Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Tuesday, May 28, 2024 7:23 AM
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; Anil Trivedi; Sujalkumar Shah
Subject: Half Yearly EC Compliance Report Submission - APSEZ, Mundra - SPM & Pipeline of COT for period of Oct. 23 to March 2024 part -1
Attachments: EC Compliance Report_2004 - SPM_Oct23 to Mar24-part-1.pdf

adani
Ports and Logistics

APSEZL/EnvCell/2024-25/008 **Date:** 28.05.2024

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 of Environment Clearance of "Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kachchh by M/s. Adani Ports & SEZ Limited"

Ref : Environment clearance granted to M/s Adani Ports & SEZ Ltd. vide letter dated 21st July, 2004 bearing no. J-16011/30/2003-IA-III.

Dear Sir,

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 2023 to March 2024 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.

Bhagwat Swaroop Sharma

From: Bhagwat Swaroop Sharma
Sent: Tuesday, May 28, 2024 7:27 AM
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; Anil Trivedi; Sujalkumar Shah
Subject: Half Yearly EC Compliance Report Submission - APSEZ, Mundra - SPM & Pipeline of COT for period of Oct. 23 to March 2024 part -2
Attachments: EC Compliance Report_2004 - SPM_Oct23 to Mar24-part-2.pdf

adani
Ports and Logistics

APSEZL/EnvCell/2024-25/008 **Date:** 28.05.2024

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 of Environment Clearance of "Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kachchh by M/s. Adani Ports & SEZ Limited"

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For, **M/s Adani Ports and Special Economic Zone Limited**

Bhagwat Swaroop Sharma
Head – Environment
Mundra & Tuna Port

Encl: As above

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5) The Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham – 370201.

Ports and Logistics

APSEZL/EnvCell/2024-25/008 **Date:** 25.05.2024

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 of Environment Clearance of "Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kachchh by M/s. Adani Ports & SEZ Limited"

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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.
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Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

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Ports and Logistics

Environmental Clearance Compliance Report

of

SPM, Crude Oil Terminal and Connecting Pipes

at

Mundra Port,
Dist. Kutch, Gujarat

of

Adani Ports and SEZ Limited

Period:

October-2023 to March-2024

Index

- Chronology of company name change from **M/s. Gujarat Adani Port Limited** to **M/s. Adani Ports and Special Economic Zone Ltd.** was submitted along with half yearly EC Compliance report for the period Apr'21 to Sep'21.

adani Ports and Logistics	Adani Ports and Special Economic Zone Limited, Mundra	From : Oct'23 To : Mar'24

Status of the conditions stipulated in Environment Clearance under CRZ notification

Half yearly Compliance report of Environment and CRZ Clearance of "Single Point Mooring (SPM), Crude Oil Terminal (COT) and connecting pipes at Mundra Port, District Kutch issued by MoEF vide letter no. J-16011/30/2003-IA.III dated 21st July 2004.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
A. Specific Condition		
1.	Mangrove afforestation in 25 ha of area, suitably identified in consultation with State Forest Department. The GAPL shall bear the cost of the said land as well as the cost of the plantation of mangroves and its sustenance and implant within 6 months from the date of clearance of this letter. Further, it shall be ensured that mangroves in the vicinity of the salt works are not affected due to the project.	Complied. 25 hectare of mangrove plantation with a cost of 10 Lakh is already completed near railway yard in consultation with Dr. Maity, Mangrove consultant of India. There are no salt works within the project area. It may be noted that to enhance the marine biodiversity, till Mar'24 APSEZ has carried out mangrove afforestation in 4140 ha. Area across the coast of Gujarat. Total expenditure for the same till date is INR 1592.8 lakh. Details on Mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 1**. 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 M/s. 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. These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem. Please refer attached **Annexure – 2** for CSR activity report carried out by Adani Foundation.
2.	In addition to the mangrove plantation, GAPL	Complied. During the course of development of the project, green belt was

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	should also take up massive green belt developments in 30 acres of land in and around the project in consultation with the Forest Department. Detailed plan indicating the area identified for the mangrove plantation as indicated at (i) above and for green belt development along with the financial outplay shall be provided to this ministry within 6 months from the date of receipt of this letter.	developed in 8.58 Hectares of land. Total 8981 trees were planted with the density of 1047 trees per hectare within port premises at a cost of Rs. 25 Lakh. This plantation was done in consultation with Gujarat Ecological Commission (as they are one of the authorized agencies of Dept. of Forest & Env. Dept., Govt. of Gujarat). In addition to this, various activities on green belt development and mangrove plantation are being carried out on regular basis by horticulture department. The budget of Horticulture Department for the period of financial year 2023-24 was INR 904 lacs and allocated budget has fully spent during the current FY 2023-24. It may be noted that, APSEZ has developed 458 ha. area as greenbelt with plantation of more than 9.06 Lacs saplings within the APSEZ area. Details on mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 1**.
3.	No dredging activity shall be carried out.	Complied. Construction activities are completed & project is in operation stage. SPM is approximately 8.6 km inside the open sea from the shore where 30 m of draft is naturally available. Hence no dredging is required.
4.	No ground water should be tapped at the project site / within CRZ area.	Complied. No ground water is tapped at the project site. Entire water requirement is fulfilled through APSEZ Desal Water and GWIL.
5.	Adequate facilities as listed in National Oil spill Disaster Contingency Plan	Complied. 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.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	for the Mundra Port which includes firefighting equipment of 1200 cum/hr. spray capacity with 2 monitor fitted with the dolphin 2, 3, 4 and 5 oil spill dispersant foam liquid etc. should be maintained and put into operation immediately in case of oil spills.	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 Oil spill contingency response plan was submitted along with EC Compliance report for the period Apr'22 to Sep'22. For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster 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) prepared by APSEZ is in accordance with the NOSDCP. Latest Regional Level Pollution Response exercise "SWACHCHH SAMUDRA-NW 2023" was carried out by Indian Coast Guard on 25th November, 2023 at Vadinar, Gujarat. All participants from various Oil Handling Agencies and Stakeholders (IOCL-Jamnagar, APSEZ-Mundra, Nayara Energy LTD VOTL- Vadinar, Reliance Industries LTD-Sikka Jamnagar, Essar Bulk Terminal- Salaya and Coast Guard) were participated in this exercise. Details of the same is attached as **Annexure - 3**. Based on the oil spill modeling study, it has been observed that crude oil spill of 700 tons (Tier-I) will spread over an area having radius of around 400 m within 4hr. APSEZ already has facilities for combating a Tier-1 spill. Shoreline Resources available with APSEZ, for deployment during shoreline cleanup/ emergent situation: **Item** — **Quantity** Oil Spill Dispersants — 5000 ltr. Absorbent pads — 2000 Nos. Portable dispersant storage tank: 1000 ltr. Capacity — 1 no. Portable pumps — 2 nos. Oil Containment Boom-Length 2000 metres, Height -1500 mm, Draft-900mm, Free Board-600mm — 2000 m Skimmer-KOMARA 15 Duplex Skimmer System with floating IMP 6 Pump. — 4 Nos. 12.5T Flexible Floating Storage Tank (PUA). — 3 Nos. Lamor Minimax 12 m³ skimmer — 2 sets Lamor Side Collector system (Recovery Capacity 123 m³/ hr) — 2 Nos. 2 sets Canadyne Fence Boom (Reel model — 1 No.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		7296/8496 with Power Pack, Towing bridles and Tow lines - 235 meter • 10 Tugs are fitted with Oil Spill Lamor Side Dispersant boom and proportionate pump to mix OSD and Sea water as required. • 10 Dolphin tugs are fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required. The tugs are fitted with a fire curtain and remote-controlled fire monitors. • Dolphin 11 has firefighting system of 1200 m^3/hr. along with 20 ton lifting "A" frame and diving support facility. • The equipment are being kept in working condition. Routine inspection, maintenance and testing is performed as per the stipulated requirements. • Detail of resource available at APSEZL is provided in Oil Spill Contingency Plan, which was submitted during the the compliance period Apr'22 to Sep'22.
6.	The duration of construction phase of the project should be kept to a maximum of 8 months to avoid impact on marine environment and birds as suggested by NIO.	Already complied. Not applicable at present. Construction activity is already completed and the project is in operation.
7.	It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project.	Not Applicable Location of SPM is unmanned (approximately 8.6 km inside the open sea from the shore) hence; there is no displacement of people, houses or fishing activity as a result of the project.
8.	The project proponents must make necessary arrangements for disposal of solid wastes and for	Complied. No used oil / spent oil generated during compliance period. No other type of hazardous waste as well as no effluent or liquid waste are generated from operation of SPM or discharged into the

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31.03.2024</th></tr>
<tr><td></td><td>the treatment of effluents / liquid wastes. It must be ensured that the effluents / liquid wastes are not discharged into the seawater.</td><td>sea water.

The non-hazardous solid waste generated from on-shore SPM operational activity is being handled and managed as per 5R concept for environmentally sound management.

In order to analyzed marine water quality, marine sampling (surface, bottom & sediment) is being carried out at a location nearby SPM 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'23 to Mar'24 is mentioned below.

Total Sampling Locations: 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>7.99</td><td>8.24</td><td>8.17</td><td>7.86</td><td>8.12</td><td>8.01</td></tr>
<tr><td>TSS</td><td>mg/L</td><td>98</td><td>152</td><td>126.91</td><td>78</td><td>128</td><td>106.11</td></tr>
<tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>2.2</td><td>3.5</td><td>3.02</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td><td>BDL(MDL:1.0)</td></tr>
<tr><td>DO</td><td>mg/L</td><td>5.88</td><td>6.35</td><td>6.09</td><td>5.68</td><td>6.25</td><td>5.91</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>35.24</td><td>38.88</td><td>36.39</td><td>36.15</td><td>37.38</td><td>37.06</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35864</td><td>36610</td><td>36225</td><td>34500</td><td>37540</td><td>37077</td></tr>
</table>
*BDL – Below Detection Limit
*MDL – Minimum Detection Limit

Please refer Annexure – 4 for detailed analysis reports. Approx. INR 13.37 Lakh is spent for all environmental monitoring activities during the compliance period i.e. FY 2023-24 for overall APSEZ, Mundra.</td></tr>
<tr><td>9.</td><td>The camps of labor shall be kept outside the Coastal Regulation Zone area. Proper arrangements for cooking fuel shall be made for the labor during construction phase so as to ensure that</td><td>Complied. Not applicable at present.

Construction activities are completed and project is in operational phase.</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	mangroves are not cut / destroyed for this purpose.	
10.	Regular drills should be conducted to check the effectiveness of the on-site Disaster Management Plan. The recommendations made in the Environmental Management Plan and Disaster Management Plan, as contained in the Environmental Impact Assessment and Risk analysis reports of the project, shall be effectively implemented.	Complied. Disaster Management plan is in place and implemented. Updated DMP was submitted to the MoEF & CC along with half yearly compliance report for the period from Apr – 2016 to Sep – 2016 and there is no further change. On Site Emergency Response Plan and Crisis Management Plan updated on August-2023 is in place and implemented. The updated Onsite emergency plan –was submitted during the EC compliance report submission for the period Apr'23 to Sep'23. 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. The Oil spill contingency response plan updated on 30.07.2022 is in place and implemented. Please refer Compliance of Specific Condition No. 5 for further details. Mock drills are conducted regularly by APSEZ. Last Oil Spill Mock drill was conducted on 19th January, 2024. Updated Oil Spill Mock Drill report is enclosed as **Annexure - 5**. All the recommendations given in the report of NIO and Tata AIG Risk Management Services are implemented. Few examples are provided below. **Few Marine EIA recommendations:** Temporary colonies of workforce should be located sufficiently away from the HTL with proper sanitation. Adequate arrangement of fuel supply to the workers should be made to discourage them from using mangroves for firewood. — Construction activity is already completed. Most of the construction labours were residing 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. were provided by APSEZL.

Sr. No.	Conditions	Compliance Status as on 31.03.2024	
		As a step towards improvement in marine environment quality, mangrove afforestation of intertidal mudflats should be encouraged through adequate institutional support.	25 hectare of mangrove plantation with a cost of 10 Lakh is already completed near railway yard in consultation with Dr. Maity, Mangrove consultant of India. Details on mangroves afforestation & Green belt development carried out by APSEZ till date is annexed as **Annexure – 1.**
		The prevailing traffic control management of deep-sea ships navigating through the gulf needs thorough review and introduction of state of the art VTS should be considered.	APSEZ is practicing well defined traffic control procedure. A VTS service for Gulf of Kutch is provided by the VTS Gulf of Kutch, operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information before arrival and departure respectively in Gulf of Kutch is provided to VTMS information cell through agent or by directly sending 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.
		Few Tata AIG Risk Assessment Recommendations:	
		There should be facilities of boom, skimmer, dispersant, diving suits, firefighting equipment and excellent communication facilities.	10 Dolphin tugs fitted with Oil Spill Dispersant boom and proportionate pump to mix OSD and Sea water as required; out of them 10 Dolphin Tugs are fitted with a fire curtain and remote-controlled fire monitors.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		In the event of oil spillage the oil slick normally will be carried away by water current and wind. It is very difficult to identify oil slick patches by boats/vessels, hence it is suggested that GAPL may take help from coast guard/Navy for aerial surveillance in order to identify and monitor oil slick movement. — 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 plan updated & approved by coast guard, which was submitted during last half yearly compliance report.
11.	The entire stretch of the pipelines shall be buried underground except at the booster pumping station, which will be properly fenced and the station would be manned round the clock. The buried lines will be protected with anticorrosive coal tar based coating. The coating will be tested by high voltage detector in accordance with prescribed standards.	Complied. Entire SPM pipeline is buried underground. Total pipeline length is 15.4 km including 8.6 km inside the open sea and 6.8 km on landward side. Booster pump is not provided throughout the pipeline. However the material is transferred by using pumping system of respective vessels berthed at SPM. Anticorrosive 3 LPE coating is provided to the portion of onshore pipeline while offshore pipeline is also protected by concrete coating. For offshore pipeline, Cathodic Potential (CP) survey is being done once in three years. Last CP inspection of offshore pipeline done in Mar'2021. The report of offshore pipeline, Cathodic Potential (CP) survey were submitted along with previous EC compliance report submission for the period Oct'21 to Mar'22. For onshore pipeline CP survey is being done by APSEZ on monthly bases. Monthly reports of CP survey for this compliance period are enclosed as **Annexure – 6**.
12.	Markers shall be installed at every 30 m to indicate the position of the line. Regular patrolling of the pipelines needs to be done. This	Complied. Markers are installed at every 30 m to indicate position of pipeline. Details of the same were submitted during half yearly EC Compliance report for the period Oct'18 to Mar'19. Pressure at vessel and reception points of transfer line is being monitoring during operation to ensure no leakage in pipeline.

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31.03.2024</th></tr>
<tr><td></td><td>will help in identifying any activity that have the potential to cause pipeline damage or to identify small leaks whose effects are too small to be detected by instrument.</td><td>Regular patrolling of pipeline is being done by APSEZL Security Department. Following mitigation plan is followed in case of small leaks leading to spills.

<table><tr><th>Activity</th><th>Adequacy of Measures</th></tr><tr><td>Hose Connection / Disconnection (liquid operation)</td><td>It is collected in deep tray in case of leakage. Stop the supply of liquid discharge.</td></tr><tr><td>Hose Connection / Disconnection (liquid operation)</td><td>Immediately stop the supply of liquid discharge. Marine break away coupling available for control of load.</td></tr><tr><td>Tanker discharge operation (SPM operation)</td><td>Emergency operation shut off (stopping the discharge)</td></tr></table></td></tr>
<tr><td>13.</td><td>There should be display boards at critical locations along the pipeline viz. road / rail /river crossings giving emergency instructions as well as contact details of GAPL. This will ensure prompt information regarding location of accident during any emergency. Emergency Information board should contain emergency instructions in addition to contact details.</td><td>Complied.

Display boards with emergency contact detail are provided at critical locations.

Photographs of the same were submitted as part of the compliance report for the period from Oct'16 to March'17 and there is no farther change.</td></tr>
<tr><td>14.</td><td>During operation phase, proper precautions should be taken to avoid any oil</td><td>Complied

During operation, SPM team takes responsibility and actively supervises the operation. Inspection and maintenance activities are carried out regularly for prevention of any kind of oil spill at SPM.</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	spills and no oily wastes shall be discharged into the water bodies.	No liquid waste are generated / discharged from the project activity. In order to analyze marine water quality, marine sampling is being carried out at a location near SPM. Please refer condition no 8 for further details.
15.	All conditions stipulated by the Forest and Environment Department, Government of Gujarat should be strictly implemented.	Complied All the conditions stipulated by Forest and Environment Department are being complied. Point wise compliance report of CRZ recommendations issued vide letter No. **ENV-10-2002-124-P (Part1)** dated **8th October 2003** is enclosed as **Annexure- A**.
16.	All conditions stipulated in Gujarat Pollution Control Board vide their letter No. PC/NOC/381/1039 dated 8th January, 2002 should be implemented.	Complied. Consent to Operate (CC&A) was granted by GPCB based on the compliance of conditions of the No Objection Certificate (CtE). This CC&A is renewed from time to time based on its validity. The last CC&A renewal has granted and issued by GPCB vide Order no. WH 117830 issued dated 29.03.2022 & valid till 26th April, 2027. Copy of the renewed CC&A were submitted along with previous EC compliance report submission for the period Oct'21 to Mar'22.
B. General Condition		
1	Construction of the proposed structures should be undertaken meticulously confirming to the existing Central / local rules and regulations. All the construction designs / drawings relating to the proposed construction activities must have approvals of the concerned	Complied. Not applicable at present. Construction activities are completed & project is in operation stage. Entire SPM pipeline is buried underground. Total pipeline length is 15.4 km including 8.6 km inside the open sea and 6.8 Km on landward side. Construction activities are carried out based on the approvals of the concerned state government department and prevailing laws.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	State Government Department / Agencies.	
2	The project authorities should take appropriate community development and welfare measures for the villagers in the vicinity of the project site, including drinking water facilities. A separate fund should be allocated for this purpose.	Complied 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. Adani Foundation is working in main five persuasions as below. ❖ Education ❖ Community Health ❖ Rural Infrastructure ❖ Sustainability Livelihood ❖ Skill Development Brief information about activities in the main five persuasions is mentioned below. Activities carried out for the same are summarized as below.

Area	Activity
Community Health	• Mobile Heath Care Units and Rural Clinics • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 23327 (direct & indirect) by Mobile van and rural clinic. • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students. • **Cataract-Free Mundra:** The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below. **Lives Impacted: - 1131** ➢ Comprehensive Eye Screenings at Village level ➢ Cataract Surgeries to GKGH, Bhuj ➢ Post-Operative Care and Follow-up ➢ 5 successful Operation **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, ophthalmic, specialty health camp): - 5795

Sr. No.	Conditions	Compliance Status as on 31.03.2024	
			Patients Benefited. • General health camp: - 1618 Patients benefited. • Blood Donation Camp: 1715 people have donated blood. • Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being. • Women's Health: Provided health services to more than 2610 women benefitted through Menstrual & Mental Health Awareness Drive. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 124 Times which added day in their Life. • Medical Supports: 1 007 beneficiary in 35 village. • **International year of Millets – 2023:** To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet Competition across nine villages. Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased, highlighting the potential for sustainable and nutritious dishes in our daily diets. • **Ayushman card facilitation:** Ayushman card issued to 6865 for 25 village of 686.50 Cr. health insurance. Preventive health Campaign The Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body. • **Sample Survey Report 2023-24** o 55% Never heard about Menstrual hygiene o 60% Are using cloths on regular basis o 36% Had never used sanitary pads o 68% Had no information about UTI o 30% Never used millets in their diet o 60% Never heard about millets or it's benefits • 2222 –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 7 villages and Super specialist camp which benefitted more than 4690 patients of Mundra & Mandvi 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 with total 18903 cattle benefitted and 18870 cattle vaccinated. Total 982 cattle owners benefited for Preventive Health Care & Fodder Support Program
		Sustainable Livelihood – Fisher folk, Agriculture & Women	**<u>Overall Persistent efforts for Fisherman development:</u>** • 598 Education Kit Support • 273 Fisherman Shelter Support • 1,247 Vehicle transportation support of Mundra and Mandvi taluka • 106 Cycle Support to high school going students • 613 Scholarship Support • 419 Youth Employment • 195 Linkages with Fisheries Scheme

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		• 3,534 Ramaotsav Community Engagement • 56,523 Man days Mangroves Plantation **Empowering Fisherfolk Communities through Education:** • **Vehicle Transportation Facilities:** 146 Students supported Mundra Taluka and 58 Students supported at Mandvi Taluka during the compliance period • **Education Kits Support:** Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience (57 nos. students benefitted). • **Educational Awareness Sessions:** Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education. (487 Students motivated for high school Education). • **Scholarship Support:** Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates. • **Cycle Support:** Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease. • **Assisting During Emergencie**s: Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery. (336 Fisherfolk house benefited) • **Fostering Youth Employment:** At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future. (115+ Fisherfolk youth employed) • **Strengthening Fisherfolk women:** Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support. (449 Women benefited) • **Potable Water Distribution:** Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity. (5000+ Population benefited). **Sustainable Livelihood - Agriculture:** During compliance period This year, the Adani Foundation continued its strong commitment to advancing natural farming in Mundra. Through various initiatives and partnerships, we provided crucial support to local farmers, empowering them with knowledge and resources to transition to sustainable practices. • 2200+ Farmers educated in natural farming • 800+ Farmers embracing natural farming methods • 200 Farmers got financial assistance of Rs. 10,000

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		• 3 District level exposure visit • ₹ 36.7 lakh Business done by our benefited Farmers **Promoting Natural Farming:** • **Training:** Conducted training for 1250 farmers in 16 villages, enlightening them about the harmful effects of chemical fertilizers. Demonstrated how to produce organic fertilizer using household products, emphasizing its benefits and cost-effectiveness. After adopting it, they witnessed its positive effects on their fields. • **Kitchen Garden Kit**: We have supported vegetable kitchen garden kits to 500 farmers with the aim to enable them to grow fresh and nutritious, chemical-free vegetables. This will enhance their food security and promote self-reliance. • **Empowering Farmers**: This year, amidst the aftermath of the cyclone, we stood by our farmers and held dedicated meetings with KVK, KCS, and DRC to restore the fallen date trees. Collaboratively, provided JCB, technical support, organic fertilizer etc. Successfully restored 615 trees. Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:- Rs.1.53 Cr. • **Financial Assistance:** Extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. This fund will help farmers in planting a total of 53,136 fruit-bearing plants. **Raj Shakti Prakrutik Kheti Sahkari Mandali:** • **Appreciation by Governor:** Governor of Gujarat, Shree Acharya Devvratji, encouraged 25 of our farmers practicing natural farming at the Krushi and Dairy Expo event in Bhuj. • **Exposure Visits Certification by GOPCA:** Our farmers embarked on three eye-opening exposure visits to Gautech-2023, • **Certification by GOPCA:** We have successfully certified 28 farmers under the Gujarat Organic Products and Certification Agency (GOPCA). **Kutch Kalptaru FPO (KKPC) and Prakrutik Mandli** • To promote horticulture, the Kutch Kalptaru FPO (KKPC) was established in 2020 by farmers from Mundra Block to address various challenges they faced. With an initial 350 shares held by 280 shareholders, the company is now expanding to include up to 5000 farmers and 537 registered shareholders. (800 Farmers benefited and ₹ 33.67 lacs Turn over) • 19 nos. of Market Linkage for supporting to Green carnival at Samudra Township & Shantivan colony Now 302+ farmers are collaborated with Mandli. Total Green Carnivals 37, Total Sell 8,623 kg and Revenue generated ₹ 30184805. by connecting directly with consumers, they've seen a remarkable 35% increase in their income. • Adani Foundation has also provided 14.38 lacs kg Dry Fodder and 45.85 lacs kg Green fodder in 31 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. 305.55 Lacs during FY 2023-24. • Adani Foundation provides Good Quality dry and green fodder to 24 Villages. Project is covering total 15005 Cattels / 2070 farmers and hence enhancing cattle productivity during FY 2023-24.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		• **Grass Land development:** AF converted 18 acres of denuded village common pastureland gauchar into fertile and productive grassland in Zarpara, Siracha, Gundal , Kukadsar village to transform into Fodder Sustain village during FY 2023-24. **Women Empowerment:** • **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 more than Rs 35 Lacs. • **Making SHG Self Reliant:** ➢ 16 SHG are on pathways of self-reliance. ➢ Various handicraft, dry and fresh food making, stitching, tie and die etc. ➢ 175+ women - Monthly average income @ 7000 of each member over Month. • **Job Sourcing – Govt:** ➢ 11 Women supported for application and process of Gram Rakshak Dal, Bank Sakhi, Bima Sakhi and Professional Resouce Person. ➢ Average income 4200 Per Month. • **Job Sourcing – Private:** ➢ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company. ➢ 398 Women supported till date for job sourcing of more than 18 villages. ➢ Average income 10200 Per Month. • **Social Empowerment:** ➢ 2 Livlihood Enhancement Training through RSETI. ➢ Financial support for business set up. ➢ Legal rights and domestic violence workshops. ➢ Family counselling for Job sourcing. • During FY2023-24 Approx. INR 122.32 lakh were spent for Fisherfolk Amenities work in different core areas. • Till FY 2023-24 Adani Foundation has done total expenditure of INR 1460.50 lakh for Fisherfolk Amenities work in different core areas. • 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. **Previous development activities:** • **Cement Roof Sheet Support:** fisherfolk Home were significantly damaged by the **Bipor Cyclone**. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery." • **Potable water Distribution:** Providing access of potable Drinking water Facilities to Nine sherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat.

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<tr><th>Sr. No.</th><th>Conditions</th><th colspan="2">Compliance Status as on 31.03.2024</th></tr>
<tr><td></td><td></td><td></td><td>

More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency.
Water distribution to Luni & Bavadi Bandar Fishfolk Vasahat: 35000 KL water for 936 people.
Sagar Mitra Card: Introduced the 'Sagar Mitra Card' to simplify access for Fisherfolk to specific fishing routes within APSEZ. This digital card is connected to a digital punching machine located at designated entry points. Initially, we have implemented this system for Navinal Fisherfolk, and so far, we have issued a total of 57 Sagar Mitra Cards."
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.
Organic Vegetable Shop Inauguration: Adani Foundation is promoting natural farming in Mundra through the "Rajshakti Prakrutik Kheti Sahkari Mandali," a group of 32 farmers. They opened a shop on May 24th to sale their produce in the open market.
257 Farmers have started to preparing Jiva Mrut & Gaukrupa Amrutam Bio-fertilizer and using in agricrop. Series of Training is arranged by ATMA and Adani Foundation.
Supported 1500 farmers for barrel & wormi compost.

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<tr><td></td><td></td><td>Education</td><td>
<u>Initiatives Under Utthan Project</u>:
<table>
<tr><th>Utthan Initiatives</th><th>Benefited</th></tr>
<tr><td>Strengthening government Primary & High schools</td><td>31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.</td></tr>
<tr><td>Appointing an Utthan sahayak</td><td>70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.</td></tr>
<tr><td>Mainstreamed Progressive learner</td><td>Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.</td></tr>
<tr><td>Providing required resources and facilities</td><td>Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.</td></tr>
<tr><td>Enabling joyful learning spaces</td><td>Smart Class with Navneet software+ Bala painting + Activity base learning.</td></tr>
<tr><td>Adani Students Development Center (ASDC)</td><td>2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center</td></tr>
<tr><td>Introducing English as a Third Language</td><td>Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English</td></tr>
<tr><td>Enhancing Reading Habits</td><td>Redding corner, 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)</td></tr>
<tr><td>IT on Wheels</td><td>2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students, 200+ High schools' students</td></tr>
<tr><td>Promote sports</td><td>6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh: 2000+</td></tr>
<tr><td>Teachers' & Sahayak Capacity Building</td><td>3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.</td></tr>
<tr><td>Formation of Eco Club</td><td>Plastic free village workshop: 1250+</td></tr>
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Sr. No.	Conditions	Compliance Status as on 31.03.2024

	Students, Environment Awareness program & Tree plantation in schools.
Day Celebrations & Collaboration with GoG	Summer Camp: 6000+ Students Diwali Mela: 5500+ Students. 1400+ Parents participated.
Mothers as catalyst in transformation	Mothers meet: 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)
Strengthening Stakeholders	Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.

- **Utthan Marks 5-Year Milestone:** Celebrating the extraordinary five-year journey of Utthan in Mundra, we hosted a remarkable event graced by the presence of distinguished individuals. The event witnessed the convergence of more than 2000 students, 416 school principals and teachers, and 145 School Management Committee Members
- **Mother's Meet – Promoting Community Bond:** Mothers meet is special intervention of Utthan, this year, more than 15000+ Mothers Joined in 700+ Mothers meet.
- **Utthan other various initiatives & Achievements:**
  - Utthan won FOKIA Award under the category "Excellence in collaborative CSR Project.
  - Utthan created special syllabus of Maths, Science & English to achieve good result in board exam.
  - The Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office.
  - Career Counselling in Utthan High Schools same remedial classes during summer break.
  - Health awareness programs in schools, children of class 6 to 8 were made aware about health.
  - High school girls' students celebrated Rakshabandhan with Shoulder at Boarder.
  - 1000+ Students are preparing for competitive exam. Its more than double from last year.

Adani Vidya Mandir, Bhadreshwar

- **Empowering Communities through Free and Compulsory Education:** We are empowering economically disadvantaged families through free and quality education. In the academic year 2023-24, it proudly serves a student population of 604, with 174 students hailing from fisher-folk communities. 24 dedicated teachers are there in school.
- **Achievement in sports:**
  - In August 2023, students of AVMB engaged in block-level sports competitions, excelling in Athletics, Kho-Kho, and Yoga. Team of AVMB: U14 & U17 boys secured 1st place in Kho-Kho and progressed to the district level.
  - Notably, Abzal Reliva, a Class X student, clinched 1st position in Shot Put, and Hardev Jadeja from Class IX achieved 1st rank in Long Jump earning the opportunity to represent Mundra block at the district level
- **Achievement in Arts:**
  - An Essay and Quiz Competition arranged by TATA BUILDING INDIA was organized on the theme of "Recycle". 81 students of

Sr. No.	Conditions	Compliance Status as on 31.03.2024	
			AVMB participated. ➢ 06 Students of Class VI to VIII appeared in PRARAMBHIK VISHARAD examination conducted by BRIHAD GUJARAT SANGIT SAMITI on 14/12/2023, School is waiting for the result. ➢ 19 Students of Class V to IX wrote inspirational stories in Gujarati language all the stories were submitted to a published in "GULSHAN" magazine in 10th edition on 11/10/2023. • **Training Skill Development:** Adani Skill Development Centre (ASDC) is dedicated to enhancing employability and entrepreneurship. This year, ASDC has trained 50,00 individuals across Kutch, resulting in 65% livelihood generation. ASDC's vision is to make everyone skilled and employable, meeting industry demands through trained manpower.
		Rural Infrastructure & Environmental Sustainability	Adani foundation designed and build various structure and provide service in the Health, Education, agriculture and sustainable livelihood area. **WORK COMPLETED** Below tabulated Water Conservation Projects completed during Compliance period: **Water Conservation Projects:** **Swajal Project:** ➢ **Aim:** The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➢ **Water Security Plan:** Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared forl the Seven villages.

Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)
Mundra	Check Dam	23	6,07,332.80
	Pond Deepening	66	1,89,121.08
	RRWHS	275	2750
	Recharge Borewell	209	-
	Percolation Well	24	-

Soil Conservation:

- **1250 Farmers Awareness Sessions at Village Level:** Spreading awareness on natural farming benefits and address their concerns.
- **7 exposure of Hands-On Training & Exposures:** Arranged Workshop and training to emphasizing on real-world techniques.
- **857 Farmers link with Government Scheme**: facilitation of govt. Cow Nurturing scheme to promote eco- friendly farming practices.
- **258 Gobardhan Bio-gas Support**: Link with Gov Gobar Dhan Biogas Unit Nutrient-rich slurry serves as an essential organic fertilizer for natural farming.
- **35 Farmers Natural Farming Certification** Process to obtain natural farming certification through the GOPCA for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali.

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Rs.9.88 Lacs RG Marketing Assistance: Provide platforms and resources ensuring fair prices and broader consumer reach.

