, confidence and right to speak in any decision for home, village and working area. About INR 7574.54 lakhs has been spent on various CSR activities in the Mundra region since April 2018 to till March 2023 including cost of community health and education for woman and girl child.
10.4	Due to economic growth leading to rapid urbanization, which prompts the	Level-2	Adani hospitals, Mundra is setup by Adani group near Samudra township with a goal to provide	APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the growth scenario at	APSEZ	Long Term	Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township. Primary health center and community health center are in place within the Mundra taluka.

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	need for healthcare facilities in the region. For an influx of 6 lakh people from APSEZ operations and additional 3 Lakh from induced growth by the year by 2030 (fully developed scenario), total hospitals facilities with about 540 beds would be required.		primary and secondary health care services to Adani group employees and the local populace of Mundra. The existing 100 bed Adani hospital at Mundra has been catering the services ranging from wellness and preventative care.	APSEZ development.			Other than this Adani foundation is doing various activities as part of community health. The details of last year are as below. • Mobile Heath Care Units and Rural Clinics • 09 Rural Clinics • 06 villages of Mundra, 02 villages of Anjar & 01 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 22-23:-25088 (direct & indirect). • 5 financially challenged patients has been supported with Dialysis treatment at 97 Times which added day in their Life. **Health camp:** • Specialty camps, Eye checkup camps, Blood donation camp, Anti-tobacco awareness camp, TB screening, and other are conducted in core villages as well as in labour colonies. • Specialty health (Gynec , Pediatric eye specialty health camp) :- 1527 Patients. • General health camp :- 3379 Patients Awareness Session • Cattle health camp: Total 17299 cattle of 19 Villages had benefitted with different kind of medicines and vaccines.

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							• Women's Health: Provided health services to over 1150 women through 102 + Menstrual Hygiene workshops. • Dialysis Support: During this year, 4 patients were supported for regular dialysis (twice a week) with partial support • Total 590800 CC quantity of Blood had been donated by 1710 Employees. • Medical Supports: 2460 beneficiary in 63 village. • TB screening & Awareness session: benefited 1795. • 25 villages and 07 fishermen settlements covered, with 90 types of general and lifesaving medicines through Mobile healthcare unit • 1491 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test. • For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 9 villages and Super specialist camp which benefitted more than 4906 patients of Mundra Taluka. • Cattle Health Camp: Adani Foundation and Animal Husbandry department Veterinary Jointly organizing cattle health Awareness and vaccination programs in 24 Villages of our periphery villages. Total 17299 cattle of 19 Villages had benefitted with different kind of medicines and vaccines.

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							• Lumpy Disease Vaccination Drive: Total 40 000 cattle were covered through therapeutic and ayurvedic treatment and Nutritive Cattle feed Support with association District Animal Husbandry department through vaccination and awareness drive. • Present Hospital facilities are adequate to avail the medical treatment for Mundra region considering present development. Other Occupational Health centres, primary health centres and community health centres are also in place in Mundra to take care the people residing in Mundra. Adani group is also operating high quality health care services to the people of Kutch at G. K. General Hospital, Bhuj having 750 beds facilities on public private partnership (PPP) model, which is 60 km far from Mundra. APSEZ will explore other possibilities to augment the primary and secondary healthcare facilities in future depending on the future development at APSEZ.
	Due to rapid economic development in the region, several employment opportunities can be		APSEZ has been giving preferences to people from Gujarat for providing employment opportunities	APSEZ is committed to provide support for fishermen livelihood	APSEZ	Short Term	**<u>Current FY 2022-23 fishermen livelihood activities development activities:</u>** • Government scheme Awareness session was held in association with Fisheries department Bhuj to facilitate pagadiya fishermen by providing fishing kits to seven Fishermen. The coordination was made by Adani Foundation to process application.

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10.5	generated to the local people. When the area is fully developed by the end of 2030, the working population of the Mundra taluk would increase from current level of 55,000 to as high as 4,00,000, which will be 45% of the total envisaged population in Mundra Taluk by the end of 2030.		based on eligibility and skills. In Mundra, special programmes have been conducted by Adani Foundation to enhance the employability of youth from fisherfolk communities. Based on the need assessment results, several livelihood options have been introduced by the Adani Skill Development Centre, Mundra. In these centres, youth can join and get	activities and has submitted a detailed 5 years plan to MoEF&CC with a total budget of Rs.13.5 Cr.			• Mangrove plantation and Nursery development work has created a two facet impact by providing Livelihood to Fisherfolk during two months Fishing during Off season and developing 162 hector dense mangrove afforestation. • 5200 Men days work provide to 285 Fisherfolk of Luni, Sekhdiya and Bhadreshwar Villages in coordination with Horticulture Det. • Formed **Sagar Saheli SHG** of Navinal Fisherfolk Women and Linked with DRDA after completion of Stitching Training, received first order of Rs 80 000 to prepare Cotton Bags. Total 12 Women are engaged and planning to expand with more Women and Order. • During FY2022-23 Approx. INR 185.37 lakh were spent for Fisherfolk Amenitites work in different core areas. • Till FY 2022-23, Adani Foundation has done total expenditure of INR 1338.19 lakh for Fisherfolk Amenitites work in different core areas. • 507 underprivileged students of Fisherman & Maldhari communities underprivileged from 8 villages taking education at the Adani Vidya Mandir school. • JCB & Hitachi Machine Support for Pre-Moonson activities. Repairing and Maintenance work of Approach at Luni, Bavdi and Navinal Fishermen Bandar. • **Youth Employment: -** Adani Foundation is committed for youth employment with imparting technical and Non-Technical Training for Fisherfolk Youth and started Electrical, Welder ad Masson work training under Adani Skill Development Centre. • Total 217 Fisherfolk are Employed and earning on Monthly Base. Average Monthly Income Rs.14500/ Individual.

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			vocational training for a number of technical and non-technical skills. An industrial Training Institute is set up at APSEZ, Mundra, to enhance the skill levels of the local youth to maximum possible extent.				APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes: • Vidya Deep Yojana • Vidya Sahay Yojana – Scholarship Support • Adani Vidya Mandir • Fisherman Approach in SEZ • Machhimar Arogya Yojana • Machhimar Kaushalya Vardhan Yojana • Machhimar Sadhan Sahay Yojana • Machhimar Awas Yojana • Machhimar Shudhh Jal Yojana • Sughad Yojana • Machhimar Akshay kiran Yojana • Machhimar Suraksha Yojana • Machhimar Ajivika Uparjan Yojana • Bandar Svachhata Yojana These initiatives are planned for the period 2016 – 2021 with a committed expense of INR 13.5 Cr as submitted earlier in detail in the report namely "Silent Transformation of Fisher folk at Mundra", Till, FY 2022-23 approx. 13.38 Cr. INR, has already been spent in support for fishermen livelihood activities. Further, details regarding the expenditure incurred against the commitment are attached as **Annexure – 12**.