Earlier Completed Activities/Projects:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<tr><td>1</td><td>Check dam Restrengthening-Nana Kapaya</td><td>1</td><td>Water Storage Capacity increased by 48000 Cum</td><td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td></tr>
<tr><td>2</td><td>Recharge Borewell</td><td>21</td><td>Reduce Salinity ingress, and preventing water run</td><td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td></tr>
<tr><td>3</td><td>Pipe Culvert at Checkdamat Bhujpur</td><td>1</td><td>prevent water runoff into seaside.</td><td>35 farmers' 120+Acre Area of Agri land can be Irrigated</td></tr>
</table>

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.
377 - AC Roof sheet support to Fisherfolk Vasaha 1700+ Benefited.
2 Development of Common Gathering flooring work – 4000+ Benefited.
195 Stall – Vegetable market– 900+ Benefited.
Solar Panel System at Mundra – 600+ Benefited.
Maintenance, Fencing & Material Support - 30+ Benefited.
Renovation of Shed at Shekranpir Bhopavandh - 2000+ Benefited.
40 RRWHS structure have been completed.
Total 229 nos. Bore-well recharging activity is completedPercolation

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Sr. No.	Conditions	Compliance Status as on 31.03.2024
		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 till Compliance period:** • **Dates Tree -Restoration:** Biparjoy cyclone has damaged huge number plants of Dates, Mango, Sapota. In coordination with Kutch Crop Services and Krishi Vigyan Kendra – more than 615 plants are restored till date and continue. • **Miyawaki Forest Development, Nana Kapaya** - Native species planation in the 2 acre area at Nana Kapaya village creating a flourishing mini-forest with 5,508 trees. • **"Adani Van":** Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 23,000 trees were planted. Second example Momai Mata temple, Desalpar 10,000 trees were planted. Third Example Matiyadada at Bhujpur 8000 trees were planted. Fourth example Rasha pir, Dhrub 2-acre 5000 tree planted. Thus, in PPP Model 4 Adani Van were developed where 46,000 trees were planted. • **Prakruti Rath:** This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 46,750 sapling distribution to individuals, we have empowered communities to take ownership of their surroundings, leading to a heightened consciousness about the environment's significance. • Till the date Total 1.49 Lac tree plantation have been done that has enriched the local ecosystem and significantly contributed to carbon sequestration

Sr. No.	Conditions	Compliance Status as on 31.03.2024	
			• **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 583 farmers are supported with Biogas as sustainable environment protection.
		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. **<u>ASDC Mundra Center Activities & Achievements:</u>** • **Women Empowerment through Skill Training**: Provided Mud work training to 180 women in Mundra taluka villages supported by MPL. • **RTG Crane Operator Training**: Collaborated with APSEZ HR Team to train 79 students. • **Dori Work and Hand Embroidery Training**: Benefited 90 women in various Mundra villages supported by MPL. • **Health Awareness and Career Sessions**: 108 Ambulance Department enlightened GDA trainees at Adani Institute of Medical Sciences. Guest session on career advancement led by Mr. Kapil Goswami. • **Exposure Visit for Women**: Women trained in Mud Work, Dori Work, and Hand Embroidery showcased their skills during a visit by foreign delegates to the Solar Plant. • **Women's Related Training Seminar**: Held at Matruvandana College, Bidada, Mandvi. **<u>ASDC Bhuj Center Activities & Achievements:</u>** • **Commendation from Shree Jeet Adani**: Received appreciation for supporting the Divyang job fair. • **Employee Development Initiatives**: Conducted Advanced Excel training for 18 Sumitomo India Ltd employees. • **Entrepreneurship Development Program**: Organized a comprehensive 12- day program with 60 diverse candidates. • **New Trainee Orientation**: Conducted sessions about SAKSHAM center and LMS registration at the Bhuj Centre. • **Civil Defense Training (5 days)**: Covered essential topics including Disaster Management, First Aid, 181 Mahila Helpline, 108 Emergency Services, and Fire Safety.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		• **F&B & Housekeeping Batch Inauguration**: 92 students trained to enhance employability. • **Indo-Euro Project Seminar**: Arranged at various Nursing Colleges in Kutch District. Focused on German Language training and job placements. • **Crucial Meeting with ISAR & UNICEF**: Discussed future skill development challenges and transgender equality on 9th December 2023. Total 734 nos. in ASDC Mundra Center and 405 nos. in ASDC Bhuj Center male & female trained in various skill development programme. 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 2023-24 is to the tune of INR 953.50 lakh. Out of which, Approx. INR 940.52 lakh is spent during the FY 2023-24. Till Mar'24, Adani Foundation has done total expenditure of INR 172.76 Cr. for CSR activities in Kutch region since its inception.
3	To meet any emergency situation, appropriate fire – fighting system should be installed. Appropriate arrangements for uninterrupted power supply to the environment protection equipment and continuous water supply for the firefighting system should be made.	Complied. Tug (Dolphin-11) has firefighting system of 1200 m3/hr. along with 20 ton lifting "A" frame and diving support facility for support at offshore. With respect to onshore facilities valve station, pumping station and transportation pipeline, foam base fire tender is available. With respect to onshore facilities valve station, pumping station and transportation pipeline, foam base fire tender, fire water network is available Fire-fighting system has been installed and maintained to meet emergency situations. Additionally for emergency, DG Set is provided for fire water pumps to ensure continuous water supply for firefighting purpose. Detail information on firefighting facility available at APSEZL was submitted as part of the compliance report for the period from Oct'16 to March'17 and there is no farther change.
4	A separate Environment Management Cell with suitably qualified staff to carry out various environment	Complied. APSEZL has a well-structured Environment Management Cell, staffed with qualified manpower for implementation of the Environment Management Plan at site. Site team report to Site environment team direct report to site Chief Executive Officer (CEO) and the CEO directly reports to the top management. Updated Environment

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	related functions should be set up under the charge of a Senior Executive who will report directly to the Chief Executive of the Company.	Management Cell Organogram is attached as **Annexure – 7.**
5	The funds earmarked for environment protection measures should be maintained in a separate account and there should be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards should be reported to this Ministry's Regional Office at Bhopal.	Complied. Separate budget for the Environment Protection measures is earmarked every year. All environmental and horticulture activities are considered at group level and budget allocation is also done accordingly. No separate bank account is maintained for the same however, all the expenses are recorded in advanced accounting system of the organization. Budget for environmental management measures (including horticulture) for the FY 2023-24 is to the tune of INR 1536.48 lakh. Out of which, Approx. INR 1366.78 lakh are spent during the year FY 2023-24. Detailed breakup of the expenditures for the past 3 years is attached as **Annexure – 8**.
6	Full support should be extended to the officers of this Ministry's Regional Office at Bhopal and the officers of the Central and State Pollution Control Board by the project proponents	Complied APSEZL is always extending full support to the regulatory authorities during their visit to the project site. Last visit of Regional Office, GPCB was done on 14.02.2022 with respect to SPM project and compliance of the same has been submitted vide our letter dated 16.02.2022. Details of the same Details were submitted during half yearly EC Compliance report for the period Oct'21 to Mar'22. Inline to the compliance certification process of Environment Clearance condition of Waterfront Development Plan, RO, MoEF&CC

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	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.	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. Inline to the compliance certification process of Environment Clearance of Waterfront Development Plan, IRO- MoEF&CC Gandhinagar has lastly visited the site on 18th to 20th December, 2023 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 non-compliance observed. Copy of submitted action taken report w.r.t. certified compliance is attached as **Annexure – 9.**
7	In case of deviation or alteration in the project including the implementing agency, a fresh reference should be made to this Ministry for modification in the clearance	Point noted. There is no change in the approved project proposal.

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	conditions or imposition of new one for ensuring environmental protection. The project proponents should be responsible for implementing the suggested safeguard measures.	
8	This 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.
9	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection, which should be complied with.	Point noted.
10	A copy of the clearance letter should be marked to the concerned Panchayat / local	Not applicable at present

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	NGO, if any, from whom any suggestion / representation has been received while processing the proposal.	
11	State Pollution Control Board / Committee should display a copy of the clearance letter at the District Industries Center and Collector's Office/ Tehsildar's Office for 30 days from the date of receipt of this letter.	Not Applicable This condition does not belong to project proponent.
12	The project proponent should 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	Already Complied.

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	clearance letter are available with the Gujarat Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forests at http://www.envfor.nic.in/	
13	The project proponents should inform regional Office Bhopal as well as the Ministry, the date of financial closure and final approval of the project by the concerned authority and the date of start of work.	Already Complied
14	The project proponent will obtain Forest clearance for any stretch of land if it passes through the forest land.	Not Applicable No forest land was involved in the project.
15	So as to maintain ecological features and avoid damage to the ecosystem, movement of vehicles in the Inter Tidal Zone shall be restricted to	Complied. All activities are carried out as per the permissions obtained from competent authorities. No unauthorized movement of vehicles is allowed in the intertidal zone.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	minimum.	
16	Since the pipeline passes along mangrove areas and the mud flats of Mundra area, the project proponents will ensure adequate protection to mangroves.	Complied. Not applicable at present Construction activities are completed & project is in operation stage. Please refer to specific condition no 1 for detailed reply regarding mangrove plantation activity.
17	Budgetary break up for Environmental Management Plan for the project to be mentioned.	Complied. Please refer to general condition no 5 for detailed reply regarding budgetary break up.

Annexure - A

Status of the conditions stipulated under CRZ Recommendation

Half yearly Compliance report of CRZ recommendation for "SPM, COT and connecting pipeline at Mundra Port, Dist. Kutch in Gujarat" issued by DoEF, GOG vide letter no. ENV-10-2002-124-P (Part1) dated 8th October 2003.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
1	The provision of the CRZ notification of 1991 and its amendments issued from time to time shall be strictly complied with by the GAPL.	Complied. Construction activities are completed and the project is in operation phase. All stipulations with respect to the CRZ notification and its subsequent amendments are complied with.
2	This recommendation is only for those activities proposed to be commissioned before the end of the year 2008 as mentioned in the bar chart submitted by GAPL.	Point noted. Construction activities are completed and the project is in operation phase.
3	A separate clearance shall be obtained by the GAPL for construction of the SPM No. 3 and 4, corresponding pipelines and COTs after demonstrating the compliance of the conditions, ecological upliftment activities undertaken successfully and mitigative measures implemented while developing the SPM no.1 and corresponding COT. A regional EIA shall also be commissioned immediately by the GAPL and all future development should be based on the outcome of the said regional EIA only.	Point Noted. APSEZL has only developed SPM no. 1 so far. SPM no. 3 and 4 are not developed yet and required permissions for the same will be obtained by following procedures mentioned in respective notifications.
4	Before commissioning of the construction activities, the construction design and pipeline alignment shall be validated/	Complied. Construction activities are completed and the project is in operation phase.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	approved by National Institute Oceanography to ensure that there is no negative impact on the coastal morphology, hydrodynamics and ecological systems including the corals, if any. The mitigative measures as may be suggested by the NIO for this purpose shall be implemented by the GAPL.	The EIA report was prepared by NIO and specific design considerations were taken into account for carrying out various studies for preparation of the same. Findings of the studies were considered before commissioning of the construction activities. There are no corals present at the project site.
5	A comprehensive EIA shall be prepared and submitted to this Department by the GAPL, before commissioning of the SPM. All the suggestions for environmental protection /management that may be given in the comprehensive EIA shall be implemented by the GAPL.	Complied. EIA study has been completed and report is already submitted to MoEF&CC and other concerned authorities. Based on the same, Environment and CRZ clearance was granted by MoEF&CC. • A Regional Impact Assessment study to identify impacts of all the existing as well as proposed project activities in Mundra region inline to ToR issued by GCZMA. 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'19 to Sep'19. • 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 of the same were submitted along with previous half yearly EC Compliance report for the period Oct'20 to Mar'21. • 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

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		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. Details of the same were submitted during the last compliance period Apr'22 to Sep'22. However, APSEZ is already complying with the Environment Management Plan (applicable to APSEZ) suggested in the Cumulative Impact Assessment report. The detailed compliance, applicable to APSEZ is attached as **Annexure – 10**.
6	The ground water shall not be tapped in any case to meet with the water requirements during construction and/or operation phases.	Complied. APSEZ does not draw any ground water for the water requirement. Present source of water for entire port and SEZ is desalination plant and/or Gujarat Water Infrastructure Limited (GWIL).
7	The GAPL shall ensure that the free flow of water in the intertidal area is not hampered due to proposed construction activities for pipeline corridor as well as other activities including the COT. Further, it shall be ensured by the GAPL that the nearby mangroves are not at all affected due to proposed development activities specifically the COT.	Complied. Construction activity is already completed and the project is in operation phase. Free flow of water in the intertidal area is not hampered due to any operational activities. There are no filling or reclamation activities done at any of the creeks or mangrove areas in the vicinity of the project. As per the bathymetry study carried out by NCSCM in 2017-18, it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. NCSCM study on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ and the 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. NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31.03.2024</th></tr>
<tr><td></td><td></td><td>
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. Details of the same were submitted as a part of previous 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 10.94%.
• 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.
• According to GUIDE Mangrove
</td></tr>
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<table>
<tr><th>Sr. No.</th><th>Conditions</th><th colspan="3">Compliance Status as on 31.03.2024</th></tr>
<tr><td></td><td></td><td></td><td></td><td>monitoring study report November 2023 (the report was submitted during the last compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.
• Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).
• The cost of the said study was INR 23.60 Lacs incurred by APSEZ.

Summary of Mangrove mapping and monitoring (from 2011 to 2021):

<table>
<tr><th rowspan="2">Mangrove mapping Year</th><th rowspan="2">Mangrove cover total Area (Ha.)</th><th colspan="2">Mangrove cover area Increased</th></tr>
<tr><th>Hac.</th><th>%</th></tr>
<tr><td>2011</td><td>2094</td><td>-</td><td>-</td></tr>
<tr><td>2011 to 2016-17</td><td>2340</td><td>246</td><td>11.75%</td></tr>
<tr><td>2017 to 2019 till March</td><td>2596</td><td>256</td><td>10.94%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>127</td><td>4.89</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>--</td></tr>
</table>

To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</td></tr>
<tr><td></td><td></td><td>2.</td><td>Tidal observation in creeks in and</td><td>• APSEZ carried out the tidal observations at locations similar to</td></tr>
</table>

Sr. No.	Conditions	Compliance Status as on 31.03.2024		
			around APSEZ	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 Rs. 80000 during the FY 2023-24.. The details of Removal of Algal and Prosopis growth from mangrove areas is attached as **Annexure – 11.**
		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 29 Villages. Project is covering total 16000 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. • Grass Land development: 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization. • 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 Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on

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		28th July 2023 to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The report of day celebration was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23. • Since PhD scholars and students frequently visit this area for study. we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist. • 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 previous 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 was 23.60 Lacs (Including Taxes), which was paid by APSEZ. GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted during the EC Compliance report submission for the period Apr'23 to Sep'23.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradimata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (The report of the same was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		from 2021 to 2023.
8	The GAPL shall take up massive mangroves plantation activities in addition 25 Ha. of area suitably identified in consultation with the office of the Principal Chief Conservator of Forests, GoG, as well as this Department. The GAPL shall bear the cost of the said land as well as the cost of the plantation of mangroves & its sustenance for a reasonable period of time.	Complied. Construction activities are completed & project is in operation stage. Please refer to specific condition no 1 of the compliance of EC and CRZ clearance for detailed reply regarding mangrove plantation activity.
9	In addition to the mangroves plantation, the GAPL shall also take up massive greenbelt development in and around the project site in consultation with the Forest Department.	Complied. Construction activities are completed & project is in operation stage. Please refer to specific condition no 2 of the compliance of EC and CRZ clearance for detailed reply regarding greenbelt development activity.
10	The GAPL shall provide financial contribution as many as decided by this department for any common study like carrying capacity for the Gulf of Kachchh as well as for any common facilities including Vessels Traffic Management System in the Gulf of Kachchh, for the purpose of the environment protection/management.	Complied. APSEZ is practicing well defined traffic control procedure. A VTMS service for Gulf of Kutch is provided by the VTS Gulf of Kutch, operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information before arrival and departure respectively in Gulf of Kutch is provided to VTMS information cell through agent or by directly sending mail to vtsmanagergulfofkutch@yahoo.com and vtsgok@yahoo.com Mundra port has subscribed and taking VTMS feed from

Status of the conditions stipulated under CRZ Recommendation

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		Kandla from link www.vts.gov.in. Necessary financial contribution if require will be provided on hearing from MOEF&CC.
11	The GAPL shall provide financial support in implementation of National Green Corps scheme (being implemented in Gujarat by the GEER Foundation) in Kachchh district in consultation with Forests & Environment Department.	Complied Necessary contribution if require will be provided on hearing from GEER foundation to support NGC scheme.
12	The GAPL shall bear the cost of the external agency that may be appointed by the Forests and Environment Department, GoG for supervision/ monitoring of their activities during construction and/or operational phases.	Point noted. APSEZ will provide full support for supervision and monitoring of the project operations after due discussion with the concerned agency and Forests & Environment Department, GoG. No such agency was appointed during the compliance period. As part of the directions given by MoEF&CC vides order dated 18th Sep, 2015, following studies were conducted. 1. NCSCM (MoEF&CC promoted Government Agency) study on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ in year 2016-17. The cost of said study was 3.15 Cr, which was incurred by APSEZ. As a part of mangrove conservation plan, APSEZ has done following activities. a. Monitoring of mangrove distribution in creeks in and around APSEZ and shoreline changes in Bocha island through NCSCM, Chennai. The cost of the said study was INR 23.56 Lacs incurred by APSEZ. b. Tidal observation in creeks in and around APSEZ – The cost of the said activity was INR 1.0 Lacs incurred by APSEZ. c. Algal & Prosopis removal from Mangrove area - The cost of the said activity was Rs. 80000 during the FY 2023-24. The details of Removal of Algal and Prosopis growth

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		from mangrove is attached as **Annexure - 11**. d. Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. This is activity is being done on continuous basis as a part of CSR activity. 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 was 23.60 Lacs (Including Taxes), which was paid by APSEZ. Details of Mangrove mapping study work conducted by GUIDE team and its report is mentioned in details in above compliance of condition no. 7 To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023. 2. A Regional Impact Assessment study through Chola MS, Chennai (NABET accredited consultant) to identify impacts of all the existing as well as proposed project activities in Mundra region inline to ToR issued by GCZMA. The cost of said study was 1.3 Cr, which was incurred by APSEZ.
13	The dredged material that	Complied.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	may be generated, if any, shall be disposed of at location suitably identified in consultation with the institute of repute like NEERI/NIO after due consideration of various environmental aspects and ensuring no significant negative impacts due to the same.	Construction activities are completed & project is in operation stage. SPM is approximately 8.6 km inside the open sea from the shore where 30 m of draft is naturally available. Hence no dredging is required.
14	No waste including the construction debris, oily waste from construction equipment's, untreated sewage, etc. would be disposed of in to sea/ river/ creek or in the CRZ areas. The treated sewage meeting with the norms fixed by the Gujarat Pollution Control Board and the reject water from RO plant if any, shall be disposed of at a point in the deep sea as may be suggested by the institute of repute like the NEERI/NIO.	Complied. Construction activities are completed and the project is in operation phase. There is no disposal of any waste including civil debris in CRZ area. No Sewage or RO Reject water is being generated by SPM activity.
15	The Gujarat Maritime Board shall ensure that the Vessel Traffic Management System for safe navigation in the Gulf of Kachchh shall be established and commissioned before commissioning of the SPM No. 1 by the GAPL. The GAPL shall follow up for this with various stakeholders and provide financial and technical inputs for the same.	Complied. Kandla, GMB & DGLL are the agencies who financially support to VTMS. For SPM, APSEZ is mutual partner to support in case of Oil spill & vice versa. For further details regarding traffic management, please refer condition no. 10 of CRZ recommendations above.

Sr. No.	Conditions	Compliance Status as on 31.03.2024
16	A mutual aid system for the Mundra Port region shall be developed to meet with any unforeseen circumstances or to meet with any accidental condition. The GAPL shall take a lead for this by involving other stakeholders including HPCL.	Complied. APSEZ has signed an MoU with HPCL, Mittal Pipeline Ltd., Mundra in the region of Gulf of Kutch to assist each other within stipulated time frame with best combination of resources. **Interface with ROSDCP and NOSDCP** For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster Contingency Plan NOSDCP which has the approval of the Committee of Secretaries and has been in operation since 1996. The NOSDCP brings together the combined resources of the various organizations and departments, Coast Guard, Ports and Oil handling Agencies, and related industries, to provide a level of preparedness to the threat posed to the marine environment by oil spills. Latest Regional Level Pollution Response exercise "SWACHCHH SAMUDRA-NW 2023" was carried out by Indian Coast Guard on 25th November, 2023 at Vadinar, Gujarat. All participants from various Oil Handling Agencies and Stakeholders (IOCL-Jamnagar, APSEZ- Mundra, Nayara Energy LTD VOTL- Vadinar, Reliance Industries LTD- Sikka Jamnagar, Essar Bulk Terminal- Salaya and Coast Guard) were participated in this exercise. Details of the same is attached as **Annexure - 3**.
17	A detailed Risk Assessment and Disaster Management Plan shall be worked out before commissioning of the SPM by the GAPL and the mitigative measures shall be identified and implemented. The local Oil Spill Contingency Plan in lines with the National Oil Spill Disaster Contingency Plan for the Mundra Port shall be put in to operation immediately.	Complied. Detailed Risk Assessment and Disaster Management Plan were prepaid By Tata AIG risk assessment services and few mitigation measures are addressed in compliance of specific condition no 10 of EC & CRZ clearance above. These studies were carried out before the start of the development activity and were considered by MoEF&CC before grant of the EC and CRZ clearance. For responding to oil spill, the Indian Coast Guard has developed the National Oil Spill Disaster 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. Please refer specific condition no 5 of EC & CRZ clearance

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		for further details.
18	Proper rehabilitation scheme shall be worked out for local fisherman communities in consultation with the District Collector/the Commissioner of Fisheries, Government of Gujarat, before commissioning of the SPM and report shall be furnished to the Forests and Environment Department.	Not applicable Location of SPM is unmanned (approximately 8.64 km inside the open sea from the shore) hence, there is no displacement of people, houses or fishing activity as a result of the project. However, APSEZ performs large scale socio-economic upliftment program and shares the details with FOKIA (Federation of Kutch Industries Association) chaired by District Collector quarterly. For further information related to CSR activities carried out by Adani Foundation in the Mundra region, please refer to compliance of General condition no. 2 of the EC and CRZ clearance above.
19	The construction labour shall be provided with adequate amenities/ facilities including the water supply, sanitation and fuel to ensure that the existing environmental condition is not deteriorated by them. The camps for the construction labour shall be kept outside the CRZ area. The GAPL shall ensure that there is no confrontation amongst the local villagers and construction labour.	Complied. Construction activity is already completed, project is in operation phase. No construction camps were located in CRZ area. Most workers came from nearby villages however, for others; construction camps were located outside CRZ area. All necessary infrastructure and facilities like mobile toilets, safe drinking water, medical health care etc. were provided.
20	All possible social and health impacts due to the proposed development at Mundra Port shall be assessed in detail in the comprehensive EIA and a detailed management plan shall be developed to mitigate the same.	Complied. Aspects of social and health impact were studies as part of EIA report prepared by NIO and mitigation measures have been implemented. APSEZ performs large scale socio-economic upliftment program and shares the details with FOKIA (Federation of Kutch Industries Association) chaired by District Collector quarterly. For further information related to CSR activities carried out by Adani Foundation in the Mundra region, please refer
21	The GAPL shall work out a detailed socio-economic upliftment programme in	

Sr. No.	Conditions	Compliance Status as on 31.03.2024
	consultation with the District Collector and District Development Officer and shall implement the same. Separate budgetary provisions shall be kept for this purpose.	to compliance of General condition no. 2 of the EC and CRZ clearance above.
22	An Environmental Management Cell with person having proper background shall be constituted. A separate budgetary provision shall have to be made for implementation of the Environmental Management Plan.	Complied. APSEZL has a well-structured Environment Cell, staffed with qualified manpower for implementation of the Environmental Management Plan. For further details on the same, please refer to compliance of general condition no. 4 of the EC and CRZ clearance above. Separate budget for the Environment Protection measures is earmarked every year. For further details on the same, please refer to compliance of general condition no. 5 of the EC and CRZ clearance above.
23	Post project environmental monitoring shall be carried out regularly through a reputed institute like NEERI/NIO and report shall be submitted to the Forests and Environment Department, GoG every year.	Being complied. Monitoring of various environmental parameters for Ambient Air, Noise, marine water and sediments is being carried out by NABL accredited and MoEF&CC approved agency namely M/s. Unistar Environment and Research Labs Pvt. Ltd., Vapi. 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. Summary of the same for duration from Oct'23 to Mar'24 is mentioned below. **Total Ambient Air & Noise Sampling Locations: 5 Nos.**

Parameter	Unit	Min	Max	Average	Perm. Limit$
AAQM					
PM10	µg/m3	63.95	87.13	78.78	100
PM2.5	µg/m3	23.58	38.10	31.82	60
SO2	µg/m3	18.96	33.47	26.17	80
NO2	µg/m3	22.58	38.54	30.55	80
Noise	**Unit**	**Leq Min**	**Leq Max**	**Leq Avg.**	**Leq Perm. Limit***

Sr. No.	Conditions	Compliance Status as on 31.03.2024
		<table><tr><td>Day Time</td><td>dB(A)</td><td>58.70</td><td>69.8</td><td>64.91</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>53.8</td><td>64.8</td><td>61.05</td><td>70</td></tr></table> $ as per NAAQ standards, 2009 * as per CC&A granted by SPCB Values recorded confirms to the stipulated standards. Marine water monitoring is carried out on monthly frequency. In order to analyzed marine water quality, marine sampling is being carried out at a location nearby SPM. Please refer specific condition No. 8 of EC & CRZ clearance above. Environmental monitoring reports for the period from Oct'23 to Mar'24 are enclosed as **Annexure – 4**.
24	No construction activities shall be carried out by the GAPL in any of the Forest areas.	Already Complied. Not applicable at present. The construction work is completed and project is in operation phase. No construction activity at any of the forest area is carried out for project of SPM, COT and connecting pipeline.
25	All necessary clearances from different Government Department/Agencies shall be obtained before commissioning any construction activities.	Complied. All necessary clearances as per prevailing laws have been already obtained. Construction activity is already completed, project is in operation phase.

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance Status as on 31.03.2024</th></tr>
<tr><td>26</td><td>A half yearly compliance report with respect to above mentioned conditions as well as the implementation of the suggestions/ recommendations of the EIA and Risk Assessment reports shall be furnished to the Forest and Environment Department, GoG, without fail at regular interval.</td><td>Complied.

Compliance report of EC conditions is uploaded regularly. A soft copy of last compliance report including results of monitoring data for the period of Apr'23 to Sep'23 was submitted through e-mail to Integrated Regional Office (IRO), MoEF&CC @ Gandhinagar, Zonal Office of CPCB @ Baroda, GPCB @ Gandhinagar & Gandhidham and Dept. of Forests & Env., Gandhinagar on dated 30.11.2023. Copy of the same is also available on our web site https://www.adaniports.com /ports-downloads.
Please refer below for the details regarding past six compliance submissions.

<table>
<tr><th>Sr. No.</th><th>Compliance period</th><th>Date of submission</th></tr>
<tr><td>1</td><td>Oct'20 to Mar'21</td><td>25.05.2021</td></tr>
<tr><td>2</td><td>Apr'21 to Sep'21</td><td>30.11.2021</td></tr>
<tr><td>3</td><td>Oct'21 to Mar'22</td><td>30.05.2022</td></tr>
<tr><td>4</td><td>Apr'22 to Sep'22</td><td>30.11.2022</td></tr>
<tr><td>5</td><td>Oct'22 to Mar'23</td><td>30.05.2023</td></tr>
<tr><td>6</td><td>Apr'23 to Sep'23</td><td>30.11.2023</td></tr>
</table>

All the recommendations given in the report of Tata AIG Risk Management Services are implemented. For further information related to the same, please refer to compliance of specific condition no. 10 of the EC and CRZ clearance above.</td></tr>
<tr><td>27</td><td>The GAPL shall also have to comply with any other condition as may be stipulated by the Forests and Environment Department, GoG, from time to time.</td><td>Point noted.</td></tr>
</table>

Annexure – 1

Details of Greenbelt Development at APSEZ, Mundra

	Total Green Zone Detail till Up to March 2024				
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
20	Kukadsar-(Bhadeswar-Mundra)	Kutch	250	2023-24	Avicennia marina	Shreeji Enterprise, Amreli
Total			**4140**			

Annexure – 2

CSR Gujarat

Kutch – Hazira – Dahej

adani Foundation

ANNUAL REPORT 2023-24

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

From Pledge to Progress Further,

I am happy to share that Adani Foundation continued to make significant strides to elevate the sustainability of our CSR operations. This year We prioritize capacity building and awareness on ESG, as evidenced in 8 employees completing training modules that raise awareness about best practices in ESG. We raised the bar through our environmental initiatives, Water Conservation, Terrestrial and Coastal Biodiversity. We are also spreading awareness for reducing paper usage, Reducing emissions through firewood cooking, diesel free village drive at Surat district and increasing the green cover by planting trees. We enhanced the impact of our social initiatives by empowering women through Enhancing skill and Livelihood, increasing gender diversity and improving inclusivity. We are working for socio economic upliftment marginalized community i.e. Primitive Tribes at Bharuch and Surat district and fisherman at Kutchh district.

Our commitment to sustainable CSR operations has earned the trust of our stakeholders and contributed to our success. It has also helped us build a more resilient, sustainable and profitable business. I thank our Adani Foundation Team for their continued support and dedication to our commitment to sustainable CSR practices, as we remain focused on driving long-term value for our stakeholders, and the communities in which we operate.

With best wishes,

Rakshit Shah

Contents

CSR KUTCH

The Adani group plans to invest over two lakh crore rupees in Kutch over the next five years, creating around 100,000 jobs. The investment is expected to contribute to a Vikshit Gujarat, with the group constructing a world-largest green energy park in Khavda, Kutch, and expanding its green supply chain. Kutch Copper Ltd, a subsidiary of Adani Enterprises Ltd (AEL), the world's largest single-location copper manufacturing plant at Mundra in Gujarat, will start operations of the first phase by March-end and full-scale 1 million tonnes capacity by FY29. Mundra Port, Adani Power Plant, Adani Wilmar and Mundra Solar is reached to remarkable development !

Adani Foundation is instrumental in Mundra from 25 years but for last 3 years, started CSR at Khavda, Nakhtranana, Lakhpat and Abdasa Taluka in Community health care, Women Empowerment and Water conservation core.

Demographic Details

Block	Villages	No. of HHs	Population
Mundra	61 Village	35192	153179
Anjar	6 Villages	5350	28500
Nakhtrana	22 Villages	14093	36373
Lakhpat	20 Villages	8092	18976
Khavda	22 Villages	8450	35200
Rapar	3 Villages	345	12450
Mandvi	8 Villages	2780	14560
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 PV Ltd
7. Mundra Petrochem Ltd
8. Adani Kandla Bulk Terminal Private Limited
9. Adani Solar Limited – Bitta, Abdasa
10. Adani Green Energy Limited – Nakhatrana
11. Adani Green Energy Limited - Khavda
12. Adani Energy Solution Limited – Rapar

Environment Sustainability

Water Conservation

Soil Conservation

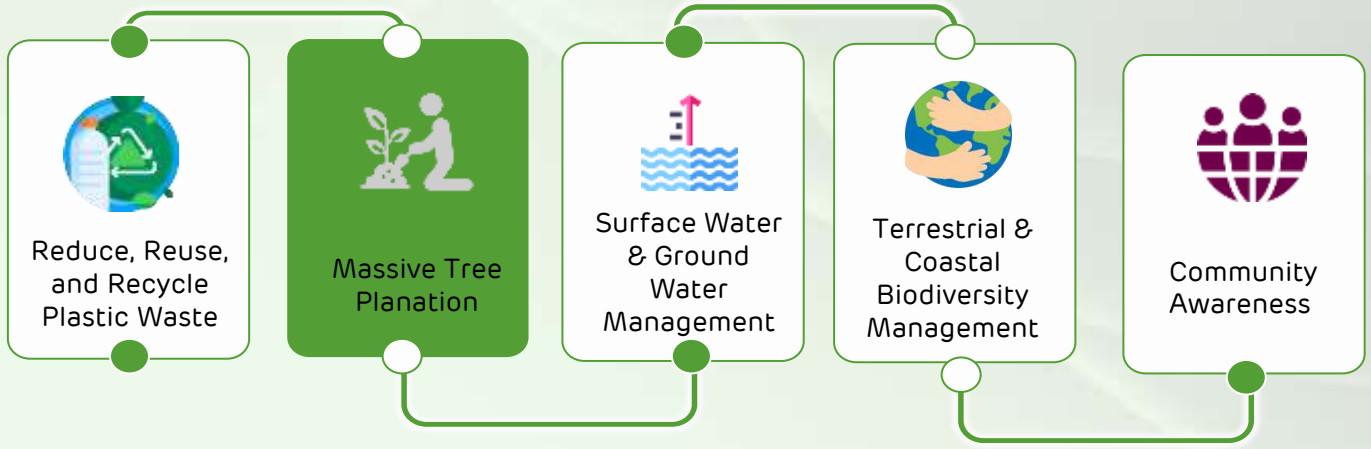
Terrestrial Biodiversity

Coastal Biodiversity

Plastic Free Drive

Environment Sustainability

As per UN Sustainable Development Goal. 13 - The environment and biodiversity serve as the lifeblood of our planet, playing a crucial role in maintaining ecological balance and sustaining life in all its diverse forms. Preserving them is more than a necessity; it is a shared responsibility to secure the health and well-being of both present and future generations. Adani Foundation embodies this commitment through its varied environmental projects. These range from extensive tree plantation and mangrove restoration to innovative biogas provision, drip irrigation, Plastic Free Drive, groundwater recharging, and water conservation.



Action to environment Sustainability

Swajal Project

AIM:

The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district.

Vision:

Devising eco-friendly and cost-efficient methods of water body rejuvenation, the project works

1. To revive existing water resources,
2. Plan sustainable infrastructure for protection of natural water bodies
3. Improve ecological conditions around the area.

Process:

1

Stakeholder's participation

Foundation involved farmers, community members, Gram Panchayat and Govt. departments throughout the various phases of project cycle.

2

Decisions backed by scientific evidence

A thorough study of the topography & watershed delineation and primary water-related data was gathered through experts with involvement of the government to identify water bodies and the proposed project sites

3

Participatory Rural Appraisal Approach

Participatory Rural Appraisal approach backed by triangulated baseline assessment data was used to implement local solutions for resolving issues pertaining to water (Quantity and Quality)

Water Security Plan

Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared for all the Seven villages.

To prepare water security plan following method has been adopted:

1. Overview of the Project villages through primary field visit and reference of prestudied and reports.
2. Survey of existing surface water resources to assess the potential and further scope of development.
3. Groundwater monitoring in term of storage and quality assessment.
4. Water balance calculation considering water supply and demand estimation.
5. Integrated water resource development and management plan for each village.

Swajal in Kutch – Block wise:

Sr. No.	Block Name	Water conservation structure	Total no. of Structure	Total Capacity Created (CUM)
1	Mundra	Check Dam	23	6,07,332.80
		Pond Deepening	66	1,89,121.08
		RRWHS	275	2750
		Percolation Well	24	-
		Bore & Well Recharge	209	-
2	Dayapar	Pond Deepening	2	9,200
		Check Dam	1	18,000.00
3	Khavda	Pond Deepening	1	2,000
		Check Dam	1	16,000.00
4	Abdasa	Pond Deepening	1	22,000
5	Lakhpat	Check Dam	1	21,237.64

Swajal - Impact:

28,000 farmers Benefited

7.2% Increase Revenue

17% TDS reduced

Rs. 1150 Reduce in health expenses/month

Total Water capacity increased ⟷ **8,87,641 Cum = 31.35 MCFT**

Water Conservation Structure:

Soil Conservation

1250 Farmers	07 exposure	857 Farmers	258 Gobardhan	35 Farmers	Rs.9.88 Lacs RG
•**Awareness Sessions at Village Level:** Spreading awareness on natural farming benefits and address their concerns.	•**Hands-On Training & Exposures :** Arranged Workshop and training to emphasizing on real-world techniques.	•**Link with Government Scheme**: facilitation of govt. Cow Nurturing scheme to promote eco-friendly farming practices.	•**Bio-gas Support:** Link with Gov Gobar Dhan Biogas Unit Nutrient-rich slurry serves as an essential organic fertilizer for natural farming	•**Natural Farming Certification Process** to obtain natural farming certification through the GOPCA for the 35 Farmers who are Members of Raj shakti Sahakrai Mandali.	•**Marketing Assistance:** Provide platforms and resources ensuring fair prices and broader consumer reach.

Natural Farming

Natural farming is an urgent need of the hour, We have initiated a comprehensive approach to promote natural farming practices through a variety of activities aiming to minimize pesticides and chemicals uses ,lead to produce , nutritious, chemical-free produce which is benefitting both farmers and consumers by providing healthier and more sustainable food options as well as plays significant role to flourishing environment and balanced ecosystem.

** Funded by -Mundra Petro chem Limited*

Home Biogas

Phase	unit	Unit Cost In Rs.	AF Support in Lac	Beneficiaries Contribution in Lac	Gov. Convergence in Lac	Total in Lac
Phase -1	125	23200	29	3.75	0	32.75
Phase -2	100	42000	42.0	5.0	0	47
Phase -3	100	42000	0	5.0	37	42
Phase -4	258	42000	6.45	6.45	95.46	108.36
Total	**583**	**149200**	**77.45**	**20.2**	**132.46**	**230.11**

Home biogas systems, adept at converting organic waste into renewable energy, present a sustainable and eco-friendly solution for cooking. We have started this project in 2020, with farmers contributing 10% towards the cost, that persisted till 2022. Since then, we have scaled our initiative by aligning with government home biogas schemes to amplify the reach and adoption of this eco-friendly technology in wider rural regions.

The deployment of home biogas has been particularly transformative for women, offering a healthier, smoke-free cooking environment reducing greenhouse gas emissions.

Current year we process to facilitate 258 Gobardhan unit through Gov.

** Funded by -Mundra Petro chem Limited*

Natural farming Workshop with Governor of Gujarat

- To promote natural farming, the Adani Foundation and Shri Rajshakti Natural Farming Cooperative Society Ltd. are making numerous efforts in kutch. In our endeavor to motivate and raise awareness among farmers, we recently organized a significant event inviting the Governor of Gujarat, Shri Acharya Devrath, Mr. V.S. Gadhavi, Executive Director of the Adani Foundation, and other distinguished guests. Addressing a gathering of 2000 farmers, Shri Acharya Devvrat aimed to inspire and enlighten them about the benefits and importance of adopting natural farming practices.
- "The foundation of people's well-being and health lies in the health of the land. Natural farming is the only way for this," said Acharya Devvratji, emphasizing that microscopic organisms in the soil nourish crops with essential elements, providing healthy and nutritious food. Devvratji highlighted the harmful effects of chemical fertilizers and pesticides on the land and urged farmers to adopt natural farming practices.

** Funded by -Mundra Petro chem Limited*


प्राकृतिक खेती
किसान परिसंवाद

Revival of Date Palm destroyed by **BIPORJOY Cyclone**

Dates Tree -Restoration

Biparjoy cyclone has damaged huge number plants of Dates, Mango, Sapota. In coordination with Kutch Crop Services and Krishi Vigyan Kendra – more than 615 plants are restored till date and continue. This initiative has created trust and credibility in farmers of Mundra. As for one date tree Average revenue is 25000 INR – this initiative revenue generation will be 1.53 Cr per year which is remarkable.

** Funded by -Mundra Petro chem Limited*

Go Green – Horticulture Saplings Distribution to Farmers

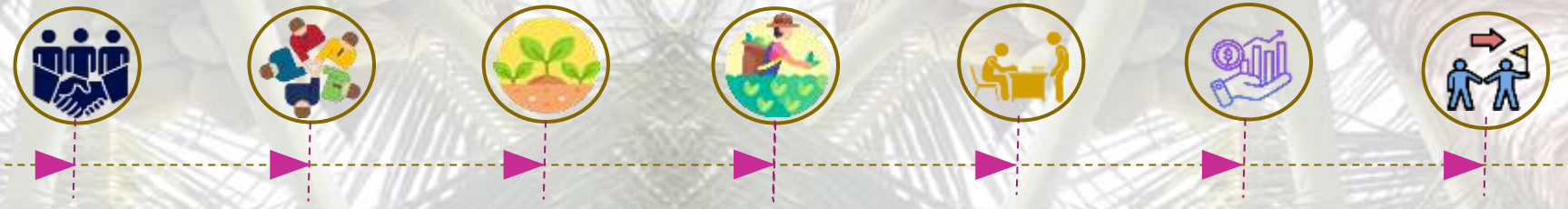
Objective :

In alignment with a vision for sustainable agriculture and environmental stewardship, MPL aims to empower local farmers and contribute to larger environmental goals. The initiative focuses on providing financial assistance to 200 farmers for cultivating horticultural saplings.

Impacts :

- Environmental sustainability
- Carbon sequestration
- Soil conservation
- Combat climate change
- A healthier ecosystem
- Contributing to a cleaner atmosphere

Road Map:



Aim- Financial aid to **200** Farmers

Partnership with KKPC (Kutch Kalpataru Producer Company)

Meeting with Farmers

Farmer's field assessment visit

Verification of Farmers legal documents

Registration Process

Credit **Rs.10,000** to each farmers

Quarterly follow-up of the saplings

** Funded by -Mundra Petro chem Limited*

Go Green – Horticulture Saplings Distribution to Farmers

Supported the plantation of 53,136 fruit brearing trees. These plants will sequestrate 1,465.00 MT of CO2 after 5 years as per calculation in Mundra Petrochem villages

Carbon sequestration Value :

Name of Fruit bearing Tree	Co2 Sequ Kg	No of Plants	Total Co2 Seq - Kg
Mango	41.47	33,780	1,4,00,856.6
Custard Apple	4	1,300	5,200
Dates	12.8	15,856	2,02,956.8
Coconut	26.87	2,200	59,114
Total		**53,136**	**1,465,170.6**

** Funded by -Mundra Petro chem Limited*

Event: Horticulture Sapling Distribution and No Plastic Drive

Noteworthy event unfolded at the serene Sonal Mata Ji Temple in Vakrai - Moti Bhujpur, organized by Adani Foundation and Adani Petrochemicals. The focus of this gathering was giving away horticulture saplings through financial assistance, a symbolic step towards fostering a cleaner and sustainable environment.

Our esteemed guests for this event include R N Parmar, RO GPCB; Javed Sindhi, Mamlatdar Mundra; Vinay Kumar Singh, Head ESG MPL; Bhagwat Swaroop Sharma, Head Environment; Panktiben Shah, Head CSR Gujarat; Vishnu Patidar, ESG expert; and Laxmiben Ninjan, Sarpanch Bhujpur.

Mr. R.N. Parmar addressed the imperative need for cultivating a green and healthy environment for current and future generations. Additionally, he praised the efforts of Adani Petrochemicals and Adani Foundation, emphasizing the importance of sustainable practices.

The primary objective of the event was to extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. Presently, MPL is aiding over 300 farmers in planting a total of 53,136 fruit-bearing plants.

The event further shone a spotlight on past beneficiaries of drip irrigation and tissue dates distribution, who took the stage to share their experiences and express gratitude for the transformative support received. Adding a touch of artistry, small Utthan students staged a captivating environment protection act,.

As the event wrapped up, a strong commitment was made to keep supporting and assessing efforts for a greener environment, contributing to carbon sequestration.

** Funded by -Mundra Petro chem Limited*

Terrestrial Biodiversity

Vruksh Se Vikas – Massive Drive

Since 2014, we has embarked a transformative journey to execute a wide range of tree plantation drive in collaborating with local communities and forestry departments .

1. Miyawaki Forest Development: Native species planation In the 2-acre area at Nana Kapaya village creating a flourishing mini-forest with 5,508 trees.

2. "Adani Van": Barren spaces were transformed into lush green havens through our massive public plantation drives. One notable example is the Bhupur Visri Mata Temple, where 23,000 trees were planted. Second example Momai Mata temple, Desalpar 10,000 trees were planted. Third Example Matiyadada at Bhujpur 8000 trees were planted. Fourth example Rasha pir, Dhrub 2-acre 5000 tree planted. Thus, in PPP Model 4 Adani Van were developed where 46,000 trees were planted.

Prakruti Rath: This initiative goes beyond just planting trees; it is about fostering a sense of responsibility towards our environment. Through 46,750 sapling distribution to individuals, we have empowered communities to take ownership of their surroundings, leading to a heightened consciousness about the environment's significance.

Till the date Total 1.49 Lac tree plantation have been done that has enriched the local ecosystem and significantly contributed to carbon sequestration

Completed the plantation of 1,49,889 trees. These plants will sequestrate 3180.00 MT of CO2 after 5 years as per calculation in Mundra Petrochem villages

1.49
Lac tree plantation

** Funded by - Kutch Copper Limited*

Coastal Biodiversity

Mangrove Biodiversity

In 2010, we initiated a mangrove plantation project at Luni coastal belt, ultimately leading to 162 hectares of dense mangrove forests. Subsequently, we expanded our efforts by planning and implementing a multi-species mangrove plantation across an additional 20 hectares. These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem..

Since PhD scholars and students frequently visit this area for study. we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist

Mangrove Plantation Work Detail

Sr. No	Year	Number	Person days	Remarks
1	2011-12	50000	3000	
2	2012-13	125000	6943	
3	2013-14	60000	1480	
4	2014-15	125000	6501	
5	2015-16	65000	3533	
6	2016-17	20000	3125	
7	2017-18	100000	3666	
8	2018-19		7539	Algal Removal work
9	2019-20		6261	Algal Removal work
10	2020-21		4830	Algal Removal work
11	2021-22	97000	5200	
12	2022-23	100000	4445	
	Total	**742000**	**56523**	

4+ Spices of Mangroves

60+ Coastal Spices as habitat preservation

160+ Hector Avicennia marine plantation

20+ Hector Biodiversity park

** Funded by -Mundra Petro chem Limited*

Plastic Free Drive

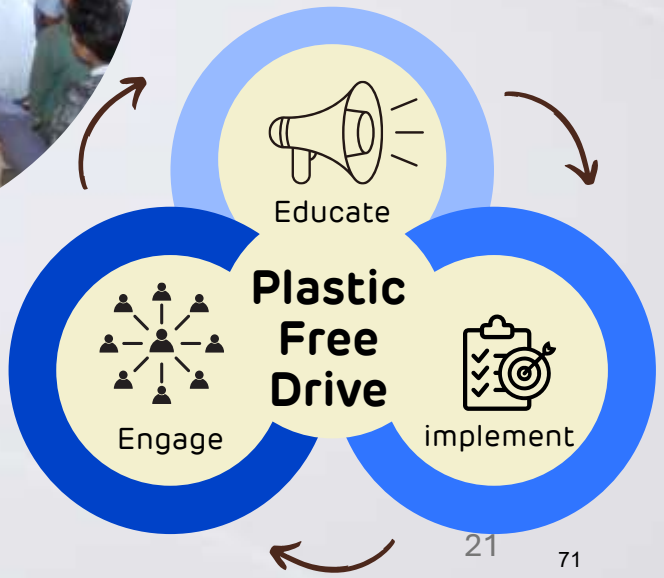
Objective:
The central aim of the Plastic-Free Drive is to empower and enlighten students as key agents of change, enabling them to disseminate awareness and instill the practice of reducing single-use plastics within their community.

1.Educate: Spread awareness about the harmful effects of plastic on the environment, marine life, soil health, and human well-being.

2.Engage: Mobilize community members, especially the youth and family members to actively participate in plastic waste reduction activities.

3.Implement: Introduce sustainable alternatives to ensure proper disposal and recycling. As of now we supply plastic to one NGO to preprare Garden benches. .

Outreach :-
12000 Students of Primary Schools.
990 Students of Secondary Schools of Mundra Block.



** Funded by -Mundra Petro chem Limited*

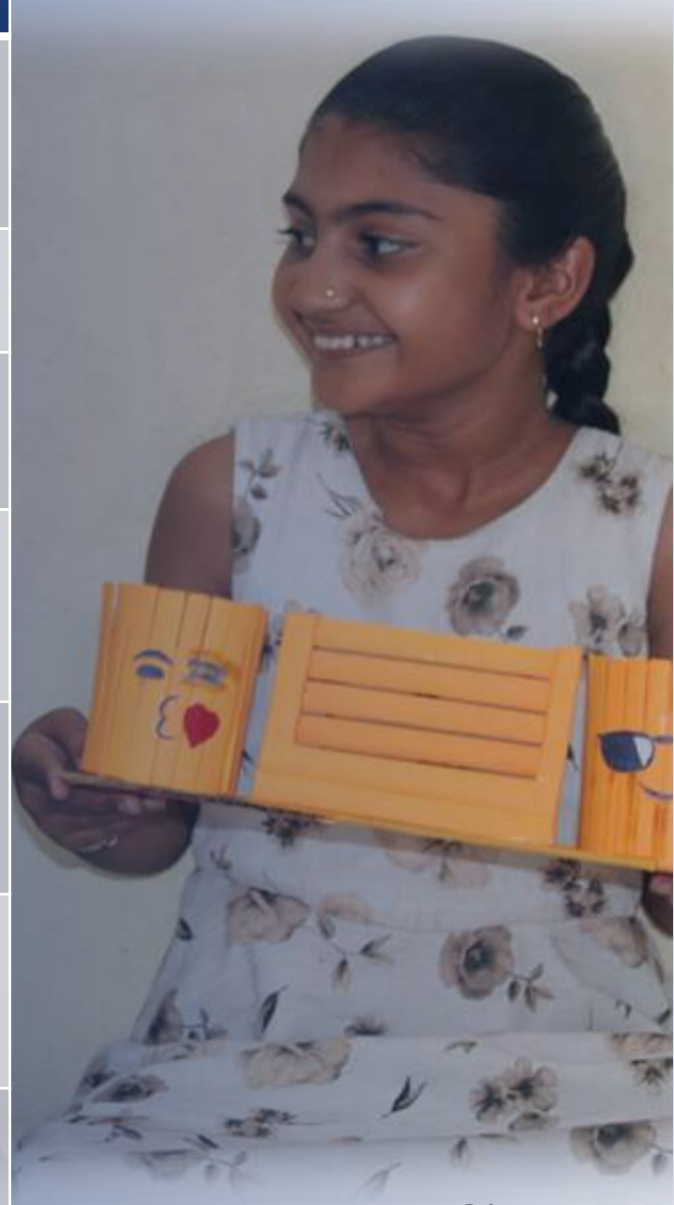

5 Years
उत्थान
2018
adani
Foundation

Education: Utthan

Project Utthan, an innovative initiative by the Adani Foundation by Mou with DEO, which aligns seamlessly with both the National Education Policy 2020 and the Sustainable Development Goal. By adopting government primary schools, Utthan fostering community engagement, it aims to create model schools that empower students and elevate education quality. By providing dedicated teachers and essential facilities, Utthan strive to enhance the Gunotsav results of primary schools and improve the Board results of 10th standard students. Project Utthan takes the lead in initiating various co-curricular activities to ensure the holistic development of students. Through capacity-building programs and collaborative efforts, we envision a future where every child receives holistic and empowering education, paving the way for a brighter tomorrow.

उत्थान
An initiative of the Adani Foundation

Utthan Initiative	SDG 4	NEP 2020	Benefited
Strengthening government Primary & High schools	Target 4.1.0 suggest to contributes to providing quality education for all.	4.1 and 4.2 - improving primary education.	31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.
Appointing an Utthan sahayak	Target 4.1.1 suggest to support students.	5.2 - focus on capacity building and support systems	70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.
Mainstreamed Progressive learner	Target 4.6.1 suggest fixed level of proficiency in functional	2.1 and 2.2 Mainstream students from progressive learners	Assessment : 6982, Progressive learners : 2541 Mainstreamed : 1278.
Providing required resources and facilities	Target 4.2.1 Suggest the necessary resources for effective learning.	7.4 and 7.5 emphasis on infrastructure development and resource availability.	Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.
Enabling joyful learning spaces	Target 5.1.2 Suggest positive and engaging learning environments	5.9 & vision of NEP suggest experiential learning to encourages creativity.	Smart Class with Navneet software+ Bala painting + Activity base learning.
Adani Students Development Center (ASDC)	Target 6.1.2 Suggest preparing students for future opportunities.	20.1 and 20.2 NEP's It resonates with the NEP's focus on holistic development and skill-building.	2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center
Introducing English as a Third Language	Target 5.1.2 Suggest other language learning.	4.13 emphasizes multilingualism and language learning.	Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English



Utthan Initiative	SDG 4	NEP 2020	Benefited
Enhancing Reading Habits	Target 7.1.2 Promote literacy and a love for reading.	2.8 Supports the NEP's goal of enhancing reading & comprehension skills.	Redding corner , 1000+ Oasis workshop , 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month(ISLM)
IT on Wheels	Target 4.2.3 Promotes Digital literacy.	5.9 focuses on integrating technology in education.	2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students , 200+ High schools' students
Promote sports	Target 6.1.2 Suggest preparing students for future opportunities	4.8 promoting physical fitness and sports.	6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh : 2000+
Teachers' & Sahayak Capacity Building	Target 4 C Suggest to qualified teachers by cooperation	2.6 emphasizing teacher training and professional development.	3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.
Formation of Eco Club	Target 5.1.2 Suggest to increase awareness of Environment.	4.44 Promoting environmental awareness.	Plastic free village workshop : 1250+ Students, Environment Awareness program & Tree plantation in schools.
Day Celebrations & Collaboration with GoG	Target 4.2.1 Suggest to inspire Holistic development of students	7.1 children of all ages should learn about arts, sports and careers.	Summer Camp : 6000+ Students Diwali Mela : 5500+ Students. 1400+ Parents participated.
Mothers as catalyst in transformation	Target 4.1.1 Suggest to inspire parents in growth of students	Aligned with NEP's Principles. Page No.6	Mothers meet : 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)
Strengthening Stakeholders	Target 4.1.0 suggest to work	Aligned with NEP's Preface, Page No. 4	Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.

Utthan Marks 5-Year Milestone

Celebrating the extraordinary five-year journey of Utthan in Mundra, we hosted a remarkable event graced by the presence of distinguished individuals. Among them, the Director of Primary Education, Gujarat, Mr. M. I. Joshi, brought with him not only wisdom but also a sense of grace that elevated the occasion. Standing alongside were the District Development Officer, Mr. Prajapati, and the District Primary Education Officer, Mr. Sanjay Parmar.

Yet, beyond the notable dignitaries, the event witnessed the convergence of more than 2000 students, 416 school principals and teachers, and 145 School Management Committee Members. Their collective presence bore witness to a significant milestone in the enduring journey of Utthan, leaving an indelible mark on our hearts and memories.

In this gracious event, we commend the outstanding contributions of the Principal, Utthan Sahayak, and students who have excelled over the past five years.

During the event, the children showcased their incredible talents. They enthralled the audience with mesmerizing performances, including folk songs, classical dances, and vibrant folk Garba dance. The young talents also graced the stage with captivating dramas and much more.

The event was a true celebration of their skills and abilities, and it was executed with utmost dedication and excellence.

** Funded by - Kutch Copper Limited*

Mother's Meet – Promoting Community Bond

Mothers meet is special intervention of Utthan, This year, more than 15000+ Mothe's Joined in 700+ Mothers meet. Some of the challenges and impact of this initiative through out the year is as bellow:

700+
Mother's meet

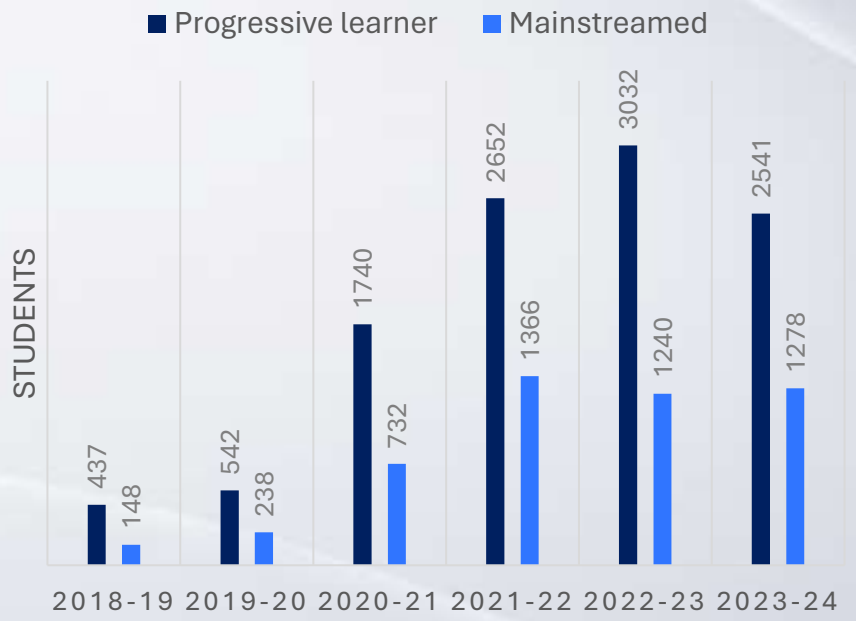
15,000+
mother participated

Challenge	Initiative	Impact
Father not interested in meeting	Engage mothers in meeting	More mothers engaged
Community not engaged with Schools	Mother's Meeting once a month	Regular engagement of the mothers
Mothers were not Contribute to Children Growth	shared tips to support their learning at home	Mothers started checking homework
Mothers Don't know about their own Children in details.	Discussed the progress and challenges of each child	Increase connection of Mothers & Students
Some Mothers don't want to came every time	Started Activities & Fun game for Mothers	Mothers started came regularly.

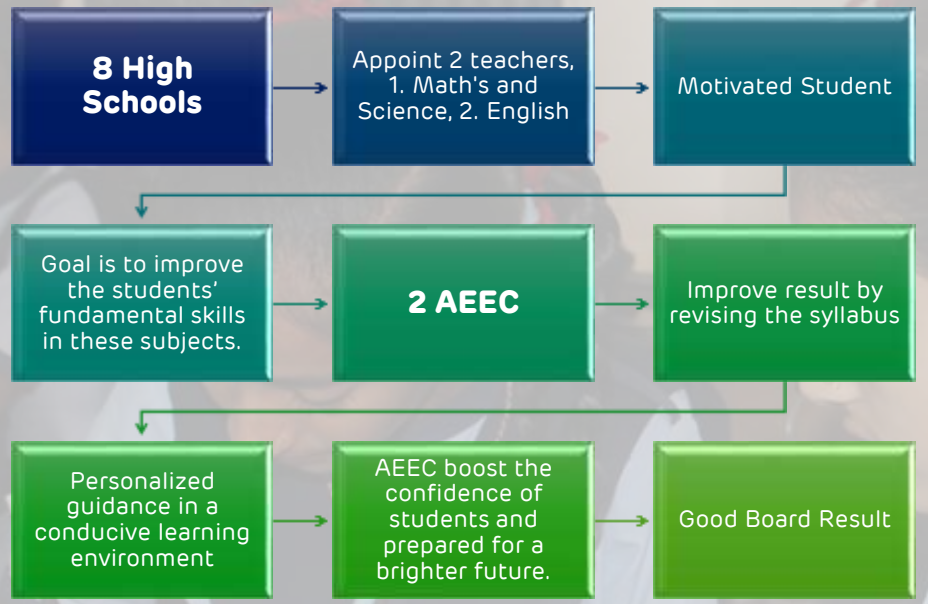
Mainstreaming Progressive learners

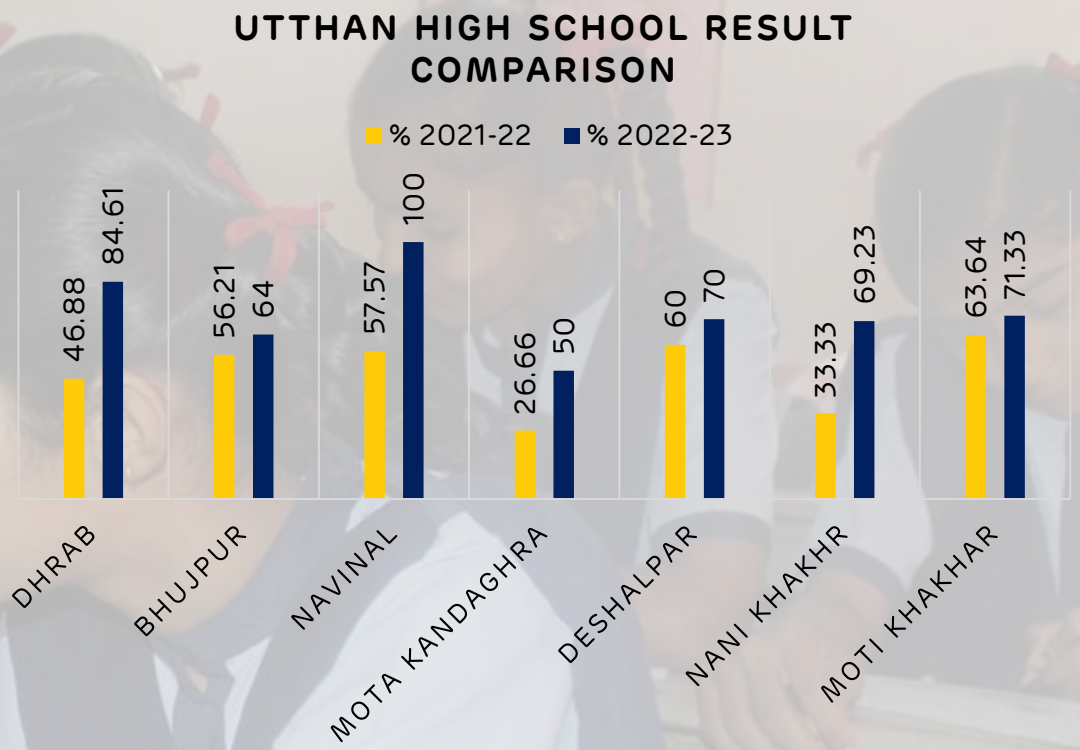
Utthan, through its assessment, has identified over 2541 Progressive students out of 6459 from 3rd to 7th standard . Among them, 1278 students have been successfully mainstreamed. The key role played by Utthan Sahayak has been instrumental in achieving this success. Utthan's approach includes a customized syllabus, activity-based learning, and teaching at the right level. Additionally, Utthan actively involves mothers and members of the School Management Committee (SMC) in strengthening progressive learners. Below is the yearly outcome of our hard work:

1278 students mainstreamed



Utthan in High Schools





Utthan other various initiatives & Achievements

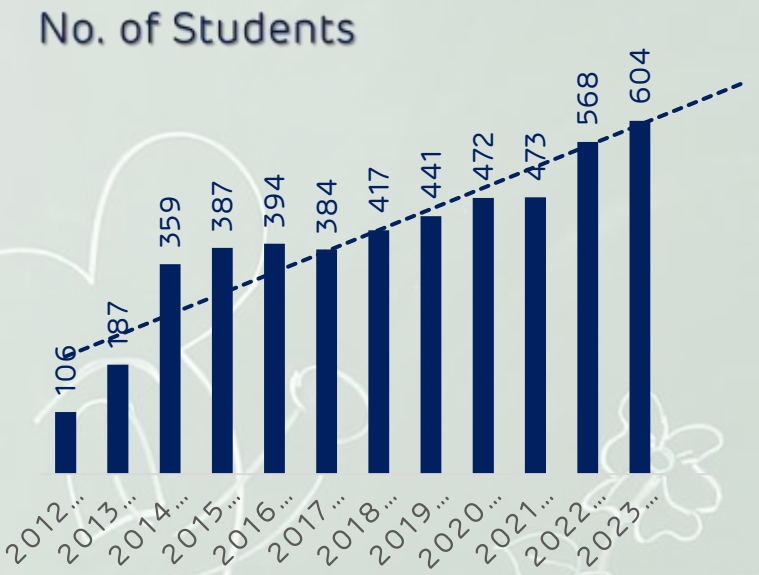
- ✓ Utthan won FOKIA Award under the category "Excellence in collaborative CSR Project.
- ✓ Utthan created special syllabus of Maths, Science & English to achieve good result in board exam.
- ✓ The Kutch University has conducted an impact assessment of IT on Wheels, which has been evaluated and certified by the DEO Office.
- ✓ Career Counselling in Utthan High Schools same remedial classes during summer break.
- ✓ Health awareness programs in schools, children of class 6 to 8 were made aware about health.
- ✓ High school girls' students celebrated Rakshabandhan with Shoulder at Boarder.
- ✓ 1000+ Students are preparing for competitive exam. Its more than double from last year.

Adani Vidya Mandir, Bhadreshwar

Empowering Communities through Free and Compulsory Education

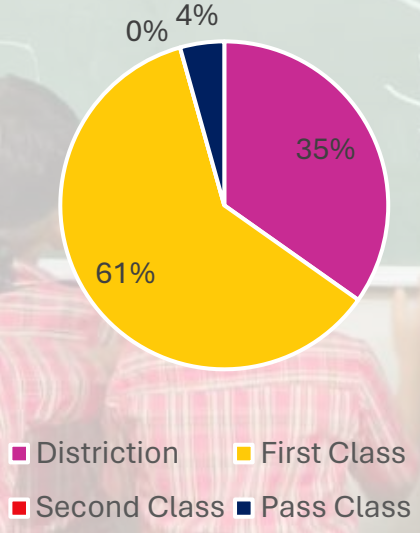
- Established in June 2012, school is a Gujarati Medium, Co-educational institution that adheres to the Gujarat State Board curriculum. It is a school for the students of KG to Class X. Starting its journey in a rented house in Bhadreshwar village, the school commenced operations with 80 students in class-I. Guided by a committed team of six teachers. In the academic year 2023-24, it proudly serves a student population of 604, with 174 students hailing from fisher-folk communities. 24 dedicated teachers are there in school. Committed to providing comprehensive and quality education, the school operates with a unique approach – offering education at no cost. Furthermore, the school extends support by providing complimentary uniforms, books, and stationery. It's noteworthy that all the students belong to the Economically Weaker Sections (EWS), emphasizing dedication to inclusivity and accessible education.
- School stands as a trailblazer, being the first state board school in Gujarat to receive accreditation from NABET under the Quality Council of India.

Adani Vidya Mandir, Bhadreshwar



Achievement in sports

- In August 2023, students of AVMB engaged in block-level sports competitions, excelling in Athletics, Kho-Kho, and Yoga. Team of AVMB: U14 & U17 boys secured 1st place in Kho-Kho and progressed to the district level.
- Notably, Abzal Reliva, a Class X student, clinched 1st position in Shot Put, and Hardev Jadeja from Class IX achieved 1st rank in Long Jump earning the opportunity to represent Mundra block at the district level.



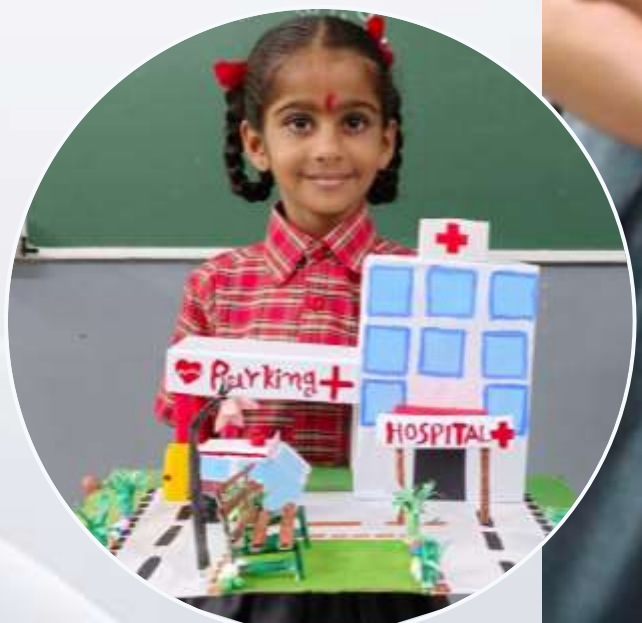
AVMB STD 10 – SSC Board Result (2022-23)		
Sr. No.	Grade	Student
1	Above 80%	8
2	Above 70%	8
3	Above 60%	6
4	Above 50%	0
5	Above 40%	1
	Total Students	23

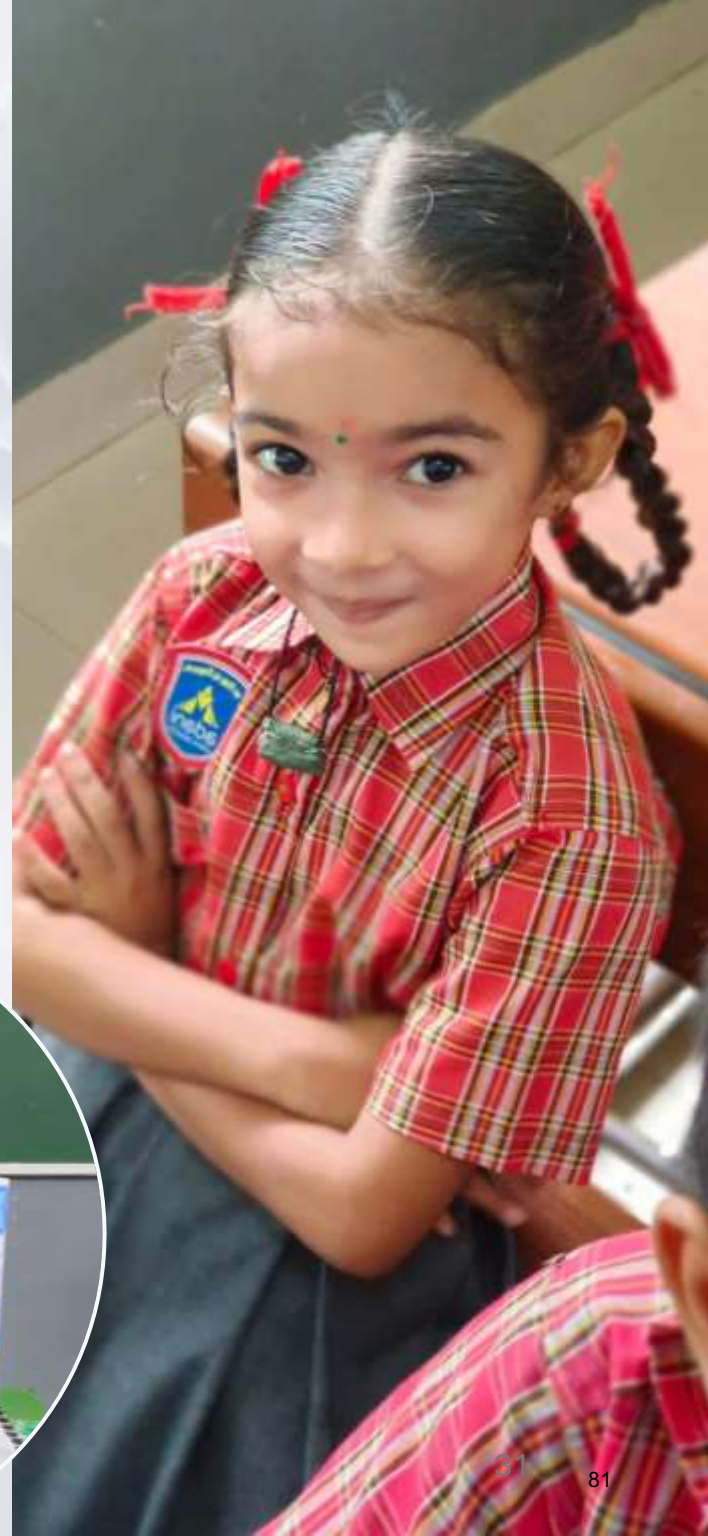
100%

Success in Gujarat Board Standard 10th Examination. 30

Achievement in Arts:

- An Essay and Quiz Competition arranged by TATA BUILDING INDIA was organized on the theme of "Recycle". 81 students of AVMB participated. Winners were recognized and rewarded by Tata Group, Rajkot. Winner students received medals.
- School orchestrated a special moment. Parents were invited to the school where they had the honor of presenting medals and certificates to the winning students. Notably, Ms. Manjaliya Najirhussain Hasam hails from the fisherman community.
- 06 Students of Class VI to VIII appeared in PRARAMBHIK VISHARAD examination conducted by BRIHAD GUJARAT SANGIT SAMITI on 14/12/2023, School is waiting for the result.
- 19 Students of Class V to IX wrote inspirational stories in Gujarati language all the stories were submitted to a publisher name: Jagdish Jepu, among them 01 story of Maheshwari Raj of Class IX title: Importance of Every individual" published in "GULSHAN" magazine in 10th edition on 11/10/2023.





Annual Function in AVMB

- On 5 March 2024, the school celebrated its 12th annual day with a pledge to plant over 25000+ saplings over 3 years in the school premises and in the surroundings, including mangroves in the coastline. The annual day named Utkarsh was aptly linked with the United Nation's Sustainable Development Goals, especially highlighting environmental consciousness.
- Utkarsh gave these students a platform to celebrate the ethos of environmental conservation with a lot of take aways in terms of showcasing learning through models based on SDGs and working models on environment and water conservation. The students presented various sustainability goals through skits, songs, and poetry narration in an enthralling event in AVMB.
- The highlight of Utkarsh 2024 was a pledge that students have taken to plant 25000+ saplings towards greening the region. The fishermen community also came forward to support the children in achieving this pledge. AVMB is committed towards contributing to a secure world. At the event, all 17 SDGs were presented in two sections – 1) Exhibition – through models, charts, and painting and 2) Drama, dance, and songs. The carefully curated event by the teachers under the guidance of the Adani Foundation sensitized the guests on the seriousness of causes, especially the importance of preserving the coastal biodiversity.
- Mr. Jugeshinder ('Robbie') Singh, CFO of Adani Group, chaired the program. He was impressed by the state-of-the-art facilities of the school and especially by the knowledge showcased by the children on the topics which are generally taken up and discussed in higher academics, policy roundtables and corporate chambers. He said, "I am humbled to be here and seeing fantastic knowledge and models presented by these young children. I am sure each of them will make great progress in their lives, become financially independent and help their families, communities and our great nation."

** Funded by -Mundra Petro chem Limited*


adani
SUSTAINABLE
DEVELOPMENT
GOALS


Total Lives Impacted


Natural Farming
(Cow based Farming):
Adopting sustainable practices i.e., organic pesticides/bio enzymes. Jivamrut ,Vermi compost , and bacterial culture to enhance Agri yield.
• First and Second phase Training given to 2200+ Farmers to motivate for Natural Farming
• 2500+ Farmers supported by 25000+ Fruit bearing Saplin
Natural Farming Training
will result in 15-20%
after 3 years.
come

About Project

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 wherein school, college students, faculties, employees from corporates are given a chance to visit the Adani Group facilities.Under this project, services are absolutely-free of cost for goverment schools.

Vision

To create a pool of inspired young minds for nation building at a global scale.

Mission

To motivate young students to dream big by exposing them to world-class industrial facilities.

Total no. of **visits** **7019**

Total no. of **participants** **447541**

Project Site

Mundra, Gujarat

(Site commenced on Dec 2010)

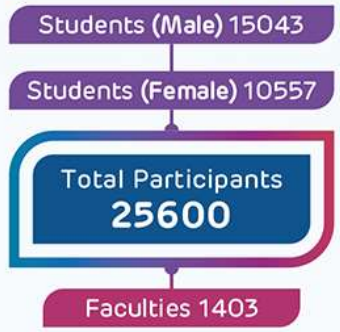
Adani Ports and Special Economic Zone Limited (APSEZ)
India's largest port operator and SEZ

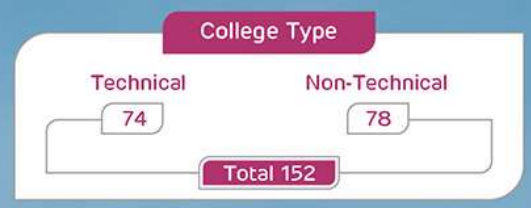
Adani Power Mundra Limited (APMuL)
India's largest single location coal based private power plant

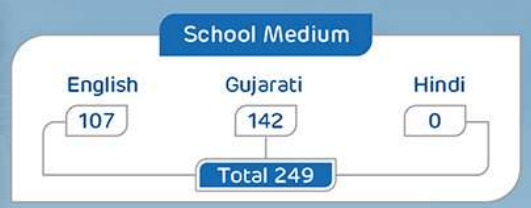
Adani Wilmar Limited (AWL)
Asia's largest single location edible oil refinery

MSPVL - Adani Mundra Solar PhotoVoltaic Limited
India's first and largest vertically integrated solar company

Mundra Windtech Ltd
A wind turbine taller than the world's tallest Statue of Unity.







Sustainable Livelihood Projects

Sustainable Livelihood - Animal Husbandry

In the face of dwindling rainfall and increasing salinity in groundwater, agriculture is under threat. Recognizing this challenge, the Adani Foundation has initiated various interventions to foster the holistic development of agriculture and animal husbandry.

Pashudhan initiative:

Two vital pillars of this initiative:

Preventive Health Care & Fodder Support Program

Preventive Health Care: Cattle Health camp

The Adani Foundation, in collaboration with the Animal Husbandry department, organizes cattle health awareness and vaccination programs in 24 villages surrounding our area. These camps bring together government veterinary doctors who conduct check-ups and administer treatments for common ailments. The remaining medicines and vaccines are provided by the Adani Foundation.

These programs are highly effective in maintaining the optimal health of livestock and safeguarding them against deadly diseases like Foot-and-Mouth Disease (FMD) and Clostridial infections. The vaccines used are specifically designed to offer long-lasting immunity against specific diseases, ensuring the continued health of the animals even in harsh environmental conditions.

18,903 Cattle Benefited → **18,870** Cattle Vaccinated → **1,140** Deworming Tablets → **982** Cattel Owner Benefited

** Funded by - Kutch Copper Limited*

Fodder Support:

Our Fodder Support Program is dedicated to assisting our neighboring villages during the challenging seasons of summer, drought, and crop failures. Through this program, we have provided a significant amount of Green and dry Fodder to ensure the well-being of both the communities.

Adani Foundation provides good quality dry and green fodder to 24 villages in our vicinity, covering 15,005 cattle of 2070 Cattel owners.

Grass Land development:

AF converted 18 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 Gauchar land is fenced and sowed with Multispecies Green Fodder with Having Good nutritive value. More than 1500 Cattle will sustain with Improving quality and quantity of milk.
1500 cattle get benefitted by green fodder for 30 days – which increase 0.5-liter milk quantity of 50% cattle.
(750 cattle x 0.5-liter milk quantity Increase x 40 INR per liter=Rs.15,000/day).
This Intervention could benefit ₹ 4,50,000.

14,38,163 Kg Dry Fodder Support
45,85,278 Kg Green Fodder Support
24 Beneficiary Villages
15005 Cattle Benefitted
2070 Cattle Owner Benefitted

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

** Funded by - Kutch Copper Limited*

Sustainable Livelihood - Fisherfolk Community

Persistent efforts for Fisherman development:

598 Education Kit Support

273 Fisherman Shelter Support

1,247 Vehicle transportation support

106 Cycle Support to high school going students

613 Scholarship Support

419 Youth Employment

195 Linkages with Fisheries Scheme

3,534 Ramatotsav Community Engagement

56,523 Man days Mangroves Plantation

Empowering Fisherfolk Communities through Education

Vehicle Transportation Facilities:

Ensure seamless access to education for school-going children from Luni, Randh and Juna Bandar Fisherfolk Students in reaching the nearest School, eliminating barriers to regular attendance.

146 Students supported Mundra Taluka

58 Students supported at Mandvi Taluka

Scholarship Support:

Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates.

Educational Awareness Sessions:

Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on advancing girl-child education.

487 Students motivated for high school Education

Cycle Support:

Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease.

Education Kits Support:

Equipping fisherfolk students in grades 9 to 12 with essential tools for academic success, including notebooks, guides, and study bags, we empower them to pursue their educational aspirations with confidence.

15 Students supported at Mundra

42 Students supported by Mandvi

Assisting During Emergencies:

Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery.

336 Fisherfolk house benefited

Fostering Youth Employment:

At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future.

115+ Fisherfolk youth employed

Strengthening Fisherfolk women:

Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support.

449 Women benefited

Potable Water Distribution:

Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity.

5000+ Population benefited

Sustainable Livelihood - Agriculture

Sustainable agriculture is a powerful force for good, safeguarding our environment. public health, communities, and the welfare of animals.

Through practices like soil enrichment, diverse crop patterns, eco-friendly cover crops, natural farming methods, orchard development, tissue culture, and water harvesting, sustainable agriculture ensures the well-being of our ecosystem while replacing harmful chemicals with healthier alternatives.

This year, the Adani Foundation continued its strong commitment to advancing natural farming in Mundra. Through various initiatives and partnerships, we provided crucial support to local farmers, empowering them with knowledge and resources to transition to sustainable practices.

2200+
Farmers educated in natural farming

800+
Farmers embracing natural farming methods

200
Farmers got financial assistance of Rs. 10,000

3
District level exposure visit

₹ 36.7 lakh
Business done by our benefited Farmers

It's more than just a farming practice; it's a commitment to nurturing our planet and enhancing lives.

Promoting Natural Farming

The Adani Foundation is dedicated to advancing natural farming through a cow-based farming initiative. Our interconnected techniques aim to boost farmer yields, with a primary focus on enhancing soil quality. We conduct pre-testing and post-testing to manage soil carbon content effectively. These are our endeavor for promoting natural farming this year:

Training

Conducted training for **1250 farmers in 16 villages**, enlightening them about the harmful effects of chemical fertilizers. Demonstrated how to produce organic fertilizer using household products, emphasizing its benefits and cost-effectiveness. After adopting it, they witnessed its positive effects on their fields.

Empowering Farmers

This year, amidst the aftermath of the cyclone, we stood by our farmers and held dedicated meetings with KVK, KCS, and DRC to restore the fallen date trees. Collaboratively, provided JCB, technical support, organic fertilizer etc. Successfully restored **615 trees**. **Each Date trees is projected to yield approximately Rs. 25,000, Total Yield in Next Season:- Rs.1.53 Cr.**

Kitchen Garden Kit

We have supported vegetable kitchen garden kits to 500 farmers with the aim to enable them to grow fresh and nutritious, chemical-free vegetables. This will enhance their food security and promote self-reliance.

Financial Assistance

Extend financial support to 200 farmers, each receiving Rs. 10,000, a transaction gracefully facilitated by Mr. R. N. Parmar, virtually transferring funds to their bank accounts, funded by Adani Petrochemicals. This fund will help farmers in planting a total of **53,136 fruit-bearing plants**.

Raj Shakti Prakrutik Kheti Sahkari Mandali

The Adani Foundation has taken a proactive step by organizing awakening and awareness sessions to promote natural farming practices in Mundra block Villages. These efforts led to the formation of the "Raj Shakti Prakrutik Kheti Sahkari Mandali," comprised of 35 dedicated farmers who are deeply committed to natural farming. These are the activities done assisting the Mandali this year:

Interaction with Governor

Rajshakti Prakrut sahakari Mandali had Opportunity to meeting with honorable Governor of Gujarat Achrya devvrat at Gandhinagar. They got the valuable knowledge by the him on Natural Farming and gave their farm's vegetables to sir.

Appreciation by Governor

Governor of Gujarat, Shree Acharya Devvratji, encouraged 25 of our farmers practicing natural farming at the Krushi and Dairy Expo event in Bhuj. He motivating them to continue their commendable work for our mother earth.

Exposure Visits

Our farmers embarked on three eye-opening exposure visits to Gautech-2023, Bansi Gir Gaushala, and Narayan Dev Dwisatabdi Mahotsav, where they learned about new agricultural tools, various seeds, organic products, and making of Gau Krupa Amrutam organic fertilizer

Certification by GOPCA

We have successfully **certified 28 farmers** under the Gujarat Organic Products and Certification Agency (GOPCA). Now, they have authentic validation as organic farmers, ensuring they receive the best prices for their farm products.

Kutch Kalptaru FPO (KKPC) and Prakrutik Mandli

To promote horticulture, the Kutch Kalptaru FPO (KKPC) was established in 2020 by farmers from Mundra Block to address various challenges they faced. With an initial 350 shares held by 280 shareholders, the company is now expanding to include up to 5000 farmers and 537 registered share holders.

In the current year, KKPC began selling 10kg capacity packaging boxes at a minimal profit margin of Rs. 29 per box, resulting in a turnover of Rs. 10.5 lakh and a profit of Rs. 75 thousand. This initiative has indirectly supported over 800 farmers.

Regular director board meetings and capacity-building training sessions have been arranged to ensure effective management and growth. Total Turn over is Rs. 33.67 Lacs current year which is four times higher than last year which shows remarkable progress of FPO.

800
Farmers benefited

₹ 33.67 lacs
Turn over

Green Carnival

Today, finding truly natural, chemical-free food has become a challenge. Our fruits and vegetables are often processed with chemicals, stripping them of their nutritional value. But there's hope.

For years, the Adani Foundation has been supporting farmers practicing natural farming methods. However, these farmers lacked a platform to sell their produce. That's why AF has launched the Green Carnival.

At Shantivan, Samudra colonies in Mundra, and KCL's Mandvi colony, we've provided a marketplace for these farmers to showcase and sell their agricultural bounty. The response has been overwhelming.

Encouraged by the positive feedback, these farmers have even established an organic produce shop in Mundra, setting an example for sustainable agriculture. Today, over **302 farmers** are part of this initiative.

Previously, these farmers sold their harvest in bulk to vendors. Now, by connecting directly with consumers, they've seen a remarkable **35% increase in their income**.

The communities of both colonies are delighted and eagerly anticipate the Green Carnival every Sunday. Together, we're not just changing food habits, but also supporting the livelihoods of those who cultivate our food, and nurturing a healthier, more sustainable future.

Total Green Carnivals = 37

Total Sell = 8,623 kg

Revenue = ₹ 3,01,805

Sustainable Livelihood - Women Empowerment

Women's empowerment holds a significant place within the Adani Foundation. Since its inception, the foundation has been dedicated to strengthening women by providing training, essential materials, and creating platforms for them to sell their products. Additionally, the foundation collaborates with the government to establish Self-Help Group (SHG) initiatives, enabling women to conduct their businesses more effectively and encouraging savings. Through various training programs, the Adani Foundation empowers women, fostering their growth and self-reliance. Moreover, the foundation is acutely aware of hygiene and health, actively involving women in initiatives related to these crucial aspects. The holistic development of women is at the core of the foundation's approach and strategy.

We dedicated to empowering women both financially and socially. To that end, a comprehensive training program that has reached 850 women across 82+ Self Help Groups with 35+ Lacks saving Corpus, out of which 5 groups have outstanding revenue generation.

About - Project Saheli

Revenue of each SHG in the FY 2023-24

Name of IG activity of SHG's/JLG/FPC's	Income 2023-24 (INR)	Cumulative income (INR)
Sonal Saheli	480250	3027450
Jay Adhar Saheli	26,500	252,066
Tejasvi Saheli	325000	3,390,150
Umang Saheli	76500	225800
Vishvas Saheli	26300	511400
Jay Momay Saheli	21000	151500
Meghadhanush Saheli	116950	597450
Sanitary Pad Group	71300	746300
Radhe Saheli	31000	870418
Shrddha Saheli	486580	1107580
Chamunda Saheli	21900	1726400
Jay shakti Saheli	2500	605500
Food Sister Sahlei	898250	898250
Jyot Saheli	40800	40800
Pantjanpir gau Saheli	412000	412000
Total	**3036830**	**14563064**

Self Help Groups

- ✓ 82 Self Help Groups in coordination with National Rural Livlihood Mission.
- ✓ 850+ Members
- ✓ Over Rs.35 Lacs Saving Amount Corpus

Job Sourcing - Govt

- ✓ 11 Women supported for application and process of Gram Rakshak Dal, Bank Sakhi , Bima Sakhi and Professional Resouce Person.
- ✓ Average income Rs.4200 Per Month

Making SHG Self Reliant

- ✓ 16 SHG are making strides towards self-reliance.
- ✓ Various handicraft, dry and fresh food making, stitching, tie and die etc.
- ✓ 175+ women - Monthly average income @ Rs.7000 of each member/Month

Social Empowerment

- ✓ 2 Livlihood Enhancement Training through RSETI
- ✓ Financial support for business set up
- ✓ Legal rights and domestic violence workshops
- ✓ Family counselling for Job sourcing

Job Sourcing - Private

- ✓ Coordination for Job by Unnati Portal with Adani Group company companies, Britania, B Medical and Emphazer company
- ✓ 398 Women supported till date for job sourcing.
- ✓ Average income Rs.10200 Per Month

Highlights of the Work done by our SHG!

Australia 29th PM visit: Exhibition in Adani Solar

The 29th PM of Australia, Mr. Malcolm Bligh Turnbull and his wife Lucinda Mary Turnbull visited Adani, Mundra. At Adani Solar, they saw our 20+ SHG exhibition stall and interacted with over 180 working women from SHGs. Mr. Turnbull was genuinely thrilled to see women stepping out of their homes, crafting beautiful pieces, and supporting their families. Mr. Malcolm Bligh Turnbull – "It's empowering to witness women taking charge of their livelihoods and making a difference."

Sathwaro Mela 2023-24

The event unfolded with the captivating theme of 'Powering Art Empowering Women,' setting the stage for an extraordinary celebration. Held at the prestigious Adani Corporate House in Ahmedabad, the inauguration was graced by the esteemed presence of the Honorable Chairperson of AF, Dr. Preeti G Adani, Mrs. Shilin R Adani, and Shri V.S. Gadhvi. We were delighted to welcome over 500 enthusiastic visitors to our stall, contributing to the resounding success of the event. **Notably, SHG Groups earned a remarkable income of over Rs. 75,000**.

Switzerland delegate visits SHG

Switzerland delegates made a memorable visit to Adani Solar to witness the exceptional craftsmanship showcased by our SHG exhibition. Captivated by the intricate artwork, they engaged with the women, gaining a profound understanding of their skills and purchasing a significant quantity of goods. **Overwhelmed by the quality of workmanship, they graciously extended their support by sponsoring $100 (90,000 INR) towards our SHG.** This monumental gesture marks a historic milestone for our group.

Handicraft Day Celebration

After 3-day training from Shrujan, hosted an exhibition showcasing handmade crafts by women, alongside interactive workshops on handicraft techniques.

Workshop on Women Health

Aware the women connected to our SHG about mental and menstrual health care, benefited over 130 women, especially those neglecting personal well-being during menstruation.

Gauchar Cleaning Abhiyan

At Bujpur, 31 women initiated the 'Gauchar Cleaning Abhiyan,' with support from AF's Loader Machine. This collaboration aims to enhance environmental preservation and community development.

Women's Day celebration

Celebrated Women's Day with entrepreneur training and mental peace awareness sessions, attracting over 100 participants.

Community Health

Ensuring good health is not just a priority; it's the cornerstone of a thriving community. At the heart of Kutch, the Adani Foundation is dedicated to nurturing well-being and facilitating access to expert medical care. Collaborating closely with G.K General Hospital in Bhuj and Adani Hospital in Mundra, we tirelessly strive to enhance community health standards.

For over a decade, our commitment to community care has been unwavering, manifested through our Mobile Health Care Units, Rural Clinics, and Ayushman Cards linkages with the beneficiaries and THO. In recent years, a concerning trend of Viral, kidney and ortho related diseases has emerged due to salinity ingress. In response, we have orchestrated a series of specialized health camps to address these issues, offering essential treatment support while fostering awareness about preventive measures.

We firmly believe that both preventive and curative healthcare are fundamental pillars for sustaining community well-being and fostering economic prosperity. Our aim is to strike a harmonious balance, paving the way for a journey of longevity, vitality, and fulfilment for all those under the care of the Adani Foundation.

Summary of Healthcare Initiatives for the Year

This year, we provided **41,546** medical health services and conducted health awareness camps for **763 High school students**. Our annual medical facilities have made a significant impact in improving healthcare access and awareness. Here are the direct beneficiaries of our endeavor:

2,108 Medical Support to needy patients

118 Dialysis Support

10,477 Mobile Van

12,850 Rural Clinic

1,618 Health Camp

5,795 Specialty Health Camp

6,865 Ayushman Card till date

1,715 Blood Donation Camp

- Medical Support – 5.5%
- Dialysis Support – 0.3%
- Mobile Van – 27.2%
- Rural Clinic – 33.3%
- Health Camp – 4.3%
- Specialty Health Camp – 15%
- Ayushman Card – 10.02%
- Blood Donation Camp – 4.5%

Rural Clinic & Mobile Health Care Unit

Health stands as the cornerstone for community development, and to revolutionize rural healthcare, the Adani Foundation has launched the 'Mobile Health Care' and 'Rural Clinic Service'. These initiatives aim to offer primary, preventive, and curative healthcare services accessible in remote and inaccessible areas, a commitment upheld for over a decade.

Rural Clinic

Rural clinics extend their services to 5 villages in Mundra and 2 villages of Mandavi Block. The services of both MHCU and Rural Clinics are accessible to patients at token charges of Rs. 20 per visit.

Mobile Healthcare Unit

MHU is equipped with a range of integrated medical devices enabling staff to conduct preliminary check-ups. With over 90 types of essential lifesaving medicines available, the Mobile Health Care Unit covers 29 villages with 7 fishermen settlements. Services provided include blood pressure checking, sugar testing, and ECG assessments.

Ayushman card facilitation

In a world where medical costs are overwhelming, the Ayushman Card offers hope by providing affordable access to quality healthcare.
The Adani Foundation bridges the gap between the government and those in nee(ensuring that 3865 people received this vital resource.
Ayushman Bharat PM-JAY provides Rs. 10 lakhs per card owner for secondary and tertiary care, Adani Foundation is aiming to achieve 100% coverage in Mundra's villages.

25 **Village**

6,865
Ayushman cards Issued

686.50 Cr
Health insurance

** Funded by - Kutch Copper Limited*

Supporting Individuals

The Adani Foundation extends financial assistance to the most economically challenged patients facing life-threatening diseases such as those related to the heart, liver, kidney, and cancer. This support comes with minimum participation requirements, ensuring access to crucial medical care.

In the current year, a total of 2,108 patients from Mundra, Mandavi, and Anjar Block have received support at Adani Hospital, Mundra. This assistance underscores our commitment to providing essential healthcare services to those in need, regardless of economic status. The medical staff of GKGH stood with us in these endeavor.

Dialysis Support

In the arid region of Kutch, particularly in Mundra where saline drinking water is prevalent, cases of urinary stones and kidney failure are significant. To address this issue, a dialysis support project has been initiated to provide essential dialysis treatment to the most vulnerable patients, enabling them to lead healthier lives.

This year, a total of 2 patients have been supported with regular dialysis sessions, twice a week. Regular dialysis sessions have notably improved the patients' conditions, extended their life expectancy and enhanced their quality of life.

Special Camp

This year Adani Foundation organized numerous special health camps, such as blood donation camps where 1715 donors contributed, helping save countless lives.

Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being.

Our camps for pregnant women provided essential prenatal care, ensuring healthier pregnancies and safer deliveries. It benefited 809 pregnant women.

Conducted a pediatric health camp, nurturing the health of 628 children and ensuring their well-being.

GKGH medical stuff support in all camps.

Cataract-Free Mundra

The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below.

Lives Impacted :- 1131

- Comprehensive Eye Screenings at Village level
- Cataract Surgeries to GKGH ,Bhuj
- Post-Operative Care and Follow-up
- 5 successful Operation

** Funded by - Kutch Copper Limited*

Preventive health Campaign

The Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body.

Sample Survey Report 2023-24

55% Never heard about Menstrual hygiene

60% Are using cloths on regular basis

36% Had never used sanitary pads

68% Had no information about UTI

30% Never used millets in their diet

60% Never heard about millets or it's benefits.

Menstrual & Mental Health Awareness Drive:

We organized impactful awareness camps in various villages, empowering women and adolescent girls with knowledge about menstrual hygiene, ensuring both physical and mental fitness.

Impact:

36% Growing usage of sanitary napkins

22% reduction in UTI

2610 women & girls benefited

International year of Millets – 2023

To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet Competition across nine villages. **Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased,** highlighting the potential for sustainable and nutritious dishes in our daily diets.

Impact:

65% of women are using millet in their regular diet.

17% Women grappling with obesity and diabetes are experiencing positive transformations in their health, evident in significant weight loss.

** Funded by - Kutch Copper Limited*

Millets Food Festival

In the wake of the "International Year of Millet" in 2023, KCL took decisive steps to promote the nutritional and empower women from remote area of Mundra Taluka.

Across the villages of Mundra Taluka, KCL organized a series of millet awareness camps and a thrilling millet food competition. The response was nothing short of remarkable, with 715 women actively participating and sharing 300 indigenous millet recipes. To commemorate this achievement, we hosted a grand millet festival at Adani House, in which 120 women showcased a diverse array of millet dishes, each one bursting with flavor and nutritional value.

But the significance of the event extended beyond mere culinary delight. Women spoke of how millets had become integral to their lives, aiding them in combating long-term ailments. They are very much grateful for these awareness camps and look forward to such health-promoting events.

At this event, we had the privilege of welcoming esteemed guests, including Mr. Sujal Shah (CEO, APSEZ), Mrs. Rachna Joshi (President, Mundra Nagar Palika), Mr. Pandya (Program officer, ICDS), Mr. Saurabh Shah (Head Corporate Affairs, APSEZ), and Mrs. Nehalben (Nutrition expert). Their presence added immense value to our gathering.

** Funded by - Kutch Copper Limited*

Community Infrastructure Development

Adani Foundation is dedicated to enhancing the quality of life of communities under the Community Infrastructure Development Initiative. It acknowledges the government's role in providing fundamental infrastructure facilities and strives to bridge gaps, ensuring its activities are tailored to meet specific needs and responsive to grassroots requirements.

Some of the initiatives include constructing check dams, deepening ponds to augment water storage capacity, infrastructure support to fisherfolk communities, developing secure education premises and facilitating access to clean drinking water for villagers.

CID endeavor of FY 2023-24

Renovation Check dam and CC road work at Nani Khakhar – 200+ benefited

Renovation of High School at Zaarapa – 2200+ Benefited

Construction of Pipe Culvert – 400+ Benefited

Construction of chain-link fencing at Mangra village – 300 people benefited

Gaushala Shed at Zarapara village – 400 cettle benefited

195 Stall – Vegetable market– 900+ Vegetable vendor benefited

Renovation of approach road, Zarpara – benefiting 400 villagers

Renovation of Civil and Electrical Work at ITI, Mundra - 500 students benefited

CID endeavor of FY 2023-24

Construction of 21 Borewell Recharge in Nagmati River - 150+ farmer benefited

Check dam Desilting and restoration at Nana Bhadiya – 100+ farmers benefited

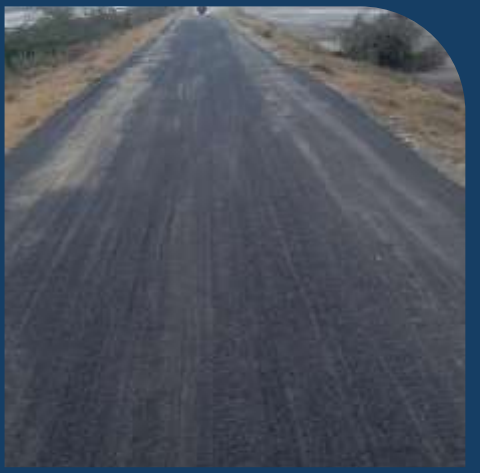
Renovation of Check dam at Pavadiyara village - 300 people benefited

Renovation of Balwadi at Juna bandar & Luni bandar

185 RRWHS construction is ongoing in various villages - will benefit 1300+ residents

Supply & installation of Solar pannel (3.25 KV) at CGP, Mundra – benefiting 1200 people

Development of Model Farm in Zarpara, Siracha & Mangra – Benefiting 300 people



Renovation of approach road at various fisherfolk vasahat

Community Resource Centre

Government Scheme Facilitation				
Sr. No	Scheme Detail	Gov. Support Rs/Month.	Total Beneficiaries	Total Amount per Month (INR)
1	Widow Pension	1250	674	28323150
2	Bal seva Ayog	2000	49	3430000
3	Divyang pension	1000	27	586000
5	Niradhar Pension	1000	126	5178000
6	Palak Mata Pita	3000	5	696000
	Total		**1439**	**38213150**

Community resource Centre 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.

Till Date 1439 beneficiaries are getting aid of Widow Pension scheme, Senior Citizen and Divyang pension scheme and Palak Mata Pita Scheme 3.81 Crore Monthly by procedure support of AF.

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	600000
2	Vahali Dikri @ 18 Year	110000	113	12430000
3	Divayang Sadhan Sahay one time	5000	176	880000
4	Manrega (NB21)	22000	32	704000
5	Pagadiya Sadhan Sahay Yojana	9000	9	81000
6	Gau Dattak Yojana	10800	857	9255600
7	Gobardhan Yojana	42000	100	4200000
8	Fishermen Shram Yogi Yojna		163	
			1487	**28150600**



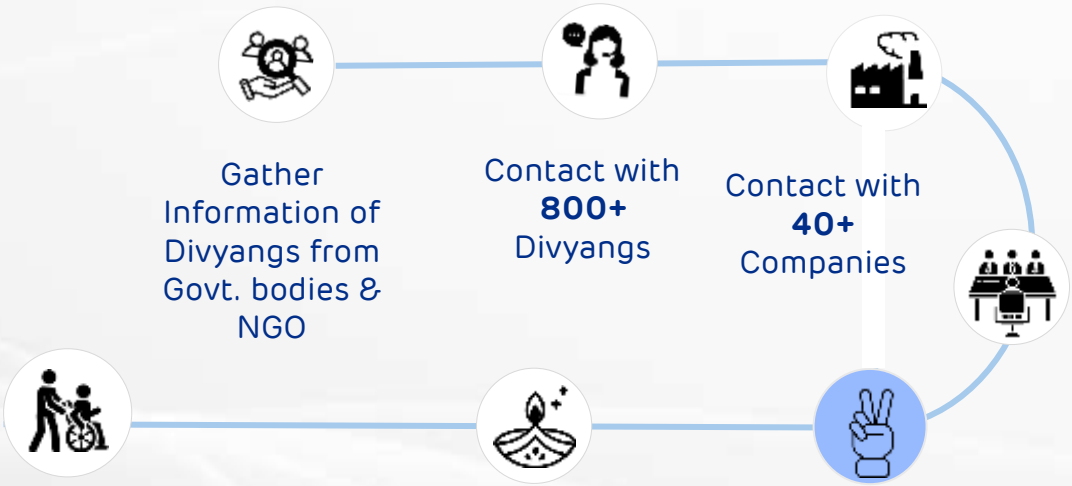

Swavlamban - Project for Divyangs

Adani Foundation's vision extends beyond Aid, focusing on dignity and sustainability through meaningful employment. While equipment support offers mobility, employment bestows the dignity to stand tall in society.

With noble intentions in mind, this year, we organized a mega employment drive. Our goal is to provide job opportunities to over 100 disabled individuals.

We've conducted interviews in three phases, for 250+ divyang candidates engaging 22 companies from Adani Groups and other reputed firms in Mundra.

➢ **Roadmap of this incredible vision:**



** Funded by - Kutch Copper Limited*

Diwali Celebration

After the successful completion of the 1st phase of the Divyang Employment Fair on November 8th, we gathered to share the joy of Diwali with over 100 remarkable divyangs.

In the spirit of uplifting divyangs, we have also invited advocates dedicated to the well-being of disabled people. Mrs. Anni Rakshit Shah and Mrs. Rupa Kapoor graced us with their presence as chief guests. Our invitation also extended to the HR representatives of Adani Group and SEZL companies.

On this auspicious occasion, we **equipped 32 divyangs with essential tools such as wheelchairs, tricycles, harmoniums, and facilitated 10 divyangs through government schemes**. To express our gratitude to those who have dedicated their lives to improving the lives of disabled individuals, we honored them with certificates and mementos.

Just as we light up our homes with glowing diyas during Diwali, the smiling faces of these divyang individuals illuminated our Adani House during this event. It was a celebration that went beyond the ordinary, leaving a lasting impression of compassion and unity.

** Funded by - Kutch Copper Limited*

Swavlamban Event

In the spirit of hard work and dedication, the Adani Foundation concluded its Divyang Employment Fair, marking a significant milestone in transforming lives. Through three phases of dedicated effort, the Foundation successfully secured over 100 employments, providing a newfound sense of self-reliance to individuals with disabilities.

Notably, 35 divyangs were equipped with essential employment tools, fostering self-sufficiency. To commemorate this achievement and honour the divyangs, companies, and advocates of inclusivity, the Foundation organized the Swavlamban event on December 5th at GAIMS, Bhuj.

The event garnered the presence of esteemed personalities, including Jeet Adani, Director of Adani Group, V.J. Rajput, Commissioner for Persons with Disabilities, and Nimesh Pandya, Ed. of Kutch collector, among others.

This celebration was a testament to the Foundation's commitment to redefining the narrative around disability and employment.

As the Adani Foundation rejoices in this achievement, it reaffirms its commitment to ongoing efforts that positively impact the lives of differently-abled individuals, embodying a vision of a more inclusive and empowered society.

** Funded by - Kutch Copper Limited*

Our Pride from Divyang Employment Fair !

Bhimaji Maheswari
DEO, Mundra Windtech ltd

Patani Govind Babu
Document Officer, KCL, Mundra

Arjan Gadhavi
DEO, Adani Solar, Mundra

Govind Maheswari
DEO, Mundra Windtech ltd

Devangh Gadhavi
DEO, Adani Solar, Mundra

Jadeja Natubha Gangji
KCRC NGO, Bhuj

Arti Nilesh Jethva
Trainer, ASDC, Mundra

Bharat Makwana
CMR, Admin, Adani house

Adani Skill Development

Adani Skill Development Centre (ASDC) is dedicated to enhancing employability and entrepreneurship. This year, ASDC has trained 50,00 individuals across Kutch, resulting in 65% livelihood generation. Their innovative courses cover diverse sectors, and they have played a significant role in empowering marginalized communities in places like Mundra and Bhuj, Gujarat. ASDC's vision is to make everyone skilled and employable, meeting industry demands through trained manpower.

SAKSHAM™
Adani Skill Development Centre

ASDC Mundra Center

Course Name	Gender Category		Total
	Female	Male	
Digital Literacy	04	03	07
Mud Work	180	00	180
JOC (RTG Crane Operator)	00	79	79
Hydrography	00	03	03
Advance Excel	00	18	18
Domestic data entry operator	23	30	53
Tally with GST	02	00	02
Hand Embroidery	170	00	170
Dori/ Macramé Work	90	00	90
Food & Beverage	20	12	32
General Housekeeper	60	00	60
Beauty Therapist	40	00	40
Total	589	145	734

ASDC Bhuj Center

Course Name	Gender Category		Total
	Female	Male	
General duty Assistant	84	20	104
Digital literacy	46	16	62
Hydrography	9	0	09
Industrial Safety	1	0	01
5S	1	0	01
Entrepreneurship Development program	60	0	60
Domestic data entry operator	25	0	25
Financial Literacy	64	0	64
Diet and Nutrition	50	0	50
First aid	18	0	18
Interview skills	11	0	11
Total	369	36	405

ASDC Mundra Center

At Mundra Center ASDC, our mission is to equip young individuals with the skills necessary for success. In the current year, a remarkable 734 youth have undergone comprehensive skill training. Our unwavering commitment extends to ensuring that every aspiring professional receives an opportunity for growth and development. Almost 99% of our fees are tied up with various companies, allowing students to access high-quality training without financial barriers.

Other Activities & Achievements

i. Women Empowerment through Skill Training: Provided Mud work training to 180 women in Mundra taluka villages supported by MPL.
ii. RTG Crane Operator Training: Collaborated with APSEZ HR Team to train 79 students.
iii. Dori Work and Hand Embroidery Training: Benefited 90 women in various Mundra villages supported by MPL.
iv. Health Awareness and Career Sessions: 108 Ambulance Department enlightened GDA trainees at Adani Institute of Medical Sciences. Guest session on career advancement led by Mr. Kapil Goswami.
v. Exposure Visit for Women: Women trained in Mud Work, Dori Work, and Hand Embroidery showcased their skills during a visit by foreign delegates to the Solar Plant.
vi. Women's Related Training Seminar: Held at Matruvandana College, Bidada, Mandvi.

ASDC Bhuj Center

ASDC Bhuj, established following successful skill development initiatives, is a beacon for aspiring professionals. Driven by youth demand, this center plays a pivotal role in providing crucial training for self-development and enhancing personality traits.

Our mission is clear: to equip young individuals with essential skills that position them for success in the job market. With almost 58% of fees tied up by ASDC through strategic partnerships and 42% of fees contributed by students, we ensure that financial barriers do not hinder skill acquisition.

Other Activities & Achievements

i. Commendation from Shree Jeet Adani: Received appreciation for supporting the Divyang job fair.
ii. Employee Development Initiatives: Conducted Advanced Excel training for 18 Sumitomo India Ltd employees
iii. Entrepreneurship Development Program: Organized a comprehensive 12-day program with 60 diverse candidates.
iv. New Trainee Orientation: Conducted sessions about SAKSHAM center and LMS registration at the Bhuj Centre.
v. Civil Defense Training (5 days): Covered essential topics including Disaster Management, First Aid, 181 Mahila Helpline, 108 Emergency Services, and Fire Safety.
vi. F&B & Housekeeping Batch Inauguration: 92 students trained to enhance employability.
vii. Indo-Euro Project Seminar: Arranged at various Nursing Colleges in Kutch District. Focused on German Language training and job placements.
viii. Crucial Meeting with ISAR & UNICEF: Discussed future skill development challenges and transgender equality on 9th December 2023.

AKBPTL - TUNA

CID:

The paver block work at Vandi and Tuna Common Gathering which enhances their usability and convenience for the community. Community hall Room construction at Rampar is completed. It will benefit 1010 fishermen.

Potable Water Distribution:

Potable water (17.5 KL per Day) Distribution to Vandi, Vira and Dhavar varo Bandar on regular base through Water tanker Regularly through **AKBTPL and GWIL.** This initiative **benefited 2230 Fishermen.**

Prakrut Rath –Tree Plantation:

Total 3000 Tree sapling were distributed to individual, And 500 tree have planted at Common place and school with ensure their responsibility for watering and caring.

3000 Tree plantation

Fodder Support:

Support of Dry & Green Fodder to Tuna and Rampar Village and Gaushala during Scarcity. That impacted on Cattle health and Milk Productivity.

7410 kg Dry fodder

4,47,473 kg Green fodder

1228 Cattle Benefited

193 Benefited by Mobile Van

56 Benefited by Medical support

AGEL – Khavda

Adani Green Energy Ltd. Khavda renewable solar plant is a hybrid power project that will use both solar and wind energy to generate electricity. It will be built in the Khavda desert along the Indo-Pak border in Kutch district of Gujarat, having a total capacity of 20,000 megawatts (MW), making it the world's largest hybrid renewable energy park and will be cover an area of 72,600 hectares of waste land. It is expected to play a major role in fulfilling India's vision of generating 450 gigawatts (GW) of renewable power by 2030.

Our Vision for Khavda:

Empowering through Education: Elevate overall academic results, champion girl child education, and ignite a passion for technical streams. We aspire to pave the way for stable employment, fostering a prosperous livelihood for the youth.

Empowering Khavda's Women: Empower 1000+ women socially, economically, and financially through the establishment of a strong federation "Sarhadi Mahila Vikas Sangathan"

Elevating Healthcare: Provide quality healthcare services in 22 villages of Khavda, with a primary focus on enhancing women and child health.

Water Positive Villages: Achieve water positivity in 8 villages of Khavda through our dedicated water conservation structures. We aim to create sustainable solutions for water availability, ensuring a secure and flourishing future for these communities.

Transforming lives in Khavda!

Nestled deep within the remote borderlands of Kutchh, Khavda grapples with the harsh reality of limited access to fundamental necessities: education, healthcare, clean water, and crucial preventive care for women. In response to these pressing challenges, the Adani Foundation has embarked on a transformative journey, launching four visionary projects aimed at illuminating hope and progress across Khavda and its surrounding villages.

Recently, luminaries including Mr. Amit Arora, the Collector of Kutchh, Mr. Verma, Plant Head of AGEL, and Mr. Sanjay Avinash, BSF Head Bt.72, convened with local leaders from 26 villages to honor the Foundation's unwavering commitment.

Amidst accolades and appreciation, Mr. Amit Arora lauded the Foundation's healthcare initiatives and advocated for further support, proposing the launch of an "Arogya Van" to bridge the gap in access.

Echoing this sentiment, Mr. Sanjay Avinash championed the pursuit of higher education, heralding a beacon of hope for the community. As the event culminated with the felicitation of five specialist doctors by the District Collector, it underscored the profound impact of the Adani Foundation's endeavors, igniting a flame of optimism that illuminates the path towards a brighter tomorrow.

Endeavor In Core Areas:

Education – Project Utthan:

Through our Utthan project, we've embraced 8 high schools.

Our mission: Elevate 10th board results, boost attendance, slash dropout rates, promote girls' education, and uplift education quality in Khavda.

At this high schools, we've enlisted 8 dedicated Utthan Sahayaks, equipped with specialized training. They're laser-focused on bolstering core subjects such as Math, Science, and English. Additionally, we've brought on board 2 community mobilizers, tasked with persuading parents to prioritize their children's education, particularly for girls.

Fostering ambition & motivation by facilitating with Industrial visit & notebook distribution

Empowering 364 Students

Health Care:

The community struggles with limited healthcare resources, including just one CHC with a single general doctor, no specialized care for women and children, and insufficient diagnostic equipment. Financial constraints further hinder access to medical services.

To improve healthcare, we're tackling diseases in two ways: through health camps and Adani Arogya Karyakram Khavda CHC for treatment, and dedicated awareness camps for prevention.

Curative Health Camp:

Adani Arogya Karyakram Khavda CHC:

Gynec	Pedia	Physi	Ortho	Optho
555	640	283	206	197

Health Camp:

Gynec	Pedia	Physi	Ortho	Optho
278	455	579	61	139

42 Villages benefited

3433 patients benefited

Preventive Health Camp:

Actively promoting preventive health awareness through family planning education, menstrual hygiene workshops, nutrition advocacy, mental health awareness sessions. Conducted 49 training in 38 villages.

1453 Women Benefited

1300 Pad Distributed

Endeavor In Core Areas:

CID – Water Conservation

In Khavda, water scarcity is critical: supply is weekly, groundwater levels are low, and villagers and animals share a single pond. Students drink unfiltered water at school, and rainwater flows away, unused.

1. **Kuran village – Pond deepening & Filter well**
2. **Tuga village - Check dam maintenance**

15 lakh CUM

3600+ villagers benefited

Other CID work

1. **Roof Shed in khavda High school**
2. **RO plant in 5 High school**

350+
students benefited

Farmer welfare:

In Khavda, agriculture struggles due to limited knowledge and challenges like water scarcity and soil fertility issues, despite 80% of the population being engaged in dairy farming.

To educate farmers we organized an awareness camp for **275 farmers**, encouraging them to join the **ATMA Government Sanstha**. This initiative aims to provide guidance on conventional agriculture techniques and exposure to modern farming methods and tools.

Women Empowerment:

Women empowerment initiatives are underway, emphasizing financial independence and self-reliance.

Conducting awareness camps across 38 villages, we're educating women about the importance of having Saving Accounts, Through awareness camps, established Saving Account Groups, forming 7 SHG with 150 women.

15
SHG formed

150+
Women Economically Empowered

Green Energy

AGEL – Dayapar & Mandvi

Dayapar Adani Wind Energy project is a large-scale wind power project located in the Kutch district of Gujarat, India. It is one of the biggest wind farms in the country, with a total capacity of 575 MW. The project was developed by Adani Group and Inox Wind, its project was commissioned in April 2019 and supplies clean energy to various states in India through power purchase agreements with Maharashtra State Electricity Distribution, NTPC and PTC India.

Our Vision for Dayapar & Mandavi:

Water Positive Villages: Achieve water positivity in 42 villages of Dayapar through our dedicated water conservation structures. We aim to stablish sustainable solutions ensuring reliable water availability.

Improve Animal Husbandry: Focus on the health of cattle by providing vaccinations, medical treatment, and highly nutritious food to cattle. Helping Cattle owners to generate good revenue and sustain their livelihoods.

Enhance Education: Enhance the school's infrastructure and financially support students for educational equipment, providing them with a modern classroom environment equipped with the modern technology.

Health Services: Provide medical services to 3500 people of Dyapar and connect them with government medical schemes.

Endeavor In Core Areas:

CID – Water Conservation

Kutch suffers from a water shortage, particularly in the Dayarpar region, which receives the least amount of rainfall and has high TDS groundwater. To conserve as much water as possible in the AGEL Dayapar region, the Adani Foundation has initiated various pond deepening and check dam restoration projects.

Sustainable Water Management projects:

1. **Pond deepening in 8 Villages**
2. **Check Dam renovation & deepening in 2 villages**
3. **Over Head Portable Water Tank in 1 village**

10.4 lakh CUM
Water capacity

985 acers
Water rich land

1500+
Farmers Benefited

50,000/Ltr
Capacity of Over head water tank

SLD - Kamdhenu:

The Dayapar people rely largely on animal husbandry as their second most important income source, after agriculture. But villagers lack in sufficient knowledge on the dietary needs and vaccinations for cattle.

To educate them we are organizing cattle treatment and vaccination program, workshop on Animal Husbandry, and participating in Krushi Mela providing cattle owners mineral mixers to improve animal health and milk production.

455
cattle owners provided Mixture Mineral

1500
cattle Vaccination

Endeavor In Core Areas:

CID - Education:

Committed to improving educational infrastructure to ensure every student in Dayapar has access to safe and quality education environment. Through smart classes and material support, we're easing financial burdens and creating engaging learning environments. For good health of students ensuring portable water facility and tree plantation drive in schools.

Support	School
LED TV for smart class	3
Morden Education tools	2
Education kit support	2
Portable water facility	3
Eco club	1
School renovation	2

13 Schools Benefited

1500+ Students Empowered

Health Care:

In AGEL Dayapar region, the health condition is concerning with major diseases like kidney stones and arthritis are prevalent in the villages. To battel this situation we are conducting health camps and organized Ayushman Bharat card camps. During these events, we distributed medicine free of cost to patients and provided recommendations for optimal treatment to those in need.

AGEL/ Adani foundation have supported 20 different equipment like Cardiac Machine, Semi auto analyzer, and other medical tools at CHC Dayapar which is going to facilitate 56 villages benefiting 62,500+ population.

618 Health camp Beneficiaries

86 Ayushman card Beneficiaries

₹8.6 Cr. Medical Coverage

Adani Cement - Sanghi

Adani Cement Plant, prominently located near Moti Ber Village in the Abdasa block of Kutch, Gujarat, stands as a distinguished entity in the cement industry. Our facility is not just a cornerstone of the local economy, but also a pivotal contributor to the community's development. With a robust and integrated manufacturing infrastructure, we boast:

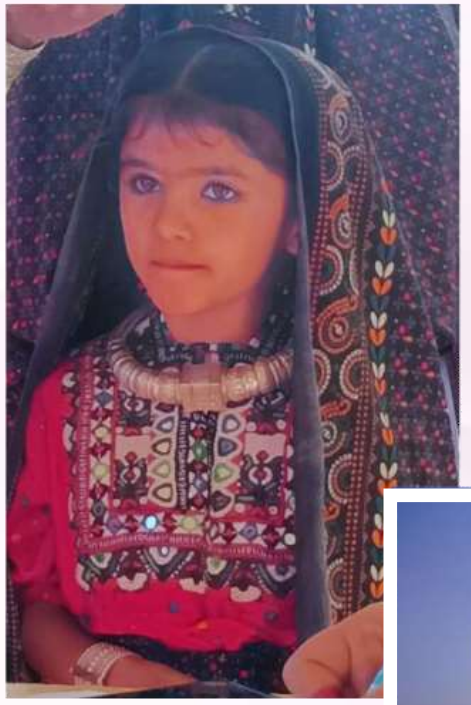
- A 6.6 MMTPA (Million Metric Tones Per Annum) capacity Clinker Plant
- A 6.1 MMTPA capacity Cement Plant
- Power generation facilities with a capacity of 143 MW.

About Abdasa:

Abdasa is a region of Gujarat's Kutch district, defined by its diverse geography and rich cultural tapestry, influenced by different communities, agriculture crops and livestock rearing, particularly cattle and camel husbandry, is integral to the region's livelihoods.

The coastal areas support fishing communities, despite progress in infrastructure and development, Abdasa faces challenges related to water scarcity, education, and healthcare, while its diverse culture and unique landscapes continue to define its identity.

Our vision:
To foster and create a sustainable future for all by providing affordable and accessible facilities at the core of health, education, livelihood, and infrastructure.





Endeavor In Core Areas:

Joyful Beginnings:

Our CSR journey in Sanghi commenced with a joyous Christmas celebration at Adani Cement Abdasa on December 24th. The event, attended by over 500 students and parents, featured cultural performances and dance competitions, spreading festive cheer. Esteemed guests, including Mr. Vivek Misra, Head of Adani Cement Plant, Sanghipuram, Mr. Pushkar Chaudhry, HR Head, and Mrs. Pankti Shah, Gujarat CSR Head, graced the occasion.

Health:

Addressing the pressing healthcare needs of residents near Adani Cement Sanghipuram, a series of specialty health camps were launched. These camps, featuring Pediatric, Gynecological, Ophthalmic, and General medical services, aimed to bridge the gap in access to specialized healthcare. Previously, locals had to travel long distances to Naliya or Bhuj for medical care. By bringing essential health services directly to the communities, these camps have made a significant impact, offering health check-ups, consultations, and treatment for various illnesses and conditions, ensuring better healthcare accessibility for all.

1200 patients benefited

11 Villages benefited

Endeavor In Core Areas:

Road Superheroes:

Introducing the "Road Superheroes" Health Care Program, tailored specifically for the drivers of Adani Cement Abdasa, dedicated to promoting health awareness and preventive care within our driving community.
This holistic initiative comprises five vital stages:

1. Health Screening
2. Telehealth Services
3. De-addiction Awareness
4. Stress Management & Yoga
5. Regular Health Tracking

150
Drivers Benefited & Receive Health Card

A two-day health screening camp held at Adani Cement, offered comprehensive health assessments, including vision tests, blood pressure measurements, ECG, diabetes screenings, and BMI evaluations, alongside expert consultations.

Tree Plantation Initiative:

Adani Cement Campus hosted a remarkable tree planting drive as part of our employee volunteer program. More than 50 enthusiastic employees joined forces to plant trees, showcasing our dedication to a greener future. This collective effort exemplifies our commitment to environmental conservation and responsible corporate citizenship.


adani
Cement
NDTV
adani
Foundation
અદાણી ફાઉન્ડેશન દ્વારા
અબડાસા વિસ્તારમાં સામાજિક ઉત્તરદાયિત્વના ભાગરૂપે
શૈક્ષણિક કાર્યનો શુભારંભ
adani
Foundation
અદાણી ફાઉન્ડેશન
આપનું હાર્દિક સ્વાગત કરે છે.

NDTV

NDTV, or New Delhi Television Limited, stands as one of India's premier news networks, renowned for its steadfast commitment to journalistic integrity and comprehensive coverage. Founded in 1988 by Radhika Roy and Prannoy Roy, NDTV has emerged as a trusted source of news and analysis, shaping public discourse on critical issues both within India and around the world.
At the heart of NDTV's ethos lies an unwavering dedication to delivering unbiased, credible, and impactful journalism

Empowerment through Education:

In Abdasa Block, the AF, partnering with NDTV, is revolutionizing education through CSR initiatives. Faced with low literacy rates and infrastructure challenges. , the Foundation conducted a thorough needs analysis. This led to targeted interventions, including:

1. **Smart Classes: Implemented in 10 primary schools for interactive learning.**
2. **School Building & Bala Painting: Creating vibrant learning spaces.**
3. **Educational Kits Distribution: Providing 1,150 students in 15 schools with essential learning materials.**

A momentous **Handing Over Ceremony** unfolded in Moti Ber Village, Abdasa, marking the debut of Smart Classes and vibrant Bala Painting in 15 primary schools.
A notable announcement by Mr. Vivek Mishra, Plant head, Adani cement, Sanghipuram unveiled plans for a forthcoming hospital within Sangji premises, promising enhanced community healthcare access.
In this overwhelming event **1,150 students facilitated with essential education kits** and teachers were honored with memento.

Shree Renuka Sugar Ltd.

Shree Renuka Sugars Limited stands as a globally recognized agribusiness and bio-energy corporation, covering the entire sugar value chain.

As one of India's largest producers of sugar and green energy, Renuka is at the forefront of sugar manufacturing. With eight cutting-edge sugar mills, many equipped with ethanol and power co-generation capabilities, Renuka leads the industry. Additionally, Renuka operates two of India's largest port-based refineries.

Education:

Committed to improving educational infrastructure to ensure every student has access to safe and quality education environment; we are committed to do following work:

- Renovation of 15 Anganwadi in Kidana, Bharapar, Tuna, Rapar and Wandi village benefiting **600+ students.** Also, supporting primary schools with smart class education equipment.
- Bala Panting and construction of stage in Primary school, Rapar.

Water Conservation Project

To support the community with secure and safe water we are dedicated in implementing water project.

Sustainable Water Management projects:

1. **Pond deepening work in Kidana, Bharapar and Tuna Villages. It will benefit 600+ villagers and will have 24,000 CUM water holding capacity.**

2. **Construction of RO plant room with installation of 1000 ltr./ hr RO System.**

AESL

Adani Energy Solutions Ltd, formerly known as Adani Transmission Ltd, is an electric power transmission company.

ATL is the country's largest private transmission company, with a presence across 16 states of India and a cumulative transmission network of 19,800 ckm and 53,000 MVA transformation capacity.
In its distribution business, AESL serves more than 12 million consumers in metropolitan Mumbai and the industrial hub of Mundra SEZ. AESL is ramping up its smart metering business and is on course to become India's leading smart metering integrator.

Course of Action in ATL's Villages:

Upon receiving the CSR responsibility for villages under ATL, the Adani Foundation embarked on a mission to address community challenges. Recognizing the pressing issue of increased salinity affecting water availability for daily needs and agriculture, we initiated work on water conservation structures as a sustainable solution to alleviate the villagers' hardships.

- **Initiated Pond deepening and Check dam restrengthening work in 5 villages of Rapar and Mandvi Taluka.**
- **Additionally, started working for Cattle Health Camp and tree plantation drive.**

27,200 CUM
Water Capacity

17,000+ villagers benefited

CER – APSEZ

Adani Ports and Special Economic Zone Limited, a subsidiary of Adani Group, is India's largest private port Operator, operating 12 ports and terminals, including India's first deep water Transshipment Port Vizhinjam International Seaport Thiruvananthapuram and India's first port-based SEZ at Mundra.

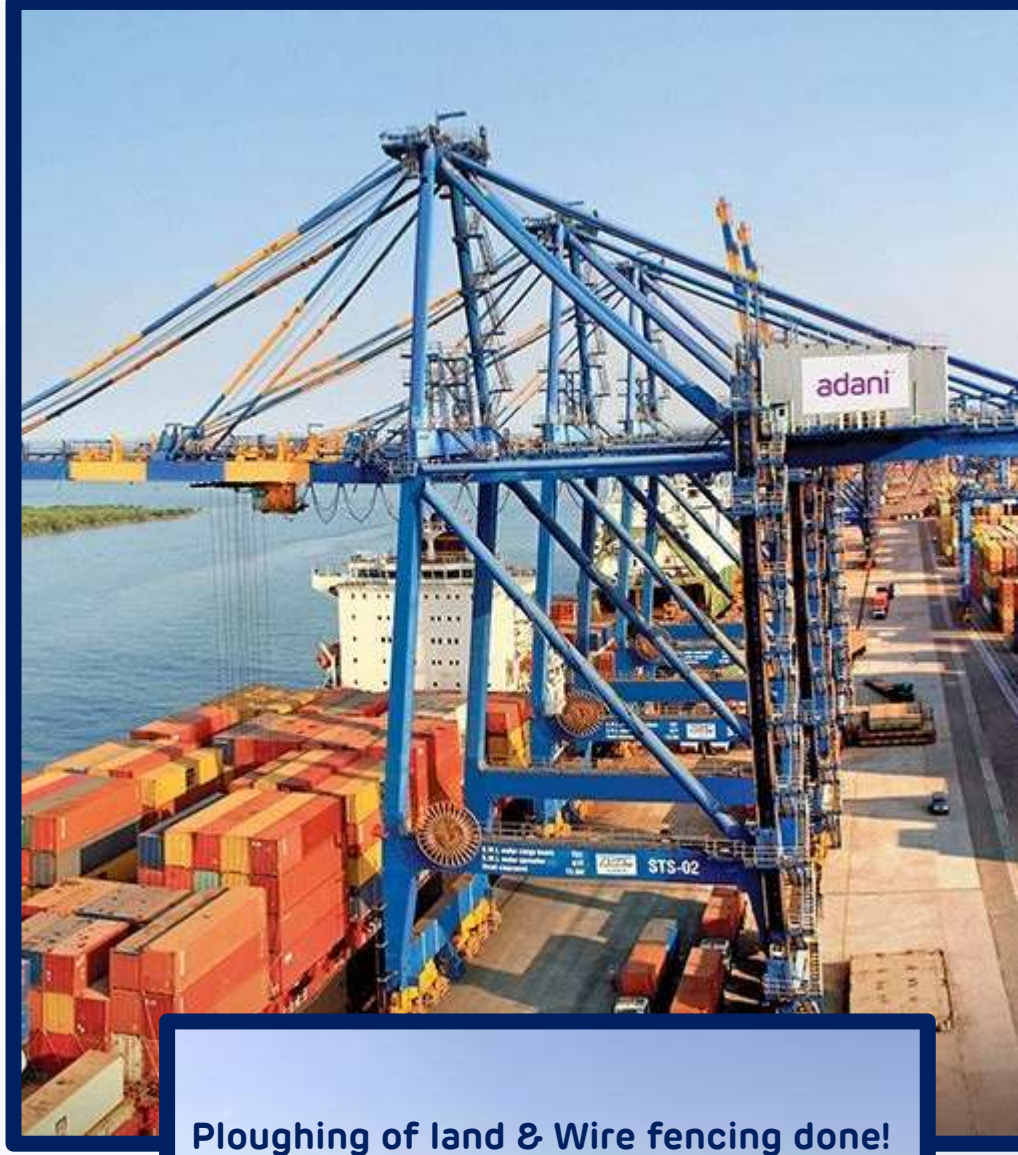
Course of Action:

Taking on the CER responsibility from APSEZ, the Adani Foundation has undertaken a massive tree plantation drive in Moti Bhujpar. To ensure its success, we have devised a comprehensive six-step plan.

8000+
Tree plantation

Meeting with GP and site selection → Cleaning location → Ploughing Land → Wire fencing → Drip irrigating → Tree plantation

Our initiative represents a sustainable approach to addressing environmental challenges and reducing carbon emissions.



Work done during **Biparjoy Cyclone**

Cyclone Biparjoy caused huge losses in Mundra and nearby villages. Adani Foundation's worked for relief and recovery with Panchayat & Government body. More than 17,000 people benefited from various efforts. Adani foundation consider this as ethical responsibility and a source of satisfaction. Stakeholders and government bodies also appreciated the efforts.

Meetings with Taluka & District government officials to facilitate assistance and coordination with local authorities.

Connect With Government & community

Health teams and ambulances on standby in case of emergency.

Health Team

Reached to more than 10000 people by Awaz de to aware all, specially for fisherfolk settlement.

AWAZ DE

4500+ Workforce migration with basic amenities.

Relocate to a secure location

100+ Team member distributed for each taluka/Villages as per requirement

Duty delegation

Monitoring

Tracking the cyclone's progress by AF team member.

Connect

Team members in directly touch with 10 Temporary housing & 60 Villages.

Government

Co- ordinating with Government organizations from Talati to Collector.

Panchayat

Co-oridnate with Gram pancahayat in case they need any emergency support.

Pre-cyclone preparation

- Team distribution
- Workforce migration
- Basic amenities
- Awareness efforts.
- Meetings with government.

During cyclone

- Food and shelter provision
- Fodder support
- Awareness messages
- Vehicle support.
- Coordination with Panchayat

Post-cyclone relief

- Temporary housing
- Food packets
- Excavator support
- Transfer of affected individuals.
- Provision of fodder

Annexure – 3

NATIONAL POLLUTION RESPONSE EXCERCISE NATPOLREX (IX) REPORT

Venue: Off Vadinar

Date: 25th Nov 2023

Exercise conducted by: Indian Coast guard

Resource agencies and stake holders involved:

1. M/S Adani Port & SEZ, Mundra
2. Indian Oil Corporation LTD, Jamnagar
3. M/S Nayara Energy LTD VOTL, Vadinar
4. M/S Reliance Industries LTD, Sikka Jamnagar
5. M/S Essar Bulk Terminal, Salaya

Attendees:

1. Capt. Hemant Dhruv
2. Capt. Peeyush Suwalka
3. Dol 11 Crew with Master
4. Mr. Yogesh Nandaniya
5. Mr. MP Choudhary with his team
6. HMEL Team
7. SRS Team
8. Sea Care Team

Statement of facts

0650 hrs.: Tug Victor left SPM & started proceeding to Vadinar for exercise.

0700 hrs.: Tug Dol 11 with crew and attendees left for Vadinar for NATPOLREX exercise from Ro-Ro pontoon.

0810 hrs.: Tug Dol 11 informed Vadinar Port Control that Tug Dol 11 & Victor will be entering Vadinar port limit for NATPOLREX exercise.

0845 hrs.: Briefing of drill carried out.

0855 hrs.: Informed ICG Commander Mishra on phone that Tug Dol 11 arrived at specified location 22 31.00 N 069 39.00 E. Commander Mishra advised to keep watch on VHF CH 71 for further communication with ICG vessel (Call sign: Coastguard Sajag)

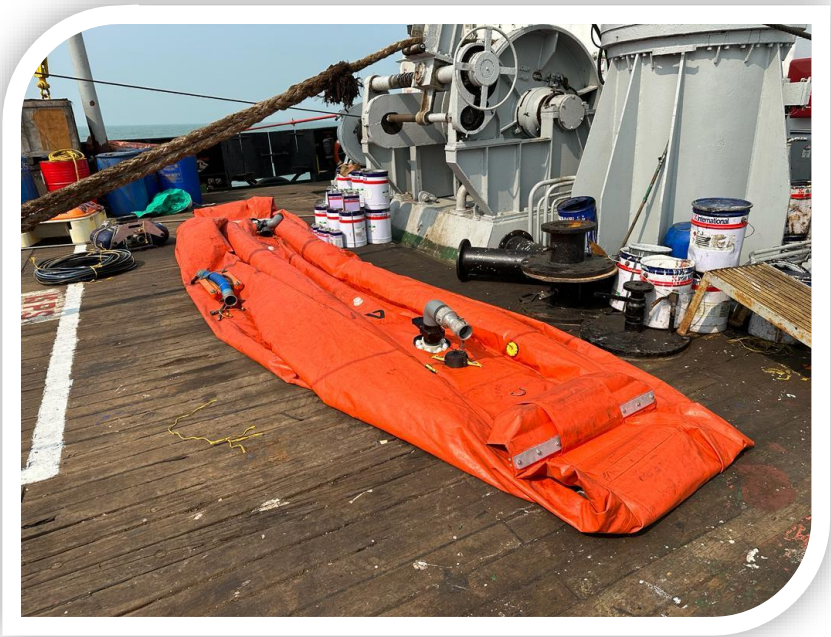
0945 hrs.: Tug Dol 11 communicated with Coastguard Sajag for launching boom to demonstrate 'J' shape boom configuration. Coastguard Sajag advised to commence launching boom.

0948 hrs.: Commence lowering boom.

1015 hrs.: Completed lowering boom (5 section 250 m in length)

1035 hrs.: J-formation of boom completed. Same informed to Coastguard Sajag. Sajag advised maintaining position with ‘J’ shape boom configuration.

1045 hrs.: Skimmer deployed in water. The floating storage tank was kept ready on Dol 11 deck. The Overside OSD spray was pressurized and demonstrated with water only.



1150 hrs.: The whole operation observed by Coastguard Samarth & Sajag and appreciated the quick and professional response from Dol-11. The Coast guard advised to start securing gears & break off from position.

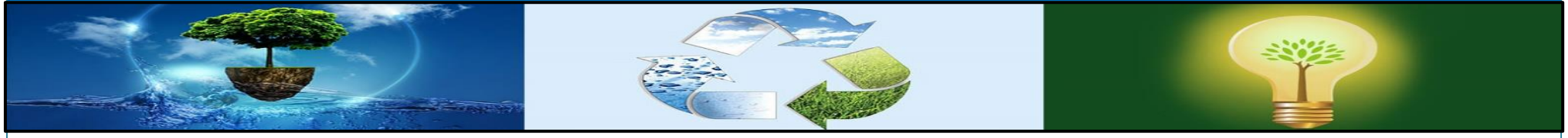
1152 hrs.: Secured all deployed equipment and started recovering boom.

1236 hrs.: Completed recovering boom and vessel started proceeding to Mundra. Same informed to Vadinar port control and Coast guard vessel Sajag.

1245 hrs.: Debriefing of drill carried out.

1430 hrs.: Dol 11 arrived Mundra port. Tug Victor arrived at IOCL SPM.

Annexure – 4



“Half Yearly Environmental Monitoring Reports “

For,

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M/S. ADANI PORTS & SPECIAL ECONOMIC ZONE LTD.

PLOT NO. 169/P, AT - NAVINAL ISLAND, TAL. - MUNDRA, DIST. - KUTCH - 370421.

Monitoring Period: October – 2023 to March - 2024

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

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.11	7.94	8.21	8.06	8.18	8.12	8.17	8.05	8.12	7.98	8.14	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.8	29.7	29.7	29.6	29.6	29.5	29.5	29.4	29.6	29.5	29.7	26.6	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	132	94	144	116	132	108	124	112	132	112	142	124	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.6	BDL	2.5	BDL	2.3	BDL	2.4	BDL	2.9	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.08	5.78	6.08	5.88	6.22	5.92	6.17	5.97	6.12	5.92	6.25	6.05	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.84	36.15	36.12	36.38	36.34	36.88	36.32	37.14	36.12	37.18	36.19	37.24	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	3.23	3.06	3.39	3.23	3.06	2.9	2.42	2.26	2.24	2	3.23	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.348	0.326	0.304	0.261	0.348	0.326	0.261	0.217	0.543	0.5	0.522	0.5	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.74	3.59	4.22	4.11	4.16	4.11	4.06	3.95	3.95	3.8	4.11	4.06	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	1.47	1.26	1.37	1.16	1.16	1.05	1.26	1.05	2.32	2.11	1.58	1.47	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.318	6.976	7.914	7.601	7.568	7.336	6.741	6.427	6.733	6.3	7.862	7.46	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	35864	36890	36110	36910	36180	37120	35980	37060	36120	36980	36328	37118	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	32	12	24.29	8.1	28.25	12.11	20.38	4.08	24.1	8	28.03	12.01	APHA 23rd Ed.,2017, 5220-B

Continue...

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.05	2.65	2.36	2.15	2.41	2.36	3.01	2.44	2.66	2.44	3.05	3.25	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	2.1	0.96	1.4	0.86	1.61	1.25	1.79	2	1.79	1.66	2	1.56	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	125	142	111	98	124	100	106	96	120	84	109	90	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Coscinodiscus*	*Odentella*	*Nitzschia*	*Biddulphia*	*Nitzschia*	*Biddulphia*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Rhizosolenia*	*Diploneis*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Surirella*	*Pinnularia*	*Surirella*	*Pinnularia*	*Biddulphia*	*Pinnularia*	
			Rhizosolenia	*Coscinodiscus*	*Rhizosolenia*	*Coscinodiscus*	*Rhizosolenia*	*Coscinodiscus*	*Navicula*	*Thalassiothrix*	*Navicula*	*Thalassiothrix*	*Navicula*	*Thalassiothrix*	
			Dinophysis	*Grammatophora*	*Dinophysis*	*Grammatophora*	*Dinophysis*	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Nitzschia*	*Grammatophora*	*Nitzschia*	*Grammatophora*	
			Thalassionema	*Thallassiosira*	*Biddulphia*	*Navicula*	*Biddulphia*	*Navicula*	*Skeletonema*	*Ceratium*	*Skeletonema*	*Ceratium*	*Skeletonema*	*Ceratium*	

B	Zooplankton								
1	Abudance(Population)	noX103/ 100 m3	52	50	46	50	41	55	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Crustacean Larvae*	*Oikoplura*	*Oikoplura*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	
			Egg(Fish and Shrimps)	*Pinnularia*	*Pinnularia*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
			Copepods	*Copepods*	*Copepods*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	
			Crustacean	*Copepods nauplii*	*Copepods nauplii*	*Crustacean*	*Crustacean*	*Crustacean*	
			Bivalve Larvae	*Thalassionema*	*Thalassionema*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	15.63	14.25	15.44	15.26	14.78	13.69	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	244		214		230		242		96		102		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	56		44		41		39		10		14		APHA 23rd Ed.2017,9222-B
3	Ecoli	/100ml	32		30		22		19		8		10		IS :15185:2016
4	Enterococcus	/100ml	19		22		14		12		Absent		Absent		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

Mr. Nilesh Patel
Sr. Chemist

GUJARAT VAPI.

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.53	0.46	0.42	0.48	0.44	0.41	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	494.2	510.3	514.8	532.2	542.2	549.3	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	%	4.02	3.92	3.96	3.98	4.02	4.06	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	124.9	110.3	115.4	121.2	124.4	130.8	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	627.3	644.8	622.5	618.2	612.4	618.3	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	3.97	4.06	4.09	4.11	4.15	4.08	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	38.62	42.28	42.44	41.08	42.02	41.88	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	37.19	40.25	40.86	41.12	42.11	42.32	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	132.2	124.3	119.2	116.34	112.5	118.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.44	2.49	2.44	2.38	2.32	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

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Isopods*	*Isopods*	*Isopods*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	APHA (23rd Ed. 2017)10500 C
			Polychates	*Polychates*	*Polychates*	*Decapods Larvae*	*Decapods Larvae*	*Decapods Larvae*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Amphipods*	*Gastropods*	*Gastropods*	
			Amphipods	*Foraminiferan*	*Foraminiferan*	*Polychates*	*Polychates*	*Polychates*	
2	MeioBenthos	--	*Herpectacoids*	*Gastropods*	Herpectacoids	Turbellarians	*Turbellarians*	*Turbellarians*	
			Decapods Larvae	*Decapods Larvae*	*Decapods Larvae*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	
3	Population	no/m²	318	303	347	356	289	368	

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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.17	7.94	8.14	7.89	8.16	7.94	8.21	8.08	8.18	8.06	8.15	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	136	114	122	108	128	114	134	112	142	118	136	120	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.9	BDL	2.8	BDL	2.5	BDL	2.2	BDL	2.6	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.88	5.68	5.98	5.78	6.12	5.82	6.17	5.87	6.12	5.82	6.25	5.95	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.24	36.41	35.62	36.55	35.98	36.84	36.22	37.15	36.25	37.18	36.32	37.24	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	2.9	2.58	3.06	2.74	3.39	3.23	2.74	2.58	2.9	2.58	3.55	3.23	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.413	0.391	0.37	0.348	0.348	0.304	0.326	0.304	0.478	0.435	0.522	0.478	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.59	3.48	3.95	3.8	3.9	3.85	3.85	3.74	3.9	3.74	4.16	4.11	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	1.68	1.58	1.47	1.37	1.37	1.26	1.47	1.37	2.32	2.21	1.9	1.68	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.903	6.451	7.38	6.888	7.638	7.384	6.916	6.624	7.278	6.755	8.232	7.818	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	36124	36960	36206	36988	36220	37110	36124	37104	36150	37110	36222	37180	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	36	16	32.38	4.05	32.29	16.14	16.3	4.08	20.1	4.1	24.02	12.01	APHA 23rd Ed.,2017, 5220-B

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.15	3.56	3.02	2.88	3.12	3.04	3	2.56	3.21	3.11	2.98	2.69	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	2.31	2.47	2.63	1.96	2.41	2.33	2.22	2.09	2.01	2.44	2.09	2.06	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10³/L	108	127	142	102	125	127	120	132	100	125	95	147	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Thalassiothrix*	*Pinnularia*	*Thalassiothrix*	*Pinnularia*	*Dinophysis*	*Pinnularia*	*Navicula*	*Thalassiothrix*	*Surirella*	*Thalassiothrix*	*Surirella*	*Thalassiothrix*	APHA (23rd Ed. 2017)10200 F
			Surirella	*Biddulphia*	*Surirella*	*Biddulphia*	*Surirella*	*Biddulphia*	*Skeletonema*	*Surirella*	*Pinnularia*	*Surirella*	*Pinnularia*	*Surirella*	
			Navicula	*Navicula*	*Navicula*	*Navicula*	*Nitzschia*	*Navicula*	*Rhizosolenia*	*Navicula*	*Rhizosolenia*	*Navicula*	*Melosira*	*Navicula*	
			Thallassiosira	*Rhizosolenia*	*Cyclotella*	*Rhizosolenia*	*Cyclotella*	*Rhizosolenia*	*Dinophysis*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	
			Skeletonema	*Skeletonema*	*Skeletonema*	*Thallassiosira*	*Skeletonema*	*Thallassiosira*	*Thalassionema*	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Thalassionema*	*Skeletonema*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	44	57	38	41	52	47	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)*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Copepods	*Oikoplura*	*Nitzschia*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	
			Copepods nauplii	*Copepods nauplii*	*Copepods nauplii*	*Copepods*	*Copepods*	*Copepods*	
			Crustacean	*Crustacean*	*Pinnularia*	*Crustacean*	*Crustacean*	*Copepods nauplii*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	17.36	15.36	13.25	14.13	14.39	15.78	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
C	Microbiological														
1	Total Bacterial Count	CFU/ml	200		188		200		222		144		120		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	42		30		36		40		36		30		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	20		24		21		22		18		12		IS :15185:2016
4	Enterococcus	/100ml	18		10		18		15		Absent		Absent		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

Mr. Nilesh Patel
Sr. Chemist

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. GUJARAT VAPI.

Mr. Nitin Tandel
Technical Manager

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.46	0.43	0.48	0.46	0.42	0.44	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	582.2	588.4	546.2	538.4	550.2	561.4	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	%	4.07	4.16	4.09	4.02	4.11	4.03	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	162.4	156.8	148.2	142.2	134.5	142.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	684.4	702.2	686.5	644.4	652.2	644.5	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.02	4.11	4.08	4.03	4.09	4.02	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	40.39	40.88	41.05	42.12	42.84	42.52	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	40.28	40.62	41.12	42.35	42.66	42.15	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	144.8	148.9	152.24	148.6	150.24	149.62	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.18	2.24	2.18	2.24	2.33	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

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Continue...

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Decapods Larvae*	*Polychates*	*Polychates*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	APHA (23rd Ed. 2017)10500 C
			Isopods	Isopods	*Isopods*	*Gastropods*	*Gastropods*	Gastropods	
			Amphipods	*Amphipods*	*Gastropods*	*Isopods*	*Isopods*	*Isopods*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Amphipods*	*Amphipods*	
2	MeioBenthos	--	*Foraminiferan*	*Foraminiferan*	*Decapods Larvae*	*Herpectacoids*	*Sipunculids*	*Sipunculids*	
			Herpectacoids	*Herpectacoids*	*Herpectacoids*	*Polychates*	*Polychates*	*Polychates*	
3	Population	no/m²	256	350	321	308	254	307	

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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.12	8.02	8.18	8.04	8.24	8.11	8.16	7.98	8.12	7.89	8.16	7.99	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	111	84	118	92	126	98	130	104	136	110	144	120	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	3.1	BDL	2.9	BDL	3.1	BDL	3.3	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	6.08	5.98	5.88	5.92	5.72	5.97	5.77	5.92	5.72	6.05	5.85	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.78	36.35	36.24	36.68	36.68	37.16	36.74	37.22	36.77	37.28	36.84	37.32	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	3.06	2.74	3.55	3.39	3.23	2.9	3.06	2.9	2.74	2.42	3.06	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.435	0.391	0.456	0.413	0.391	0.348	0.326	0.304	0.348	0.326	0.391	0.37	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.69	3.48	4.01	3.9	3.74	3.69	3.69	3.59	3.74	3.59	4.06	4.01	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	1.79	1.68	1.58	1.47	1.37	1.26	1.58	1.37	1.47	1.26	1.58	1.37	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.185	6.611	8.016	7.703	7.361	6.938	7.076	6.794	6.828	6.336	7.511	7.28	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	35880	36744	35970	36790	36130	36860	36080	36780	36210	37050	36320	37180	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	32	8	28.34	16.19	28.25	16.14	12.03	4.08	16.1	8	20.02	12.01	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.11	2.83	3.11	3.04	2.98	3.26	2.45	3.08	2.74	2.56	2.47	2.47	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.65	1.52	1.65	2.01	2.01	2.18	2.06	2.41	1.87	1.45	1.66	1.47	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	147	109	147	110	148	135	132	125	154	88	140	98	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Pinnularia*	*Coscinodiscus*	*Pinnularia*	*Coscinodiscus*	*Pinnularia*	*Coscinodiscus*	*Melosira*	*Cyclotella*	*Melosira*	*Cyclotella*	*Melosira*	*Cyclotella*	APHA (23rd Ed. 2017)10200 F
			Biddulphia	*Pinnularia*	*Biddulphia*	*Pinnularia*	*Biddulphia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	*Pinnularia*	
			Navicula	*Rhizosolenia*	*Navicula*	*Rhizosolenia*	*Navicula*	*Rhizosolenia*	*Skeletonema*	*Skeletonema*	*Rhizosolenia*	*Skeletonema*	*Rhizosolenia*	*Skeletonema*	
			Thallassiosira	*Dinophysis*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	*Dinophysis*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	*Thallassiosira*	
			Skeletonema	*Thalassionema*	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	*Thalassionema*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	63	55	50	38	30	65	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods*	*Copepods*	*Rhizosolenia*	*Crustacean*	*Crustacean*	*Crustacean*	
			Copepods nauplii	*Copepods nauplii*	*Crustacean Larvae*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	
			Egg(Fish and Shrimps)	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Crustacean	*Pinnularia*	*Oikoplura*	*Crustacean*	*Crustacean*	*Egg(Fish and Shrimps)*	
			Bivalve Larvae	*Bivalve Larvae*	*Thalassionema*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	15.69	16.35	14.23	17.12	15.47	15.47	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	178		164		188		198		132		128		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	33		28		30		42		24		26		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	23		20		24		20		10		20		IS :15185:2016
4	Enterococcus	/100ml	17		12		20		19		Absent		Absent		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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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.43	0.47	0.46	0.41	0.44	0.45	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	564.2	570.3	580.4	584.6	602.2	612.4	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	%	4.08	4.14	4.09	4.13	4.15	4.09	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	124.6	121.2	125.4	132.2	142.2	138.6	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	624.2	633.4	621.2	614.4	618.2	622.5	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.12	4.15	4.08	4.01	4.06	4.12	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	44.28	48.2	46.4	44.8	42.9	42.5	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	38.2	40.3	38.5	38.95	40.12	41.08	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	117.4	120.2	118.4	120.2	124.5	132.1	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.44	2.51	2.46	2.38	2.44	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 [M3 EAST OF BOCHAISLANOT DETECTED - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	Polychates	*Polychates*	*Amphipods*	*Gastropods*	*Gastropods*	*Decapods Larvae*	APHA (23rd Ed. 2017)10500 C
			Gastropods	*Gastropods*	*Gastropods*	*Isopods*	*Isopods*	*Isopods*	
			Isopods	*Isopods*	*Isopods*	*Amphipods*	*Amphipods*	*Amphipods*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Sipunculids*	
2	MeioBenthos	--	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Polychates*	*Polychates*	*Foraminiferan*	
			Polychates	*Polychates*	*Polychates*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	
3	Population	no/m²	284	303	247	268	287	296	

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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

White House
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Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.19	8.06	8.24	8.09	8.17	8.12	8.22	8.09	8.19	8.04	8.24	8.05	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.7	29.6	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	146	118	134	112	128	110	142	118	136	122	152	128	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.4	BDL	3.2	BDL	3.1	BDL	3	BDL	3.4	BDL	3.2	BDL	IS 3025(Part 4)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	5.98	5.88	5.68	6.22	6.12	6.27	6.18	6.22	6.12	6.35	6.25	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.27	36.83	36.54	37.02	36.74	37.19	36.66	37.34	36.84	37.32	38.88	37.34	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	2.74	2.42	2.9	2.74	2.74	2.58	3.06	2.9	3.23	3.06	3.06	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.478	0.435	0.5	0.478	0.478	0.435	0.391	0.37	0.522	0.478	0.478	0.456	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.9	3.74	3.85	3.69	3.8	3.74	4.16	4.11	3.85	3.64	4.01	3.9	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	2.32	2.21	1.79	1.68	1.47	1.37	1.37	1.16	2.53	2.42	2.32	2.11	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.118	6.595	7.25	6.908	7.018	6.755	7.611	7.38	7.602	7.178	7.548	7.256	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	36220	37120	36290	37140	36330	37210	36228	37120	36340	37150	36460	37240	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	32	20	12.14	4.05	32.29	20.18	20.38	4.08	24.1	8	28.03	12.01	APHA 23rd Ed.,2017, 5220-B

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CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A	Phytoplankton														
1.	Chlorophyll	mg/m³	3.42	3.55	3.22	2.86	3.08	2.56	2.88	3.04	2.9	3.14	2.36	3.14	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.36	1.35	1.58	1.87	2.33	1.88	1.98	1.56	2.03	1.65	2.69	2	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	109	188	110	142	125	139	99	126	108	145	154	88	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Coscinodiscus*	*Surirella*	*Surirella*	*Surirella*	*Coscinodiscus*	*Surirella*	*Thallassiosira*	*Coscinodiscus*	*Thallassiosira*	*Coscinodiscus*	*Thallassiosira*	*Coscinodiscus*	APHA (23rd Ed. 2017)10200 F
			Diploneis	*Biddulphia*	*Diploneis*	*Biddulphia*	*Diploneis*	*Biddulphia*	*Melosira*	*Diploneis*	*Melosira*	*Diploneis*	*Melosira*	*Diploneis*	
			Rhizosolenia	*Navicula*	*Thalassiothrix*	*Coscinodiscus*	*Skeletonema*	*Coscinodiscus*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	
			Dinophysis	*Thallassiosira*	*Navicula*	*Thallassiosira*	*Navicula*	*Thallassiosira*	*Rhizosolenia*	*Dinophysis*	*Rhizosolenia*	*Dinophysis*	*Rhizosolenia*	*Dinophysis*	
			Thalassionema	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Thalassionema*	*Skeletonema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	

B	Zooplankton								
1	Abudance(Population)	noX103 / 100 m3	48	63	49	50	36	40	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Oikoplura*	*Oikoplura*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	*Copepods nauplii*	
			Copepods nauplii	*Rhizosolenia*	*Rhizosolenia*	*Crustacean Larvae*	*Crustacean Larvae*	*Egg(Fish and Shrimps)*	
			Crustacean Larvae	*Crustacean Larvae*	*Egg(Fish and Shrimps)*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
			Crustacean	*Crustacean*	*Crustacean*	*Bivalve Larvae*	*Bivalve Larvae*	*Copepods nauplii*	
			Bivalve Larvae	*Bivalve Larvae*	*Bivalve Larvae*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
3	Total Biomass	ml/100 m³	17.58	16.55	16.25	15.26	14.25	14.23	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	258		248		280		258		90		88		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	44		46		62		56		30		42		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	24		32		35		29		14		18		IS :15185:2016
4	Enterococcus	/100ml	14		21		23		15		Absent		Absent		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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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.52	0.49	0.44	0.48	0.52	0.49	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	648.1	640.2	610.5	612.2	625.4	611.1	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	%	4.01	4.08	4.11	4.08	4.12	4.09	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	142.7	146.4	138.5	132.5	135.2	141.3	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	604.5	610.2	594.5	580.5	594.2	602.4	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.06	4.12	4.15	4.1	4.12	4.05	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	52.37	54.36	55.08	49.38	50.12	49.54	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.24	44.28	44.62	42.33	44.25	44.63	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	122.3	126.4	124.2	122.4	136.4	130.1	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.64	2.71	2.64	2.58	2.45	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 [M4 JUNA BANOT DETECTEDAR N 22°47'577" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D	Benthic Organisms								
1	Macrobenthos	--	*Foraminiferan*	*Amphipods*	*Amphipods*	*Sipunculids*	*Sipunculids*	Sipunculids	APHA (23rd Ed. 2017)10500 C
			Gastropods	*Gastropods*	*Gastropods*	*Decapods Larvae*	*Decapods Larvae*	*Decapods Larvae*	
			Isopods	*Isopods*	*Isopods*	*Polychates*	*Polychates*	*Polychates*	
			Sipunculids	*Sipunculids*	*Turbellarians*	*Isopods*	*Isopods*	*Foraminiferan*	
2	MeioBenthos	--	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Turbellarians*	Gastropods	*Gastropods*	
			Polychates	*Turbellarians*	*Decapods Larvae*	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	
3	Population	no/m^2	322	341	288	304	308	300	

Mr. Nilesh Patel
Sr. Chemist

ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR GUJARAT VAPI.

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.15	8.01	8.12	8.05	8.18	8.08	8.18	8.01	8.24	8.06	8.15	8.01	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	104	82	124	98	142	122	134	108	138	112	126	108	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.8	BDL	3.1	BDL	3.5	BDL	3.4	BDL	3.2	BDL	2.9	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.08	5.88	6.18	5.78	6.22	6.02	6.27	6.07	6.22	6.02	6.35	6.15	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.18	36.71	36.46	37.12	36.65	37.33	36.84	37.28	36.74	37.25	36.79	37.31	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	2.58	2.42	3.23	3.06	3.06	2.74	2.9	2.74	3.39	3.23	3.71	3.55	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.348	0.326	0.37	0.348	0.413	0.37	0.391	0.37	0.348	0.326	0.391	0.37	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.48	3.32	3.9	3.8	4.01	3.95	4.32	4.22	3.74	3.59	4.06	3.85	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	1.9	1.68	1.79	1.58	1.68	1.58	1.79	1.68	1.47	1.26	1.68	1.47	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	6.408	6.066	7.5	7.208	7.483	7.06	7.611	7.33	7.478	7.146	8.161	7.77	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	36233	37080	36274	37112	36320	37140	36120	37060	36140	37100	36186	37260	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	40	28	20.24	8.1	24.22	20.18	20.38	8.15	24.1	12.1	28.03	16.02	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	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.47	2.96	3.45	2.68	2.36	2.76	3.05	3.14	3.14	3.1	3.14	3.09	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.63	1.75	2.14	2.07	1.23	1.66	1.68	2.03	2.11	2.66	2.45	1.22	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	100	109	152	132	110	157	105	106	1422	141	110	109	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Diploneis*	*Navicula*	*Diploneis*	*Navicula*	*Navicula*	*Navicula*	*Navicula*	*Pinnularia*	*Navicula*	*Pinnularia*	*Navicula*	*Pinnularia*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Skeletonema*	*Rhizosolenia*	*Skeletonema*	*Biddulphia*	*Skeletonema*	*Biddulphia*	*Biddulphia*	*Biddulphia*	*Biddulphia*	*Biddulphia*	*Rhizosolenia*	
			Nitzschia	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Navicula*	*Nitzschia*	*Navicula*	*Odontella*	*Dinophysis*	
			Cyclotella	*Dinophysis*	*Cyclotella*	*Biddulphia*	*Cyclotella*	*Biddulphia*	*Cyclotella*	*Thallassiosira*	*Cyclotella*	*Thallassiosira*	*Cyclotella*	*Coscinodiscus*	
			Pleurosigma	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Skeletonema*	*Pleurosigma*	*Skeletonema*	*Pleurosigma*	*Skeletonema*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	52		44		36		44		48		41		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Copepods nauplii*		*Nitzschia*		*Nitzschia*		*Crustacean Larvae*		*Crustacean Larvae*		*Crustacean Larvae*		
			Crustacean Larvae		*Crustacean Larvae*		*Crustacean Larvae*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		
			Oikoplura		*Oikoplura*		*Oikoplura*		*Copepods*		*Copepods*		*Copepods nauplii*		
			Bivalve Larvae		*Bivalve Larvae*		*Bivalve Larvae*		*Crustacean*		*Crustacean*		*Crustacean*		
			Oikoplura		*Oikoplura*		*Oikoplura*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	14.6		13.52		14.23		14.52		15.36		14.68		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	286		256		242		244		140		140		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		38		33		42		28		28		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	28		25		26		31		15		16		IS :15185:2016
4	Enterococcus	/100ml	14		14		21		25		4		Absent		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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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.57	0.53	0.48	0.45	0.48	0.52	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	562.4	570.5	765.2	738.6	744.1	721.4	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	%	4.04	4.13	4.11	4.04	4.08	4.11	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	138.2	136.2	130.5	134.6	142.2	136.5	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	627.8	633.2	624.4	621.5	626.4	618.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.09	4.12	4.08	3.98	4.12	3.96	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	46.97	48.23	46.85	46.12	45.98	45.36	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	42.38	44.28	45.21	45.58	45.96	45.82	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	118.2	123.4	119.6	119	124.1	118.2	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.41	2.46	2.35	2.27	2.24	2.11	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

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Amphipods*	*Amphipods*	*Amphipods*	*Isopods*	*Isopods*	*Isopods*	APHA (23rd Ed. 2017)10500 C
			Polychates	*Sipunculids*	*Polychates*	*Polychates*	*Polychates*	*Gastropods*	
			Isopods	*Isopods*	*Isopods*	*Sipunculids*	*Sipunculids*	*Sipunculids*	
			Gastropods	*Gastropods*	*Gastropods*	*Amphipods*	*Amphipods*	*Amphipods*	
2	MeioBenthos	--	Decapods Larvae	Decapods Larvae	Foraminiferan	Polychates	Herpectacoids	*Herpectacoids*	
			Herpectacoids	*Gastropods*	*Herpectacoids*	*Foraminiferan*	*Foraminiferan*	*Polychates*	
3	Population	no/m²	336	247	256	264	298	302	

Mr. Nilesh Patel
Sr. Chemist

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. GUJARAT VAPI.

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.17	7.99	8.21	7.96	8.24	8.12	8.19	8.02	8.14	7.88	8.09	7.91	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	112	88	128	104	110	94	124	110	130	114	124	98	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.3	BDL	3.5	BDL	3.4	BDL	3.2	BDL	3.1	BDL	3.3	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.98	5.78	6.08	5.78	6.12	5.92	6.07	5.97	6.02	5.92	6.15	6.05	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.29	36.64	36.41	36.98	36.52	37.17	36.44	37.25	36.35	37.18	36.41	37.22	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	2.9	2.74	3.06	2.58	3.55	3.23	3.39	3.06	3.23	2.9	3.39	3.06	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.522	0.478	0.435	0.413	0.456	0.435	0.435	0.413	0.435	0.391	0.478	0.435	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.85	3.64	4.11	3.95	4.06	3.95	3.95	3.85	3.69	3.48	3.95	3.85	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	2.53	2.42	2.11	2	1.9	1.79	1.58	1.47	1.79	1.68	2.11	1.9	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.272	6.858	7.605	6.943	8.066	7.615	7.775	7.323	7.355	6.771	7.818	7.345	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	36122	37148	36180	37180	36240	37210	36124	37180	36220	37090	36340	37230	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	28	8	36.43	16.19	36.32	24.22	16.3	4.08	20.1	8	24.02	12.01	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.98	3.35	3.08	3.35	3.25	3.65	3.12	2.88	2.96	3	3.09	2.49	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.36	2.47	2	1.78	2.44	2.44	2.14	2.04	2.14	1.25	2.19	1.78	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	106	160	108	158	156	137	128	100	120	96	87	121	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Nitzschia*	*Thalassiothrix*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Diploneis*	*Coscinodiscus*	*Diploneis*	*Coscinodiscus*	*Diploneis*	*Coscinodiscus*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Surirella*	*Pinnularia*	*Surirella*	*Odontella*	*Surirella*	*Rhizosolenia*	*Diploneis*	*Rhizosolenia*	*Diploneis*	*Rhizosolenia*	*Diploneis*	
			Odontella	*Navicula*	*Dinophysis*	*Navicula*	*Dinophysis*	*Navicula*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	*Nitzschia*	*Rhizosolenia*	
			Dinophysis	*Thallassiosira*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	*Thalassiothrix*	*Dinophysis*	
			Surirella	*Skeletonema*	*Surirella*	*Skeletonema*	*Cyclotella*	*Skeletonema*	*Pleurosigma*	*Thalassionema*	*Pleurosigma*	*Thalassionema*	*Cyclotella*	*Thalassionema*	

B			Zooplankton												
1	Abudance(Population)	noX103 / 100 m3	50		48		53		41		25		38		APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Nitzschia*		*Nitzschia*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		*Egg(Fish and Shrimps)*		
			Pinnularia		*Pinnularia*		*Coscinodiscus*		*Oikoplura*		*Oikoplura*		*Oikoplura*		
			Odontella		*Odontella*		*Odontella*		*Copepods nauplii*		*Copepods nauplii*		*Copepods nauplii*		
			Dinophysis		*Dinophysis*		*Dinophysis*		*Crustacean*		*Crustacean*		*Crustacean*		
			Surirella		*Surirella*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		*Bivalve Larvae*		
3	Total Biomass	ml/100 m³	16.33		16.25		17.35		16.23		13.56		16.58		

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	186		200		202		260		86		96		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	33		41		36		46		12		27		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	30		31		24		36		5		14		IS :15185:2016
4	Enterococcus	/100ml	21		19		22		23		Absent		Absent		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

ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR GUJARAT VAPI.

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.21	8.04	8.18	8.08	8.16	8.06	8.09	7.96	7.99	7.86	8.06	7.88	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.6	29.5	29.5	29.4	29.4	29.3	29.5	29.4	29.6	29.5	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	102	78	112	84	98	84	106	88	112	90	122	98	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.4	BDL	3.1	BDL	3.4	BDL	3.1	BDL	3.3	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.98	5.88	5.88	5.68	6.02	5.82	6.07	5.87	6.02	5.82	6.15	5.95	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.02	36.76	36.27	36.88	36.44	37.09	36.38	37.24	36.22	37.14	36.38	37.09	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	3.23	2.9	3.39	3.06	3.71	3.39	3.55	3.23	3.23	3.06	3.55	3.06	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.543	0.5	0.522	0.478	0.478	0.456	0.456	0.435	0.435	0.391	0.543	0.478	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.95	3.8	4.16	4.01	4.11	4.06	3.74	3.64	3.85	3.64	4.06	3.95	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	2.32	2.11	2.21	2	2.11	1.9	2.21	2	2.53	2.32	2.32	2.21	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.723	7.2	8.072	7.548	8.298	7.906	7.746	7.305	7.515	7.091	8.153	7.488	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	36268	37350	36302	37410	36380	34500	36410	37320	36540	37410	36610	37540	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24	12	28.34	8.1	32.29	28.25	20.38	12.23	24.1	16.1	28.03	20.02	APHA 23rd Ed.,2017, 5220-B

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Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.68	2.47	2.36	2.85	2.3	2.88	2.95	3.04	2.36	3.01	3	3.01	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.99	2.03	1.06	1.88	2.03	1.78	2.36	1.55	1.88	1.63	1.88	1.36	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	78	156	86	145	97	148	100	85	123	96	106	106	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Odentella*	*Cyclotella*	*Odentella*	*Cyclotella*	*Odentella*	*Cyclotella*	*Nitzschia*	*Diploneis*	*Nitzschia*	*Diploneis*	*Nitzschia*	*Diploneis*	APHA (23rd Ed. 2017)10200 F
			Rhizosolenia	*Pinnularia*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Pinnularia*	*Grammatophora*	*Rhizosolenia*	*Grammatophora*	*Rhizosolenia*	*Grammatophora*	*Rhizosolenia*	
			Coscinodiscus	*Skeletonema*	*Coscinodiscus*	*Skeletonema*	*Coscinodiscus*	*Skeletonema*	*Diploneis*	*Nitzschia*	*Diploneis*	*Nitzschia*	*Diploneis*	*Nitzschia*	
			Grammatophora	*Thallassiosira*	*Grammatophora*	*Thallassiosira*	*Grammatophora*	*Thallassiosira*	*Thalassiothrix*	*Cyclotella*	*Thalassiothrix*	*Cyclotella*	*Thalassiothrix*	*Grammatophora*	
			Thallassiosira	*Thalassionema*	*Thallassiosira*	*Thalassionema*	*Thallassiosira*	*Thalassionema*	*Pleurosigma*	*Pleurosigma*	*Pleurosigma*	*Pleurosigma*	*Pleurosigma*	*Pleurosigma*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	41	52	60	49	49	49	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Coscinodiscus*	*Coscinodiscus*	*Odontella*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
			Diploneis	*Egg(Fish and Shrimps)*	*Egg(Fish and Shrimps)*	*Copepods nauplii*	*Copepods nauplii*	*Egg(Fish and Shrimps)*	
			Rhizosolenia	*Rhizosolenia*	*Rhizosolenia*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Dinophysis	*Bivalve Larvae*	*Bivalve Larvae*	*Crustacean*	*Crustacean*	*Crustacean*	
			Thalassionema	*Thalassionema*	*Thalassionema*	*Bivalve Larvae*	*Bivalve Larvae*	*Bivalve Larvae*	
3	Total Biomass	ml/100 m³	16.45	15.44	17.68	15.44	15.44	14.78	

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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	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	202		274		250		266		98		98		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	30		39		35		32		20		14		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	22		30		26		27		14		10		IS :15185:2016
4	Enterococcus	/100ml	17		18		20		16		10		8		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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Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1.	Organic Matter	%	0.43	0.42	0.46	0.41	0.42	0.43	IS: 2720 (Part 22):1972 RA.2015, Amds.1
2.	Phosphorus as P	µg/g	580.4	594.2	580.3	582.8	580.5	574.2	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	%	4.11	4.16	4.11	4.15	4.16	4.12	IS3025(Part 55)2003
5.2	Total Chromium as Cr+3	µg/g	134.1	128.5	122.6	121.2	120.4	116.2	EPA 3050B/7190 (Extraction &Analytical Method): 1986
5.3	Manganese as Mn	µg/g	621.2	630.4	624.2	618.4	620.5	624.2	EPA 3050B/7460 (Extraction &Analytical Method): 1986
5.4	Iron as Fe	%	4.14	4.12	4.08	4.02	4.11	4.02	EPA 3050B/7380 (Extraction &Analytical Method): 1986
5.5	Nickel as Ni	µg/g	46.92	42.85	42.22	41.23	42.35	41.86	EPA 3050B/7520 (Extraction &Analytical Method): 1986
5.6	Copper as Cu	µg/g	47.79	46.57	45.88	45.27	45.39	45.21	EPA 3050B /7210 (Extraction &Analytical Method):1986
5.7	Zinc as Zn	µg/g	122.2	114.2	119.4	112.2	114.5	110.6	EPA 3050B/7950 (Extraction &Analytical Method): 1986
5.8	Lead as Pb	µg/g	2.41	2.32	2.18	2.1	2.3	2.41	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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UniStar
Environment and Research Labs Pvt. Ltd.

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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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	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
D			Benthic Organisms						
1	Macrobenthos	--	*Polychates*	*Gastropods*	*Gastropods*	*Polychates*	*Polychates*	*Polychates*	APHA (23rd Ed. 2017)10500 C
			Decapods Larvae	*Decapods Larvae*	*Decapods Larvae*	*Amphipods*	*Amphipods*	*Amphipods*	
			Isopods	*Isopods*	*Isopods*	*Isopods*	*Isopods*	*Sipunculids*	
			Sipunculids	*Sipunculids*	*Sipunculids*	*Sipunculids*	*Herpectacoids*	*Herpectacoids*	
2	MeioBenthos	--	*Herpectacoids*	*Herpectacoids*	*Herpectacoids*	*Foraminiferan*	*Foraminiferan*	*Foraminiferan*	
			Turbellarians	*Turbellarians*	Turbellarians	Turbellarians	Turbellarians	*Turbellarians*	
3	Population	no/m²	240	307	335	333	300	366	

Mr. Nilesh Patel
Sr. Chemist

GUJARAT VAPI. UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD.

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.16	8.02	8.19	8.06	8.22	8.1	8.14	7.99	8.12	7.86	8.18	8.02	IS 3025 (Part11)1983
2.	Temperature	°C	29.7	29.6	29.7	29.6	29.6	29.5	29.3	29.2	29.4	29.3	29.5	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	134	106	126	114	122	110	118	106	124	108	138	112	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	3.2	BDL	2.9	BDL	2.6	BDL	2.8	BDL	2.9	BDL	2.8	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	5.88	5.68	6.18	6.08	6.02	5.92	6.07	5.97	6.02	5.92	6.15	6.05	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	35.89	37.06	36.21	37.14	36.39	37.31	36.44	37.38	36.33	37.32	36.31	37.18	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	3.39	3.23	3.55	3.23	3.39	3.06	3.55	3.23	2.74	2.42	2.9	2.58	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.435	0.391	0.413	0.391	0.5	0.478	0.522	0.478	0.609	0.543	0.609	0.522	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.85	3.64	4.22	4.06	4.27	4.22	4.43	4.32	3.74	3.53	4.27	4.16	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	2.53	2.32	2.32	2.21	2.21	2.11	2	1.79	2.11	1.9	2.32	2.11	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.675	7.261	8.183	7.681	8.16	7.758	8.502	8.028	7.089	6.493	7.779	7.262	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	36210	37132	36340	37150	36400	37210	36104	36940	36220	37124	36310	37220	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	28	8	20.24	8.1	28.25	24.22	16.3	8.15	20.1	12.1	24.02	16.02	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	3.05	3.07	2.36	2.85	3.68	3.54	3.06	3.11	3.09	2.63	2.98	2.5	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	1.11	1.88	1.06	1.88	2.57	2.67	2.47	2.44	2.55	1.45	1.55	1.87	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	109	134	86	145	187	174	148	64	122	117	122	114	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Dinophysis*	*Navicula*	*Odontella*	*Cyclotella*	*Cyclotella*	*Surirella*	*Odontella*	*Nitzschia*	*Odontella*	*Nitzschia*	*Odontella*	*Nitzschia*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Skeletonema*	*Rhizosolenia*	*Pinnularia*	*Pinnularia*	*Skeletonema*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Pinnularia*	*Rhizosolenia*	*Pinnularia*	
			Thalassiothrix	*Rhizosolenia*	*Coscinodiscus*	*Skeletonema*	*Thalassiothrix*	*Rhizosolenia*	*Coscinodiscus*	*Odontella*	*Coscinodiscus*	*Odontella*	*Coscinodiscus*	*Odontella*	
			Grammatophora	*Dinophysis*	*Grammatophora*	*Thallassiosira*	*Rhizosolenia*	*Cyclotella*	*Grammatophora*	*Dinophysis*	*Grammatophora*	*Dinophysis*	*Pleurosigma*	*Dinophysis*	
			Ceratium	*Thalassionema*	*Thallassiosira*	*Thalassionema*	*Ceratium*	*Thalassionema*	*Thallassiosira*	*Surirella*	*Thallassiosira*	*Surirella*	*Thallassiosira*	*Surirella*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	40	60	42	51	51	43	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Diploneis*	*Diploneis*	*Diploneis*	*Decapoda*	*Decapoda*	*Decapoda*	
			Rhizosolenia	*Rhizosolenia*	*Rhizosolenia*	*Copepods*	*Copepods*	*Oikoplura*	
			Nitzschia	*Nitzschia*	*Nitzschia*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Thalassiothrix	*Coscinodiscus*	*Coscinodiscus*	*Crustacean*	*Crustacean*	*Bivalve Larvae*	
			Pleurosigma	*Pleurosigma*	*Pleurosigma*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
3	Total Biomass	ml/100 m³	15.47	17.45	15.24	16.02	16.02	15.23	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	222		221		222		212		212		222		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	40		39		28		33		33		40		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	33		30		26		28		28		30		IS :15185:2016
4	Enterococcus	/100ml	24		16		14		21		21		18		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

ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR GUJARAT VAPI.

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1.	pH	--	8.16	7.94	8.12	7.88	8.19	7.98	8.24	8.08	8.19	8.04	8.14	7.98	IS 3025 (Part11)1983
2.	Temperature	°C	29.8	29.7	29.7	29.6	29.6	29.5	29.4	29.2	29.5	29.3	29.6	29.4	IS 3025 (Part 9)1984
3.	Total Suspended Solids	mg/L	118	98	132	110	124	108	116	102	112	108	134	120	APHA 23rd Ed.,2017,2540- D
4.	BOD (3 Days @ 27°C)	mg/L	2.7	BDL	3.4	BDL	2.8	BDL	3.1	BDL	3.4	BDL	3.1	BDL	IS 3025(Part 44)1993Amd.01
5.	Dissolved Oxygen	mg/L	6.18	5.78	6.18	5.98	5.92	5.82	5.97	5.87	5.92	5.82	6.05	5.95	APHA 23rd Ed.,2017,4500-O, B
6.	Salinity	ppt	36.08	36.74	36.22	36.97	36.34	37.11	36.48	37.38	36.44	37.32	36.48	37.35	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	3.23	2.9	3.39	3.06	3.23	3.06	3.39	3.06	2.9	2.74	3.23	2.9	APHA 23rd Ed., 2017,4500 NO3-B
9.	Nitrite as NO_2	µmol/L	0.609	0.543	0.565	0.522	0.522	0.5	0.5	0.456	0.522	0.478	0.565	0.543	APHA 23rd Ed.,2017,4500NO_2B
10.	Ammonical Nitrogen as NH_3	µmol/L	3.74	3.53	4.27	4.16	4.01	3.95	4.22	4.06	3.85	3.64	4.32	4.22	APHA 23rd Ed., 2017,4500- NH3 B
11.	Phosphates as PO_4	µmol/L	2.11	1.9	2	1.79	2.32	2.21	1.68	1.58	2.53	2.42	2.32	2.11	APHA 23rd Ed.,2017,4500-P, D
12.	Total Nitrogen	µmol/L	7.579	6.973	8.225	7.742	7.762	7.51	8.11	7.576	7.272	6.858	8.115	7.663	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	36138	37122	36210	37140	36270	37180	36120	37090	36324	37210	36410	37390	APHA 23rd Ed.,2017, 2540- C
15.	COD	mg/L	24	12	36.43	16.19	24.22	20.18	8.15	4.08	12.1	8	16.02	12.01	APHA 23rd Ed.,2017, 5220-B

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
A			Phytoplankton												
1.	Chlorophyll	mg/m³	2.22	3.26	2.35	3	2.58	2.98	2.58	3.07	2.64	3.07	2.58	2.87	APHA (23rd Ed. 2017)10200 H
2.	Phaeophytin	mg/m³	0.85	1.63	1.05	1.77	1.44	2.06	2	2.63	1.74	2.4	1.09	1.44	APHA (23rd Ed. 2017)10200 H
3.	Cell Count	No. x 10^3/L	90	145	101	123	129	152	162	111	135	102	74	124	APHA (23rd Ed. 2017)10200 F
4	Name of Group Number and name of group species of each group	--	*Ceratium*	*Melosira*	*Ceratium*	*Rhizosolenia*	*Surirella*	*Rhizosolenia*	*Skeletonema*	*Odontella*	*Skeletonema*	*Odontella*	*Skeletonema*	*Odontella*	APHA (23rd Ed. 2017)10200 F
			Pinnularia	*Dinophysis*	*Pinnularia*	*Dinophysis*	*Pinnularia*	*Dinophysis*	*Grammatophora*	*Rhizosolenia*	*Grammatophora*	*Rhizosolenia*	*Grammatophora*	*Rhizosolenia*	
			Odontella	*Skeletonema*	*Odontella*	*Skeletonema*	*Grammatophora*	*Skeletonema*	*Nitzschia*	*Coscinodiscus*	*Nitzschia*	*Coscinodiscus*	*Nitzschia*	*Coscinodiscus*	
			Thalassiothrix	*Thallassiosira*	*Thalassiothrix*	*Thallassiosira*	*Thalassiothrix*	*Thallassiosira*	*Thalassiothrix*	*Grammatophora*	*Thalassiothrix*	*Grammatophora*	*Coscinodiscus*	*Pinnularia*	
			Thallassiosira	*Thalassionema*	*Thallassiosira*	*Melosira*	*Rhizosolenia*	*Melosira*	*Pleurosigma*	*Thallassiosira*	*Pleurosigma*	*Thallassiosira*	*Pleurosigma*	*Thallassiosira*	

B			Zooplankton						
1	Abudance(Population)	noX103 / 100 m3	39	41	55	49	49	32	APHA (23rd Ed. 2017)10200 G
2	Name of Group Number and name of group species of each group		*Nitzschia*	*Nitzschia*	*Nitzschia*	*Copepods*	*Copepods*	*Copepods*	
			Grammatophora	*Grammatophora*	*Grammatophora*	*Oikoplura*	*Oikoplura*	*Oikoplura*	
			Diploneis	*Diploneis*	*Egg(Fish and Shrimps)*	*Crustacean Larvae*	*Crustacean Larvae*	*Crustacean Larvae*	
			Thalassiothrix	*Thalassiothrix*	*Thalassiothrix*	*Crustacean*	*Crustacean*	*Crustacean*	
			Pleurosigma	*Pleurosigma*	*Pleurosigma*	*Bivalve Larvae*	*Bivalve Larvae*	*Egg(Fish and Shrimps)*	
3	Total Biomass	ml/100 m³	14.56	15.15	16.23	15.23	15.23	14.56	

Continue…

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

SR. NO.	TEST PARAMETERS	UNIT	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM			
C			Microbiological												
1	Total Bacterial Count	CFU/ml	202		240		256		288		288		248		APHA 23rd Ed.2017,9215-C
2	Total Coliform	/100ml	50		50		44		43		43		52		APHA 23rd Ed.2017,9222-B
3	E.coli	/100ml	42		33		32		36		36		41		IS :15185:2016
4	Enterococcus	/100ml	19		21		17		26		26		31		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

ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR GUJARAT VAPI.

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

RESULTS OF ETP OUTLET WATER

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24		
			21-04-2023	29-05-2023	29-06-2023	25-07-2023	25-08-2023	14-09-2023		
1.	Colour	Pt. Co. Scale	50	40	50	40	50	50	100	IS 3025(Part 4)
2.	pH @ 27 ° C	--	7.41	6.74	7.26	7.36	7.44	7.52	6.5 to 8.5	APHA 23rd Ed.,2017,4500-H^+B
3.	Temperature	^0C	30	31	30.5	30	30	30	40	IS 3025(Part 9)1984
4.	Total Suspended Solid	mg/L	22	24	26	24	18	32	100	APHA 23rd Ed.,2017,2540 –D
5.	Total Dissolved Solids	mg/L	1106	732	804	810	822	840	2100	APHA 23rd Ed.,2017,2540- C
6.	COD	mg/L	72.6	76.2	74.3	89.4	80.9	83.6	100	IS 3025(Part 58)2006
7.	BOD (3 days at 27 ^0C)	mg/L	20	23	25	27	24	23	30	IS 3025(Part 44)1993Amd.01
8.	Chloride (as Cl) $^-$	mg/L	480.9	332.5	420.1	411.5	391	337.3	600	IS 3025(PART 32) 1988
9.	Oil & Grease	mg/L	BDL	BDL	BDL	BDL	BDL	BDL	10	IS 3025(Part39)1991, Amd. 2
10.	Sulphate (as SO_4)	mg/L	102	43.3	40.2	36.6	42.2	46.4	1000	IS 3025(Part 24)1986
11.	Ammonical Nitrogen	mg/L	22.2	28.4	24.2	22.8	20.6	28.8	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	BDL	BDL	BDL	BDL	BDL	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

Continue…

SR.NO.	TEST PARAMETERS	UNIT	LIQUID TERMINAL						GPCB Limit	TEST METHOD
			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24		
			21-04-2023	29-05-2023	29-06-2023	25-07-2023	25-08-2023	14-09-2023		
15.	Sulphide as S	mg/L	0.62	BDL	BDL	BDL	BDL	BDL	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	1.03	0.82	0.94	0.86	0.74	0.66	2	APHA 23rd Ed.,2017,4500 F, D
18.	Residual Chlorine	mg/L	0.74	0.88	0.78	0.64	0.94	0.82	0.5 Min.	APHA 23rd Ed.,2017,4500-Cl-B
19.	Percent Sodium	%	48.51	48.05	46.74	45.72	46.93	46.94	60	By Calculation
20.	Sodium Absorption ratio	--	3.51	3.09	2.67	2.86	2.64	2.61	26	By Calculation

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * GUJARAT VAPI.

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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.	02-10-2023	84.39	36.85	28.57	32.39	0.92	--	NOT DETECTED
2.	05-10-2023	80.25	35.79	31.12	34.85	1.06	4.74	NOT DETECTED
3.	09-10-2023	85.20	37.85	32.02	35.76	0.97	4.29	NOT DETECTED
4.	12-10-2023	79.36	35.13	29.41	33.64	1.00	4.57	NOT DETECTED
5.	16-10-2023	83.56	38.10	31.54	36.83	1.05	4.87	NOT DETECTED
6.	19-10-2023	84.84	34.37	28.59	32.16	0.95	4.74	NOT DETECTED
7.	23-10-2023	80.93	36.73	30.16	35.74	1.00	4.98	NOT DETECTED
8.	26-10-2023	83.79	33.91	26.84	31.83	0.94	4.52	NOT DETECTED
9.	30-10-2023	85.47	36.94	27.89	31.25	1.00	4.23	NOT DETECTED
10.	02-11-2023	80.12	34.23	26.96	31.28	1.00	5.13	NOT DETECTED
11.	06-11-2023	83.51	36.58	28.42	33.88	1.05	5.25	NOT DETECTED
12.	09-11-2023	81.33	35.05	26.13	30.97	1.02	4.86	NOT DETECTED
13.	13-11-2023	78.49	33.64	24.85	29.60	0.97	4.53	NOT DETECTED
14.	16-11-2023	80.94	35.26	26.62	31.78	1.00	4.76	NOT DETECTED
15.	20-11-2023	84.63	37.89	28.76	33.52	1.04	5.29	NOT DETECTED

Continue…

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.	23-11-2023	81.76	35.25	27.10	31.49	1.00	4.88	NOT DETECTED
17.	27-11-2023	74.68	32.09	24.95	29.18	0.95	4.49	NOT DETECTED
18.	30-11-2023	76.29	34.41	26.37	32.51	0.98	4.64	NOT DETECTED
19.	02-12-2023	78.36	32.19	25.75	30.21	1.11	5.10	NOT DETECTED
20.	06-12-2023	80.96	34.52	27.13	31.98	1.14	5.26	NOT DETECTED
21.	09-12-2023	83.56	36.91	30.6	34.69	1.16	5.59	NOT DETECTED
22.	13-12-2023	81.10	34.31	28.74	32.58	1.13	5.42	NOT DETECTED
23.	16-12-2023	83.92	36.42	29.59	32.05	1.15	5.79	NOT DETECTED
24.	20-12-2023	80.46	33.87	26.43	30.91	1.12	5.62	NOT DETECTED
25.	23-12-2023	82.63	35.29	27.55	32.4	1.14	5.92	NOT DETECTED
26.	27-12-2023	84.10	37.33	29.15	34.62	1.16	6.12	NOT DETECTED
27.	01-01-2024	80.74	37.29	30.74	35.62	1.17	--	NOT DETECTED
28.	04-01-2024	83.15	35.61	27.42	31.81	1.14	5.35	NOT DETECTED
29.	08-01-2024	81.49	32.27	26.12	30.11	1.12	5.2	NOT DETECTED
30.	11-01-2024	84.56	34.2	28.62	32.54	1.15	5.26	NOT DETECTED
31.	15-01-2024	80.77	31.63	25.91	30.73	1.12	4.97	NOT DETECTED

Continue…

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.	18-01-2024	84.26	35.27	30.46	35.67	1.18	5.42	NOT DETECTED
33.	22-01-2024	82.52	32.84	28.71	33.41	1.16	5.36	NOT DETECTED
34.	25-01-2024	83.79	36.41	31.11	36.07	1.20	5.74	NOT DETECTED
35.	29-01-2024	84.57	34.62	29.88	34.28	1.17	5.52	NOT DETECTED
36.	01-02-2024	83.55	35.07	32.23	36.14	1.20	5.94	NOT DETECTED
37.	05-02-2024	80.49	33.84	29.87	34.52	1.16	5.62	NOT DETECTED
38.	08-02-2024	82.62	31.29	31.41	35.86	1.15	5.77	NOT DETECTED
39.	12-02-2024	77.21	29.74	28.95	32.72	1.12	5.41	NOT DETECTED
40.	15-02-2024	80.73	31.82	29.38	33.64	1.16	5.59	NOT DETECTED
41.	19-02-2024	84.65	34.83	31.26	36.10	1.22	5.88	NOT DETECTED
42.	22-02-2024	79.19	32.5	27.89	32.76	1.19	5.34	NOT DETECTED
43.	26-02-2024	76.53	30.48	27.15	32.91	1.13	5.13	NOT DETECTED
44.	29-02-2024	81.92	33.46	29.21	33.89	1.17	5.47	NOT DETECTED
45.	04-03-2024	83.38	33.56	29.13	34.82	1.16	5.27	NOT DETECTED
46.	07-03-2024	80.63	29.86	27.67	31.90	1.15	4.96	NOT DETECTED
47.	11-03-2024	73.85	28.76	24.91	29.74	1.12	4.83	NOT DETECTED

Continue…

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.	14-03-2024	83.47	32.25	28.83	32.38	1.17	5.31	NOT DETECTED
49.	18-03-2024	76.58	30.13	26.48	30.65	1.14	5.10	NOT DETECTED
50.	21-03-2024	79.62	33.78	28.85	33.27	1.11	5.25	NOT DETECTED
51.	25-03-2024	74.38	29.42	25.56	30.17	1.10	4.89	NOT DETECTED
52.	28-03-2024	77.81	32.39	28.12	31.84	1.15	5.13	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)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

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.	02-10-2023	79.31	32.15	27.81	30.99	0.91	--	NOT DETECTED
2.	05-10-2023	83.28	33.51	26.94	32.54	0.87	3.46	NOT DETECTED
3.	09-10-2023	85.10	32.56	30.12	35.47	0.95	3.25	NOT DETECTED
4.	12-10-2023	78.14	35.73	28.15	33.37	1.00	3.34	NOT DETECTED
5.	16-10-2023	75.84	37.47	30.23	34.92	1.00	3.16	NOT DETECTED
6.	19-10-2023	79.62	34.59	28.53	32.57	1.04	3.47	NOT DETECTED
7.	23-10-2023	74.22	36.64	26.99	35.98	1.05	3.48	NOT DETECTED
8.	26-10-2023	81.26	33.38	28.85	33.47	0.93	3.26	NOT DETECTED
9.	30-10-2023	84.79	31.72	26.43	31.85	0.90	3.10	NOT DETECTED
10.	02-11-2023	80.53	34.36	26.58	33.63	0.95	3.58	NOT DETECTED
11.	06-11-2023	84.92	37.26	28.92	35.26	1.00	3.70	NOT DETECTED
12.	09-11-2023	83.46	36.52	27.86	34.10	0.97	3.64	NOT DETECTED
13.	13-11-2023	81.82	34.40	26.31	32.55	0.95	3.42	NOT DETECTED
14.	16-11-2023	78.63	33.16	25.47	30.41	0.90	3.30	NOT DETECTED
15.	20-11-2023	75.41	31.73	24.75	29.99	0.86	3.26	NOT DETECTED

Continue…

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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.	23-11-2023	77.35	34.62	27.32	32.76	0.92	3.49	NOT DETECTED
17.	27-11-2023	72.86	30.91	24.59	29.74	0.85	3.15	NOT DETECTED
18.	30-11-2023	75.63	32.5	26.35	30.52	0.91	3.37	NOT DETECTED
19.	02-12-2023	75.36	30.59	25.12	30.94	0.84	3.51	NOT DETECTED
20.	06-12-2023	73.69	29.46	24.62	28.65	0.80	3.28	NOT DETECTED
21.	09-12-2023	78.25	31.62	26.35	31.26	0.88	3.60	NOT DETECTED
22.	13-12-2023	80.42	33.56	28.64	32.49	0.91	3.64	NOT DETECTED
23.	16-12-2023	84.30	34.89	29.44	34.71	0.94	3.70	NOT DETECTED
24.	20-12-2023	83.02	34.81	29.02	33.86	0.89	3.66	NOT DETECTED
25.	23-12-2023	80.15	32.41	27.52	32.48	0.80	3.47	NOT DETECTED
26.	27-12-2023	78.63	30.96	25.48	30.26	0.78	3.30	NOT DETECTED
27.	01-01-2024	76.51	29.18	25.69	29.37	0.81	--	NOT DETECTED
28.	04-01-2024	79.62	31.43	27.50	31.86	0.86	3.76	NOT DETECTED
29.	08-01-2024	81.59	33.52	28.97	32.06	0.89	3.89	NOT DETECTED
30.	11-01-2024	75.92	28.45	25.26	28.42	0.76	3.52	NOT DETECTED
31.	15-01-2024	77.57	30.91	26.48	30.29	0.78	3.67	NOT DETECTED

Continue…

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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.	18-01-2024	79.65	32.46	28.54	32.11	0.85	3.76	NOT DETECTED
33.	22-01-2024	82.73	33.47	29.26	33.56	0.90	3.85	NOT DETECTED
34.	25-01-2024	78.26	30.55	26.42	30.64	0.82	3.71	NOT DETECTED
35.	29-01-2024	75.37	29.93	24.35	28.63	0.77	3.39	NOT DETECTED
36.	01-02-2024	78.32	28.61	26.35	28.94	0.75	3.53	NOT DETECTED
37.	05-02-2024	81.56	32.11	29.54	32.29	0.83	3.86	NOT DETECTED
38.	08-02-2024	79.48	30.26	28.09	31.74	0.78	3.47	NOT DETECTED
39.	12-02-2024	75.73	28.91	26.62	30.11	0.74	3.38	NOT DETECTED
40.	15-02-2024	72.58	27.73	25.42	29.59	0.7	3.24	NOT DETECTED
41.	19-02-2024	75.16	29.1	26.85	29.13	0.76	3.40	NOT DETECTED
42.	22-02-2024	80.29	32.46	30.13	33.40	0.81	3.81	NOT DETECTED
43.	26-02-2024	73.84	28.38	26.91	31.42	0.72	3.42	NOT DETECTED
44.	29-02-2024	76.52	30.21	28.79	32.47	0.79	3.68	NOT DETECTED
45.	04-03-2024	71.94	27.79	25.37	29.52	0.69	3.07	NOT DETECTED
46.	07-03-2024	74.35	29.84	28.12	32.57	0.73	3.15	NOT DETECTED
47.	11-03-2024	70.54	27.27	25.94	28.77	0.67	3.24	NOT DETECTED

Continue…

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.	14-03-2024	72.95	30.71	27.47	32.81	0.70	3.42	NOT DETECTED
49.	18-03-2024	79.13	32.47	24.81	28.67	0.75	3.68	NOT DETECTED
50.	21-03-2024	75.46	30.68	28.45	33.13	0.78	3.52	NOT DETECTED
51.	25-03-2024	77.93	32.57	25.89	29.93	0.72	3.40	NOT DETECTED
52.	28-03-2024	81.24	27.83	27.64	32.28	0.79	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)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

White House
Near G.I.D.C. Office, Char Rasta,
Vapi - 396 195. Gujarat, India.
Phone : +91 260 2433966 / 2425610
Email : response@uerl.in Website : www.uerl.in

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.	02-10-2023	84.63	34.59	26.58	30.15	1.00	--	NOT DETECTED
2.	05-10-2023	82.39	32.65	25.97	29.76	0.97	3.86	NOT DETECTED
3.	09-10-2023	80.98	36.74	28.47	31.83	1.00	4.37	NOT DETECTED
4.	12-10-2023	76.84	34.10	30.26	33.94	1.05	4.50	NOT DETECTED
5.	16-10-2023	78.63	34.90	28.57	32.69	1.09	4.56	NOT DETECTED
6.	19-10-2023	85.70	36.85	29.98	32.46	1.10	4.10	NOT DETECTED
7.	23-10-2023	80.25	34.75	27.68	30.05	1.07	4.63	NOT DETECTED
8.	26-10-2023	84.64	32.39	26.14	29.65	1.03	4.21	NOT DETECTED
9.	30-10-2023	85.36	34.52	25.45	27.86	1.00	3.86	NOT DETECTED
10.	02-11-2023	82.26	35.65	28.27	32.18	0.99	4.13	NOT DETECTED
11.	06-11-2023	79.65	33.42	26.19	30.48	0.95	3.89	NOT DETECTED
12.	09-11-2023	83.16	36.48	29.62	33.55	1.02	4.35	NOT DETECTED
13.	13-11-2023	80.75	32.10	25.47	29.73	1.00	3.76	NOT DETECTED
14.	16-11-2023	82.92	36.83	28.24	31.92	1.05	4.50	NOT DETECTED
15.	20-11-2023	78.85	31.93	26.82	30.13	0.98	4.19	NOT DETECTED

Continue…

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Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

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.	23-11-2023	80.20	33.52	28.76	33.38	1.00	4.36	NOT DETECTED
17.	27-11-2023	73.86	31.49	24.84	28.40	0.92	3.76	NOT DETECTED
18.	30-11-2023	78.58	32.73	26.13	29.62	0.95	3.97	NOT DETECTED
19.	02-12-2023	76.35	31.84	25.13	30.58	0.95	3.95	NOT DETECTED
20.	06-12-2023	81.63	33.29	27.86	31.96	1.00	4.32	NOT DETECTED
21.	09-12-2023	78.91	32.10	25.32	31.42	0.98	4.12	NOT DETECTED
22.	13-12-2023	80.53	33.75	27.43	31.77	1.00	4.36	NOT DETECTED
23.	16-12-2023	83.62	35.46	29.31	33.72	1.03	4.59	NOT DETECTED
24.	20-12-2023	81.96	32.79	28.16	32.63	1.00	4.37	NOT DETECTED
25.	23-12-2023	83.67	34.99	29.92	34.59	1.06	4.46	NOT DETECTED
26.	27-12-2023	80.49	31.26	27.51	31.25	1.00	4.25	NOT DETECTED
27.	01-01-2024	82.22	34.59	29.14	34.49	1.08	--	NOT DETECTED
28.	04-01-2024	79.62	32.18	26.54	31.52	1.05	3.87	NOT DETECTED
29.	08-01-2024	84.61	35.62	30.43	34.72	1.10	4.06	NOT DETECTED
30.	11-01-2024	80.74	32.14	28.69	32.87	1.06	3.91	NOT DETECTED
31.	15-01-2024	82.90	34.82	29.31	34.09	1.09	3.98	NOT DETECTED

Continue…

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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.	18-01-2024	77.29	31.71	26.84	31.27	1.00	3.74	NOT DETECTED
33.	22-01-2024	80.25	33.06	28.42	33.72	1.05	3.87	NOT DETECTED
34.	25-01-2024	84.36	35.13	30.21	34.43	1.11	4.26	NOT DETECTED
35.	29-01-2024	81.73	33.59	28.94	34.67	1.08	4.12	NOT DETECTED
36.	01-02-2024	80.96	33.31	28.42	33.21	1.12	4.25	NOT DETECTED
37.	05-02-2024	77.64	30.72	26.84	31.43	1.07	3.86	NOT DETECTED
38.	08-02-2024	81.29	32.88	29.13	34.57	1.15	4.12	NOT DETECTED
39.	12-02-2024	84.38	35.62	31.46	36.91	1.18	4.39	NOT DETECTED
40.	15-02-2024	82.05	33.73	29.85	34.56	1.12	4.30	NOT DETECTED
41.	19-02-2024	79.63	32.47	28.38	33.17	1.10	3.87	NOT DETECTED
42.	22-02-2024	75.15	30.26	26.92	31.60	1.06	3.75	NOT DETECTED
43.	26-02-2024	80.31	33.59	30.64	35.73	1.11	4.18	NOT DETECTED
44.	29-02-2024	77.39	31.47	28.73	33.42	1.08	3.91	NOT DETECTED
45.	04-03-2024	80.63	31.36	30.11	35.47	1.10	4.46	NOT DETECTED
46.	07-03-2024	76.27	29.84	28.35	32.73	1.04	4.15	NOT DETECTED
47.	11-03-2024	81.73	33.11	29.74	34.12	1.07	4.63	NOT DETECTED

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CIN:U73100GJ2007PTC051463

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.	14-03-2024	84.12	35.62	32.17	37.65	1.14	4.76	NOT DETECTED
49.	18-03-2024	80.93	32.19	30.42	35.34	1.10	4.32	NOT DETECTED
50.	21-03-2024	84.31	33.65	33.47	38.54	1.13	4.19	NOT DETECTED
51.	25-03-2024	82.17	31.74	30.85	38.42	1.08	4.35	NOT DETECTED
52.	28-03-2024	86.42	34.17	32.75	36.13	1.12	4.64	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)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

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CIN:U73100GJ2007PTC051463

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.	02-10-2023	71.26	28.95	21.30	24.58	0.75	--	NOT DETECTED
2.	05-10-2023	68.79	26.35	20.57	23.97	0.70	2.56	NOT DETECTED
3.	09-10-2023	73.24	26.36	20.75	25.62	0.68	2.87	NOT DETECTED
4.	12-10-2023	76.48	29.60	22.42	27.25	0.70	2.74	NOT DETECTED
5.	16-10-2023	81.63	30.12	21.87	25.64	0.80	2.97	NOT DETECTED
6.	19-10-2023	78.42	28.79	23.55	28.10	0.77	2.87	NOT DETECTED
7.	23-10-2023	75.11	25.38	20.32	25.86	0.71	2.58	NOT DETECTED
8.	26-10-2023	80.65	29.81	22.58	26.84	0.78	3.10	NOT DETECTED
9.	30-10-2023	77.26	27.44	22.93	26.76	0.75	2.89	NOT DETECTED
10.	02-11-2023	74.17	29.55	23.31	28.29	0.78	2.60	NOT DETECTED
11.	06-11-2023	72.35	27.42	22.50	26.95	0.72	2.45	NOT DETECTED
12.	09-11-2023	75.67	29.93	24.82	28.43	0.80	2.76	NOT DETECTED
13.	13-11-2023	78.15	31.48	25.63	30.15	0.85	2.85	NOT DETECTED
14.	16-11-2023	74.51	29.20	23.26	28.73	0.81	2.65	NOT DETECTED
15.	20-11-2023	72.88	27.41	21.85	26.38	0.76	2.46	NOT DETECTED

Continue…

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.	23-11-2023	75.63	30.19	24.48	29.83	0.80	2.71	NOT DETECTED
17.	27-11-2023	70.11	26.54	21.10	26.55	0.72	2.40	NOT DETECTED
18.	30-11-2023	73.26	28.79	23.92	28.37	0.76	2.53	NOT DETECTED
19.	04-12-2023	72.47	27.91	21.82	25.73	0.70	2.39	NOT DETECTED
20.	07-12-2023	76.29	30.31	23.58	28.19	0.75	2.45	NOT DETECTED
21.	11-12-2023	80.53	30.95	24.04	28.97	0.81	2.61	NOT DETECTED
22.	14-12-2023	82.65	31.10	25.31	30.26	0.82	2.78	NOT DETECTED
23.	18-12-2023	78.71	28.27	23.98	28.21	0.79	2.65	NOT DETECTED
24.	21-12-2023	75.20	27.52	21.93	25.67	0.72	2.58	NOT DETECTED
25.	25-12-2023	68.93	26.69	20.86	24.79	0.69	2.36	NOT DETECTED
26.	28-12-2023	71.38	28.61	23.13	28.45	0.73	2.51	NOT DETECTED
27.	01-01-2024	74.54	30.13	22.46	26.21	0.79	--	NOT DETECTED
28.	04-01-2024	77.37	32.59	25.03	29.17	0.84	3.12	NOT DETECTED
29.	08-01-2024	75.19	31.63	23.84	26.96	0.80	2.94	NOT DETECTED
30.	11-01-2024	72.84	28.16	21.69	25.32	0.74	2.8	NOT DETECTED
31.	15-01-2024	76.25	30.54	24.98	28.73	0.83	2.89	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
32.	18-01-2024	69.98	28.63	21.00	25.37	0.73	2.76	NOT DETECTED
33.	22-01-2024	67.37	27.57	20.69	24.15	0.70	2.62	NOT DETECTED
34.	25-01-2024	71.83	30.49	21.76	26.33	0.74	2.78	NOT DETECTED
35.	29-01-2024	73.24	32.73	23.54	28.16	0.77	2.82	NOT DETECTED
36.	01-02-2024	76.57	32.81	23.12	27.37	0.79	2.98	NOT DETECTED
37.	05-02-2024	73.16	30.26	21.68	25.42	0.74	2.86	NOT DETECTED
38.	08-02-2024	70.62	28.96	20.21	24.38	0.69	2.71	NOT DETECTED
39.	12-02-2024	75.84	30.42	22.38	26.71	0.77	2.88	NOT DETECTED
40.	15-02-2024	72.68	29.82	21.45	24.60	0.69	2.64	NOT DETECTED
41.	19-02-2024	66.43	27.19	19.87	22.59	0.68	2.51	NOT DETECTED
42.	22-02-2024	69.15	28.79	20.62	23.10	0.70	2.69	NOT DETECTED
43.	26-02-2024	73.54	31.56	22.84	26.62	0.79	2.82	NOT DETECTED
44.	29-02-2024	70.69	30.11	20.03	24.27	0.72	2.73	NOT DETECTED
45.	04-03-2024	67.50	28.42	20.84	24.15	0.60	2.69	NOT DETECTED
46.	07-03-2024	65.84	25.73	19.87	22.58	0.68	2.45	NOT DETECTED
47.	11-03-2024	63.95	26.45	22.27	26.42	0.60	2.41	NOT DETECTED

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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
48.	14-03-2024	67.35	29.13	20.57	24.48	0.65	2.68	NOT DETECTED
49.	18-03-2024	69.54	30.26	22.85	25.92	0.59	2.74	NOT DETECTED
50.	21-03-2024	74.13	27.41	23.36	26.10	0.70	2.85	NOT DETECTED
51.	25-03-2024	70.54	25.95	22.48	24.65	0.67	2.53	NOT DETECTED
52.	28-03-2024	65.48	27.30	19.84	23.39	0.61	2.49	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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Jaivik S. Tandel
(Manager - Operations)

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CIN:U73100GJ2007PTC051463

Results of Ambient Air Quality Monitoring

Name of Location		CT-4 RMU-1						
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.	02-11-2023	76.42	28.27	23.65	28.37	0.90	4.26	NOT DETECTED
2.	06-11-2023	72.59	26.92	21.37	26.55	0.84	4.05	NOT DETECTED
3.	09-11-2023	67.73	30.76	24.68	29.81	1.00	4.38	NOT DETECTED
4.	13-11-2023	74.25	33.13	26.72	31.64	1.05	4.76	NOT DETECTED
5.	16-11-2023	87.13	28.64	23.13	28.72	0.95	4.52	NOT DETECTED
6.	20-11-2023	84.25	26.49	22.51	26.94	0.88	4.36	NOT DETECTED
7.	23-11-2023	82.64	25.20	21.35	25.46	0.85	4.14	NOT DETECTED
8.	27-11-2023	76.37	23.58	18.96	23.89	0.76	3.96	NOT DETECTED
9.	04-12-2023	82.75	30.41	25.13	29.85	0.94	4.62	NOT DETECTED
10.	07-12-2023	78.38	27.53	22.96	25.27	0.82	4.41	NOT DETECTED
11.	11-12-2023	80.16	29.37	25.12	28.76	0.86	4.73	NOT DETECTED
12.	14-12-2023	84.48	33.81	27.64	32.49	0.98	4.89	NOT DETECTED
13.	18-12-2023	82.31	31.26	24.94	28.51	0.90	4.75	NOT DETECTED
14.	21-12-2023	76.47	27.83	23.46	27.25	0.81	4.52	NOT DETECTED

Continue…

Name of Location		CT-4 RMU-1						
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
15.	25-12-2023	73.59	24.57	20.13	24.81	0.74	4.36	NOT DETECTED
16.	28-12-2023	79.11	29.32	22.53	26.76	0.79	4.48	NOT DETECTED
17.	01-01-2024	81.42	31.86	24.28	28.17	0.97	--	NOT DETECTED
18.	04-01-2024	84.26	34.48	26.84	31.46	1.00	4.82	NOT DETECTED
19.	08-01-2024	79.82	28.91	22.86	27.52	0.92	4.53	NOT DETECTED
20.	11-01-2024	82.57	31.49	25.22	29.35	1.00	4.68	NOT DETECTED
21.	15-01-2024	78.84	27.59	22.12	26.89	0.87	4.41	NOT DETECTED
22.	18-01-2024	80.64	29.17	23.79	27.42	0.91	4.65	NOT DETECTED
23.	22-01-2024	83.49	32.72	26.31	30.58	1.05	4.73	NOT DETECTED
24.	25-01-2024	85.27	35.49	29.32	33.24	1.10	4.82	NOT DETECTED
25.	29-01-2024	80.65	30.16	24.05	29.13	0.95	4.70	NOT DETECTED
26.	01-02-2024	78.62	28.96	22.10	26.93	0.82	4.45	NOT DETECTED
27.	05-02-2024	82.36	30.19	24.56	29.31	0.93	4.62	NOT DETECTED
28.	08-02-2024	84.16	32.46	27.84	33.46	0.97	4.87	NOT DETECTED
29.	12-02-2024	80.43	31.46	25.63	29.70	0.89	4.70	NOT DETECTED
30.	15-02-2024	77.29	29.66	22.38	27.62	0.76	4.62	NOT DETECTED

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Name of Location		CT-4 RMU-1						
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
31.	19-02-2024	75.73	27.43	20.96	25.17	0.70	4.39	NOT DETECTED
32.	22-02-2024	79.37	30.11	22.16	26.93	0.78	4.53	NOT DETECTED
33.	26-02-2024	82.64	32.83	25.31	29.62	0.86	4.81	NOT DETECTED
34.	29-02-2024	79.55	29.89	23.72	27.53	0.77	4.68	NOT DETECTED
35.	04-03-2024	85.13	34.25	25.81	28.47	0.79	4.85	NOT DETECTED
36.	07-03-2024	80.74	31.48	22.57	26.35	0.64	4.71	NOT DETECTED
37.	11-03-2024	78.93	28.52	21.76	26.11	0.57	4.52	NOT DETECTED
38.	14-03-2024	75.38	30.86	23.29	27.46	0.52	4.68	NOT DETECTED
39.	18-03-2024	81.52	33.47	24.92	29.53	0.76	4.82	NOT DETECTED
40.	21-03-2024	86.14	37.35	27.11	32.42	0.82	4.97	NOT DETECTED
41.	25-03-2024	83.74	34.68	25.24	30.48	0.73	4.72	NOT DETECTED
42.	28-03-2024	86.85	31.57	26.86	29.62	0.87	4.82	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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Nikunj D. Patel
(Chemist)

Jaivik S. Tandel
(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					
		12-10-2023	13-11-2023	14-12-2023	11-01-2024	12-02-2024	14-03-2024
1	06:00 to 07:00	64.8	64.5	65.5	66.3	65.6	65.8
2	07:00 to 08:00	69.2	66.9	63.5	62.4	63.6	63.7
3	08:00 to 09:00	65.4	65.2	67.3	66.6	65.7	67.5
4	09:00 to 10:00	66.8	69.6	64.3	65.2	63.8	64.7
5	10:00 to 11:00	64.1	61.2	63.8	62.6	64.1	66.8
6	11:00 to 12:00	68.9	65.7	66.7	64.9	65.8	64.3
7	12:00 to 13:00	65.3	68.8	66.5	66.5	66.1	62.3
8	13:00 to 14:00	68.3	67.5	64.7	64.7	65.3	66.7
9	14:00 to 15:00	61.8	65.2	66.4	65.3	66.9	63.5
10	15:00 to 16:00	64.3	68.6	65.4	65.4	66.3	64.9
11	16:00 to 17:00	69.4	65.2	68.1	68.5	67.5	65.8
12	17:00 to 18:00	63.9	68.2	65.8	65.8	64.2	65.6
13	18:00 to 19:00	67.5	67.4	64.8	63.8	64.8	62.3
14	19:00 to 20:00	66.4	63.9	62.8	64.3	66.1	65.4
15	20:00 to 21:00	63.4	60.7	63.4	62.8	62.8	63.8
16	21:00 to 22:00	65.1	63.8	61.7	60.7	61.3	63.2
Day Time		<75 dB (A)					

Continue...

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CIN:U73100GJ2007PTC051463

Location Name		CT3 RMU-2					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) – Night Time					
		12-10-2023	13-11-2023	14-12-2023	11-01-2024	12-02-2024	14-03-2024
1	22:00 to 23:00	59.6	63.7	64.1	64.3	63.8	63.5
2	23:00 to 24:00	61.6	61.8	63.9	63.9	62.5	62.6
3	24:00 to 01:00	60.6	59.4	62.4	62.6	64.1	63.1
4	01:00 to 02:00	57.9	60.3	62.8	63.4	62.9	63.9
5	02:00 to 03:00	55.8	62.7	63.9	63.9	64.1	64.7
6	03:00 to 04:00	61.3	60.9	61.8	61.8	63.2	63.2
7	04:00 to 05:00	60.3	57.5	59.2	59.2	61.8	60.1
8	05:00 to 06:00	61.1	59.9	58.3	59.7	60.3	61.3
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI. ENVIRONMENT & RESEARCH LABS PVT. LTD. UNISTAR

Jaivik S. Tandel
(Manager - Operations)

Regd. Office : 215, Royal Arcade, Near G.I.D.C.Office, Char Rasta,Vapi-396 195, Gujarat, India.
Extended Work Office : G.I.D.C., Dahej-II, Bharuch, Gujarat.
CIN:U73100GJ2007PTC051463

Results of Noise Level Monitoring

Location Name		Near Fire Station					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		05-10-2023	06-11-2023	07-12-2023	04-01-2024	05-02-2024	07-03-2024
1	06:00 to 07:00	63.4	64.4	62.7	64.3	65.1	64.1
2	07:00 to 08:00	66.4	67.3	64.8	64.8	63.2	65.3
3	08:00 to 09:00	69.3	65.7	66.4	65.8	66.2	65.8
4	09:00 to 10:00	61.3	62.8	63.7	64.8	65.3	67.1
5	10:00 to 11:00	63.1	65.5	67.1	65.2	67.2	65.4
6	11:00 to 12:00	68.3	63.6	65.7	66.7	65.3	63.8
7	12:00 to 13:00	65.7	64.2	66.4	65.1	64.8	65.2
8	13:00 to 14:00	66.7	67.4	68.3	68.3	67.3	66.5
9	14:00 to 15:00	60.4	61.2	65.2	66.3	65.5	66.9
10	15:00 to 16:00	67.5	64.8	63.8	62.9	63.8	65.2
11	16:00 to 17:00	64.7	62.8	61.3	61.3	63.6	64.4
12	17:00 to 18:00	67.1	60.1	63.5	64.7	65.2	63.7
13	18:00 to 19:00	63.2	64.9	66.4	66.4	65.7	62.8
14	19:00 to 20:00	66.8	61.3	63.8	64.6	63.6	64.6
15	20:00 to 21:00	64.2	64.5	62.4	63.8	64.1	63.6
16	21:00 to 22:00	61.3	60.7	62.1	63.1	63.6	62.4
Day Time		<75 dB (A)					

Continue…

Location Name		Near Fire Station					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		05-10-2023	06-11-2023	07-12-2023	04-01-2024	05-02-2024	07-03-2024
1	22:00 to 23:00	59.9	58.8	60.2	59.9	61.4	62.7
2	23:00 to 24:00	58.4	61.6	63.8	62.6	63.6	61.8
3	24:00 to 01:00	62.4	62.3	64.6	64.6	62.5	62.3
4	01:00 to 02:00	57.5	58.4	62.3	62.3	63.1	64.4
5	02:00 to 03:00	61.7	61.3	61.3	62.8	61.6	62.3
6	03:00 to 04:00	60.1	60.6	59.1	59.1	58.9	60.8
7	04:00 to 05:00	61.3	59.3	58.5	58.5	58.5	61.5
8	05:00 to 06:00	58.2	57.6	58.1	59.6	57.8	60.4
Night Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * 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					
		09-10-2023	09-11-2023	11-12-2023	08-01-2024	08-02-2024	11-03-2024
1	06:00 to 07:00	60.5	63.8	64.2	63.1	62.8	63.4
2	07:00 to 08:00	65.4	65.4	66.1	65.3	64.8	63.8
3	08:00 to 09:00	68.9	62.6	64.8	63.7	64.9	65.2
4	09:00 to 10:00	65.3	67.4	66.4	66.4	65.3	66.5
5	10:00 to 11:00	67.3	63.3	66.3	64.9	65.6	65.2
6	11:00 to 12:00	65.3	68.4	67.4	65.2	66.2	67.4
7	12:00 to 13:00	67.4	67.2	64.8	63.7	63.9	65.7
8	13:00 to 14:00	69.2	63.8	62.5	61.9	63.1	64.2
9	14:00 to 15:00	67.3	66.3	68.2	68	67	66.7
10	15:00 to 16:00	69.8	60.4	63.5	64.5	65.3	63.5
11	16:00 to 17:00	68.2	63.5	65.7	65.7	63.8	64.1
12	17:00 to 18:00	64.3	67.9	65.9	64.6	63.4	62.4
13	18:00 to 19:00	65.4	68.1	62.6	62.6	63.8	64.5
14	19:00 to 20:00	63.6	65.2	64.1	62.5	64.2	65.1
15	20:00 to 21:00	66.1	64.1	61.7	61.7	60.8	64.5
16	21:00 to 22:00	62.8	62.3	63.5	62.5	61.8	61.9
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					
		09-10-2023	09-11-2023	11-12-2023	08-01-2024	08-02-2024	11-03-2024
1	22:00 to 23:00	62.7	61.4	62.3	63.1	62.5	61.2
2	23:00 to 24:00	62.3	63.5	60.5	61.3	60.7	60.7
3	24:00 to 01:00	56.8	64.1	62.3	63.7	63.5	62.7
4	01:00 to 02:00	60.1	62.7	64.6	64.6	63.6	63.4
5	02:00 to 03:00	56.5	60.6	63.2	63.2	64.5	63.8
6	03:00 to 04:00	57.5	59.4	61.7	62.5	63.1	62.6
7	04:00 to 05:00	60.7	58.7	60.3	60.3	59.6	61.3
8	05:00 to 06:00	59.5	56.4	57.4	57.9	59.2	58.7
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT VAPI. UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD.

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time					
		02-10-2023	02-11-2023	04-12-2023	01-01-2024	01-02-2024	04-03-2024
1	06:00 to 07:00	64.2	62.5	63.1	62.5	63.5	61.9
2	07:00 to 08:00	62.8	65.1	66.3	65.7	65.4	63.2
3	08:00 to 09:00	58.7	68.2	64.8	64.8	64.7	65.7
4	09:00 to 10:00	61.8	63.9	65.3	66.1	65.9	64.3
5	10:00 to 11:00	68.7	67.8	68.2	67.2	66.5	65.7
6	11:00 to 12:00	63.4	65.2	66.5	66.5	67.2	66.3
7	12:00 to 13:00	68.3	61.3	63.7	64.3	65.3	63.7
8	13:00 to 14:00	63.9	65.9	67.4	67.4	66.8	64.2
9	14:00 to 15:00	62.5	62.6	64.6	65.9	66.1	64.8
10	15:00 to 16:00	62.9	63.7	65.1	65.1	66.9	65.7
11	16:00 to 17:00	65.5	65.4	66.4	67.1	67.5	67.9
12	17:00 to 18:00	63.3	65.3	67.3	65.7	64.3	66.2
13	18:00 to 19:00	61.8	69.1	65.9	64.2	63.8	64.6
14	19:00 to 20:00	68.3	65.2	63.2	63.2	62.7	63.8
15	20:00 to 21:00	64.2	63.8	62.6	62.6	63.9	62.3
16	21:00 to 22:00	63.6	61.2	60.8	61.2	62.3	60.8
Day Time		<75 dB (A)					

Continue…

Location Name		PUB/Adani House					
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time					
		02-10-2023	02-11-2023	04-12-2023	01-01-2024	01-02-2024	04-03-2024
1	22:00 to 23:00	57.4	60.5	59.7	58.6	59.2	60.7
2	23:00 to 24:00	55.8	63.2	61.3	61.7	60.3	58.4
3	24:00 to 01:00	53.9	61.4	62.3	63.3	62.9	60.7
4	01:00 to 02:00	58.6	64.8	61.9	61.9	60.3	62.1
5	02:00 to 03:00	59.3	60.1	59.7	59.5	57.8	60.5
6	03:00 to 04:00	53.8	58.2	57.6	57.4	56.3	61.3
7	04:00 to 05:00	56.3	57.5	56.3	56.3	56.8	58.6
8	05:00 to 06:00	55.6	59.3	57.5	58.1	57.3	58.1
Day Time		<70 dB (A)					

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

Results of Noise Level Monitoring

Location Name		CT-4 RMU-1				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Day Time				
		22-11-2023	18-12-2023	15-01-2024	15-02-2024	18-03-2024
1	06:00 to 07:00	62.2	63.7	62.8	64.2	63.3
2	07:00 to 08:00	65.2	66.4	65.3	64.9	65.2
3	08:00 to 09:00	63.8	68.9	68.9	67.8	66.3
4	09:00 to 10:00	66.8	65.4	64.1	65.3	67.2
5	10:00 to 11:00	64.1	66.3	65.8	63.8	65.4
6	11:00 to 12:00	63.4	65.6	66.7	65.2	66.8
7	12:00 to 13:00	65.3	64.3	65.3	62.3	65.1
8	13:00 to 14:00	68.1	67.2	67.5	66.8	65.4
9	14:00 to 15:00	64.9	65.2	64.2	63.8	64.3
10	15:00 to 16:00	66.3	67.8	66.8	64.9	66.1
11	16:00 to 17:00	64.8	65.1	66.2	66.3	64.8
12	17:00 to 18:00	65.3	64.5	64.5	65.1	63.7
13	18:00 to 19:00	66.2	67.4	67.4	66.7	65.2
14	19:00 to 20:00	64.8	65.3	64.37	65.2	64.8
15	20:00 to 21:00	63.2	64.7	64.7	63.7	61.7
16	21:00 to 22:00	60.6	62.5	62.4	63.1	62.7
Day Time		<75 dB (A)				

Continue…

Location Name		CT-4 RMU-1				
Sr. No.	Sampling Date and Time	Noise Level Leq. dB(A) - Night Time				
		22-11-2023	18-12-2023	15-01-2024	15-02-2024	18-03-2024
1	22:00 to 23:00	60.4	62.8	63.6	62.9	61.8
2	23:00 to 24:00	63.2	60.5	61.4	63.2	64.3
3	24:00 to 01:00	60.1	64.3	64.3	63.4	62.7
4	01:00 to 02:00	58.4	61.6	62.8	64.3	64.3
5	02:00 to 03:00	60.2	62.4	62.4	63.8	62.4
6	03:00 to 04:00	57.4	64.1	63.8	64.6	64.1
7	04:00 to 05:00	56.2	62.6	63.7	62.4	63.4
8	05:00 to 06:00	57.3	60.1	60.3	58.6	60.2
Day Time		<70 dB (A)				

Test Method	IS: 9989 : 1981

Nikunj D. Patel
(Chemist)

GUJARAT ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR 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-23								
1	Particulate Matter	mg/Nm^3	20.16	20.53	23.28	22.45	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.41	6.74	8.32	9.75	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	23.68	20.38	20.61	23.18	50	IS 11255 (Part - 7)
Nav-23								
1	Particulate Matter	mg/Nm^3	21.45	19.86	22.51	20.69	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO2	ppm	7.86	6.13	7.89	8.92	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NOX	ppm	24.15	19.87	19.60	21.45	50	IS 11255 (Part - 7)
Dec-23								
1	Particulate Matter	mg/Nm^3	21.87	20.31	22.98	21.47	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.91	6.80	8.03	9.28	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	24.43	20.12	20.50	22.13	50	IS 11255 (Part - 7)
Jan-24								
1	Particulate Matter	mg/Nm^3	22.11	20.74	23.11	22.17	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	8.12	6.96	8.27	9.49	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	24.73	20.62	21.06	22.86	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-24								
1	Particulate Matter	mg/Nm^3	21.87	20.52	23.84	21.96	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.78	7.10	8.11	9.17	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	24.10	21.11	20.89	22.49	50	IS 11255 (Part - 7)
Mar-24								
1	Particulate Matter	mg/Nm^3	22.43	21.19	22.95	23.41	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	8.12	6.74	8.34	8.57	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	22.97	20.13	21.37	21.15	50	IS 11255 (Part - 7)

Nikunj D. Patel
(Chemist)

UNISTAR ENVIRONMENT & RESEARCH LABS PVT. LTD. * 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-24	Mar-24				
			23-03-2024	21-02-2024	21-02-2024	21-02-2024		
1	Particulate Matter	mg/Nm^3	22.46	16.27	19.72	17.11	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	8.18	12.86	15.49	14.53	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	16.92	25.43	27.64	20.39	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	1.7	1.64	1.26	0.95	--	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-24			Dec-22		
			24-02-2024	24-02-2024	24-02-2024	25-02-2024		
1	Particulate Matter	mg/Nm^3	22.65	25.29	19.98	20.43	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	8.12	8.91	8.56	7.28	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	20.37	22.13	18.11	26.86	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	1.12	1.87	1.51	1.13	--	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
			Feb-24					
			25-02-2024	25-02-2024	25-02-2024	25-02-2024		
1	Particulate Matter	mg/Nm^3	24.69	22.36	27.11	22.1	150	IS 11255 (Part - 1)
2	Sulphur Dioxide as SO_2	ppm	7.00	9.24	8.96	8.87	100	IS 11255 (Part - 2)
3	Oxides of Nitrogen as NO_X	ppm	28.37	28.39	27.88	27.26	50	IS 11255 (Part - 7)
4	Carbon Monoxide	mg/Nm3	1.53	1.72	1.97	1.45	--	UERL/AIR/SOP/18
5	Non Methyl Hydro Carbon	ppm	Not Detected	Not Detected	Not Detected	Not Detected	--	UERL/AIR/SOP/27

Nikunj D. Patel
(Chemist)

ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR GUJARAT VAPI.

Jaivik S. Tandel
(Manager - Operations)

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
			12-02-2024	12-02-2024	12-02-2024	12-02-2024	12-02-2024	
1.	pH @ 25 ° C	--	7.81	7.45	8.03	8.32	8.23	IS 3025(Part 11)1983
2.	Salinity	ppt	1.07	0.99	1.76	3.44	3	APHA 23rd Ed.,2017,2520 B
3.	Oil & Grease	mg/L	BDL(MDL:5.0)	BDL(MDL:5.0)	BDL(MDL:5.0)	BDL(MDL:5.0)	BDL(MDL:5.0)	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)	0.022	BDL(MDL:0.01)	0.109	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	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)	BDL(MDL:0.02)	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)	0.015	0.008	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	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	BDL(MDL:0.05)	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	1.236	1.776	BDL(MDL:0.1)	0.114	0.115	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	2.2	2.1	--

GUJARAT VAPI. ENVIRONMENT & RESEARCH LABS PVT. LTD. * UNISTAR

Mr. Nilesh Patel
Sr. Chemist

Mr. Nitin Tandel
Technical Manager

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

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	--

Annexure – 5

ANNEXURES

ANNEXURE 1	**INITIAL OIL SPILL REPORT**	
Particulars of person, office reporting	Capt. Sachin Srivastava- HOD Marine Capt. Girish Chandra - HOS marine, APSEZ	
Tel No.	+91 6359883102	
Date & time of incident	19.01.2024 / 0900 hrs.	
Spill location	IOCL SPM	
Likely cause of spill	Hose rupture	Witness – Tug Dol 11
Initial response action	Initiated OSCRP	
Any other information	NO	

Identity of informant	Tug Dol 11
Time of FIR	0900 hrs.
Source of spill	IOCL SPM
Cause of spill	Floating Hose rupture
Type of spill	Crude Oil
Color code information (from CG)	Sheen
Radius of slick	30-40 m
Tail	15 m
Volume	175 cubic meter approx.
Quantity	150 tones
Weather	N'Ely x 5-6 knots.
Tide / current	Ebbing / 0.8 to 1.2 knots.
Density	0.2 to 0.86 kg/m3 approx.
Layer thickness	0.02 mm approx.
Air / Sea temp.	22 deg C /27 deg C
Predicted slick movement	S'Wly
Size of spill classification (Tier 1, 2 or 3)	Tier 1

ANNEXURE 2 **POLREP**

In case of an oil spill, APSEZ will provide information to Commandant Coast Guard District 1 Porbandar COMDIS 1 and Coast Guard Station Vadinar CGS Vadinar in the following format:

SN.	Parameter	Data
1.	Identity of the informant	Tug Dol 11
2.	Time of information receipt	0900 hrs.
3.	Source of Spill	IOCL SPM
4.	Cause of Spill	Floating Hose rupture
5.	Type of oil	Crude Oil
6.	Colour code information	Sheen
7.	Configuration	-
8.	Radius	30-40 m
9.	Tail	15 m
10.	Volume	175 cubic meter approx.
11.	Quantity	150 tones
12.	Weathered or Fresh	Fresh
13.	Density	0.2 to 0.86 kg/m3 approx.
14.	Viscosity	53.36 CST@25 deg centigrade
15.	Wind	N'Ely x 5-6 knots.
16.	Wave Height	0.1 to 0.2 m
17.	Current	0.8 to 1.2 knots.
18.	Layer Thickness	0.2 to 0.4 mm approx.
19.	Ambient air temperature	22 deg C
20.	Ambient sea temperature	27 deg C
21.	Predicted slick movement	S'Wly
22.	Confirm Classification of spill size	Tier 1

Drill Log Sheet

Page Number: 1 of 1	**Date**: 19 -01-2024
Name: Vikram Pratap Singh	**Position:** Radio Officer
Contact Number: 9825228673	**Signature:**

Activity Timeline:

0900 hrs.: Tug Victor reported oil spill at IOCL SPM to Tug Dol 11.

0901 hrs.: Tug Dol 11 immediately reported to Marine Control and Diving Supervisor.

0901 hrs.: Marine Control informed all concerned departments including IOCL.

0902 hrs.: Tug Dol 11 proceeded to IOCL SPM.

0905 hrs.: Tug Dol 11 reached IOCL SPM and all SPM valves closed by diving team.

0906 hrs.: IOCL SPM team observed oil spillage from floating hose of IOCL SPM.

0906 hrs.: Tug Dol 11 commenced boom deployment and same time informed to control.

0907 hrs.: Tug Dol 11 requested Marine Control for Barge BB-10 for storage of recovered oil.

0907 hrs.: Marine Control deployed Barge BB-10 along with Tug Dol 2 to IOCL SPM.

0908 hrs.: Barge BB-10 underway with Tug Dol 2.

0910 hrs.: Marine Control informed to all vessels at anchor regarding oil spill near IOCL SPM area. The control room requested all underway vessels to pass 5 miles from IOCL SPM. Unberthing operations suspended.

0910 hrs.: Capt. Girish Chandra informed Commandant Konark Sharma ICGS Mundra about the incident through phone.

0912 hrs.: Tug Dol 11 requested to keep one tug stand by with additional boom at short notice.

0914 hrs.: Marine Control informed Tug Dol 10 & 15 to standby with OSD.

0915 hrs.: Informed commercial team (Mr. Jagdish Rabadia) and environment cell (Mr. Radhe Shyam Singh) by Mr. Sudhakar Singh.

0921 hrs.: Tug Dol 11 reported 150m boom deployed and continued to deploy remaining 100 meters.

0925 hrs.: Marine Control informed jetty team to be stand by with crew for mooring the Barge BB-10 at B-12 berth. Jetty supervisor also informed to deploy one hydra for loading/unloading of OSR equipment at SPM Store and jetty.

0932 hrs.: DoI 11 informed that spill is spread in an area of around 30-40 m^2.

0933 hrs.: Tug DoI 11 reported 250 m boom deployment completed and commenced J-formation.

0931 hrs.: Mr. Mahendra Singh Solanki from Corporate affairs informed DM Bhuj office about the incident.

0936 hrs.: Mr. Sudhakar Singh informed HMEL team Mr. Ashok Tiwari about the incident through phone.

0936 hrs.: Initial intimation mail sent to GMB/MMD Kandla/Coast Guard Station/MRCC.

0940 hrs.: Patrolling boat DoI 19 reported underway with Capt. Girish Chandra and proceeding to IOCL SPM.

0944 hrs.: Tug DoI 11 reported J-formation completed, and oil containment is in progress and commenced skimmer deployment.

0949 hrs.: Barge BB-10 arrived at IOCL SPM with Tug DoI 2.

0950 hrs.: Skimmer lowered and commenced recovering of spilled oil to floating tank.

0950 hrs. Liquid team informed commercial department for 6 no. tanker/bowser for transportation of recovered oil from jetty to OWS unit. The team also informed to keep motor pump and other equipment stand by at berth B-12.

0956 hrs.: Barge BB-10 secured P/S of Tug DoI 11 and commenced transferring of oil in barge BB-10.

0959 hrs.: Tug DoI 11 reported approx. 10 T of recovered oil loaded in barge BB-10.

1000 hrs.: HMEL informed readiness for assisting to IOCL team for same.

1003 hrs.: Marine Control informed Tug DoI 17 with second set of booms to proceed for IOCL SPM.

1010 hrs.: Tug DoI 17 underway with second set of booms.

1020 hrs.: Liquid team informed Marine Control that motor pump and other equipment is standby at berth B-12.

1025 hrs.: Liquid team informed Marine Control that 6 no. of Tanker/bowser arrived and standby at berth B-12.

1046 hrs.: Joint Inspection team (ICG and OISD) boarded on Tug DoI 11.

1100 hrs.: Recovery of spilled oil completed (150 T).

1100 hrs.: Drill called off and same time informed all concern.

1101 hrs.: BB-10 cast off and proceed to B-12 berth for transfer of oil for disposal.

1102 hrs.: Boom recovery started.

1107 hrs.: Area assessed by diving team for recovered oil and confirmed all clear.

1108 hrs.: Informed environment team for water sampling of spillage area.

1124 hrs.: Environment team informed that area is clear of oil and no harm for sea.

1125 hrs.: BB-10 arrived at B-12 berth.

1130 hrs.: Liquid team started loading oil from BB-10 to tankers for disposal.

1145 hrs.: Tanker loaded with oil departed from B12 for disposal of oil at Oil Water Separator unit.

1202 hrs.: Tanker reached Oil Water Separator unit.

1225 hrs.: Recovered oil transfer from tanker to OWS unit completed.

1230 hrs.: Environment team informed that GPCB approved recycler has executed disposal.

Personnel & Boats Participated in Drill

Offshore

1. Capt. Hemant Dhruv
2. Capt. Girish Chandra
3. Capt. Peeyush Suwalka
4. Mr. Yogesh Nandaniya
5. Mr. Ramdas Pawale
6. Mr. Upinder Samkaria
7. Mr. Shashikant Padave
8. Mr. Santosh Rasam
9. Mr. Vishwanath Chauhan
10. Mr. Dharamveer Yadav
11. Members from Sea Care
12. Crew of Tug Dolphin 11
13. Crew of Tug Victor
14. Crew of Boat Al Dariya
15. Tug Dol 2 and BB10
16. ICG Mundra – 04
17. Mr. Bhagwat Swaroop Sharma- Head Environment
18. Mr. Radheshyam Singh-Environment
19. Mr. Mayur Kasundra - Liquid Team

Onshore:

1. Capt. Sachin Srivastava
2. Sudhakar Singh
3. Mr. Chandrashekhar Kumar
4. Mr. Vikram Pratap Singh
5. Mr. Rupesh Pandey
6. Mr. Anish
7. Mr. Arshdeep

Drill Performance Monitoring:

Sl. No	Activity	Time Taken
1.	Time taken to shift OSR equipment from SPM Store to load on DSV tugs	NA / 200-meter Fence boom and 1- skimmer is kept 24 x 7 on Tug DoI 11.
2.	Time taken for Tug cast off from time information given.	NA
3.	Time taken from tug cast off to Reach at Location.	NA
4.	Time taken for deploying 250-meter boom and skimmer after reaching at site.	27 min.
5	Time taken for J/U formation and deployment of skimmer.	11 min.

Observations:

SR. NO.	POINTS	ACTION TAKEN	TARGET DATE	RESPONSIBILITY	REMARKS
1	All discharge pipes of skimmer should be connectable in advance.	Point discussed with team during drill de-briefing.	NA	NA	

Drill snap – 19 Jan 2024

Date 19 Jan 2024 OSR Drill at IOCL SPM	
Pre Drill Briefing	Boom laying from DoI 11
	
J formtion making in progress	Skimmer Operations
	
Inspection by ICG and OISD team	Discussion with ICG and APSEZ team
	
Joint Inspection (ICG and OISD) and APSEZL Mundra team on DSV Dolphin 11	

APSEZL Mundra OSR Team on Tug Dolphin -11

Annexure – 6

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 4.20 VOLTS; DC Current = 3.20 AMP

DATE : 25.10.2023
REPORT NO : OCTOBER23/18
DATE OF MONITORING : 25.10.2023

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.372	-	0.021	-	-	-	-	-	-	-	-	-	1.372	1.080	
2	D	0.425	1.381	-	0.022	1.381	0.715	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.418	-	0.020	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.428	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.396	-	0.006	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.357	-	0.002	1.357	0.565	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.295	-	0.006	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.318	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.343	-	0.009	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.376	-	0.026	-	-	-	-	-	-	-	-	-	1.376	1.001	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

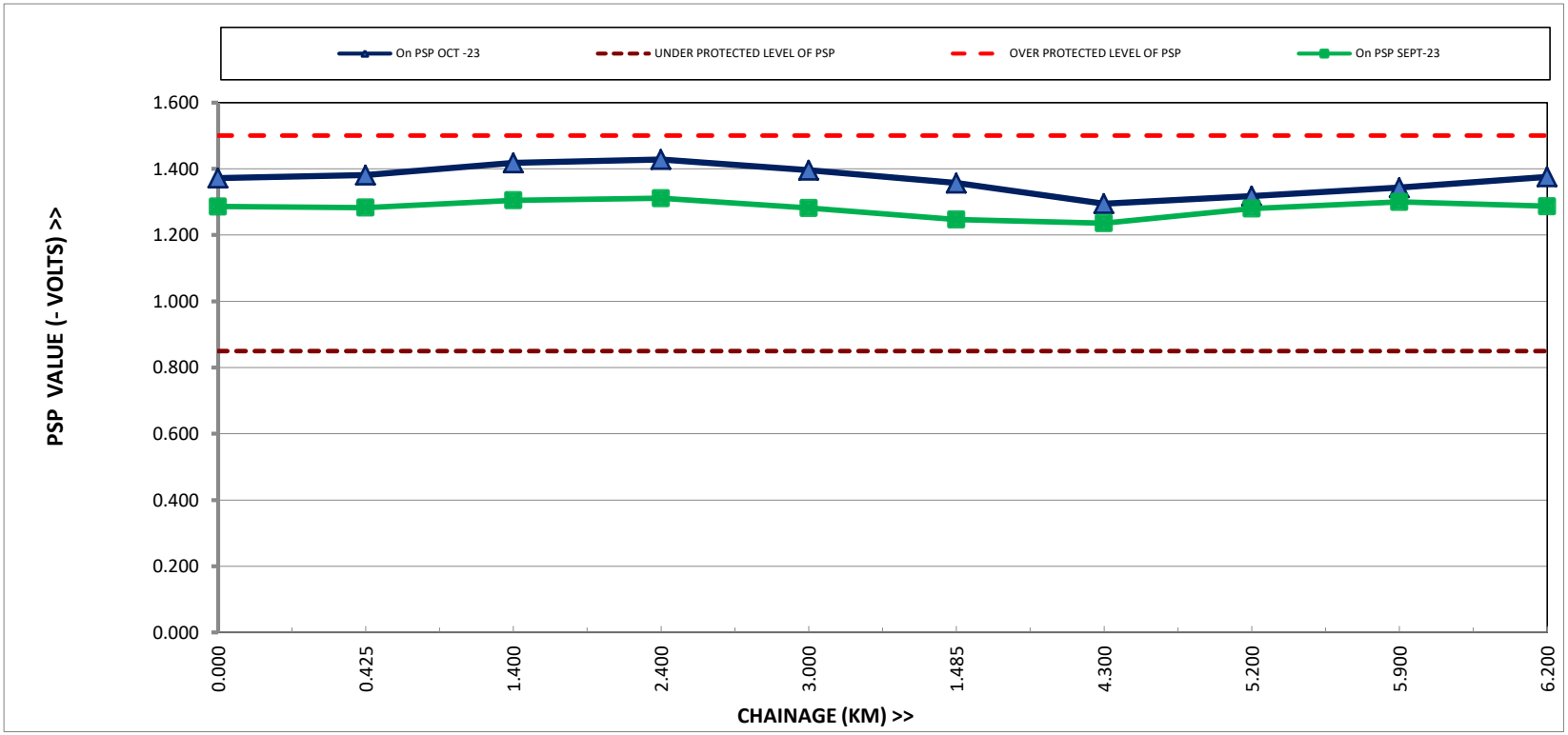
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : DC Voltage (V) = 4.20 DC Current (A) = 3.20

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
OCT 2023 ON PSP (VOLT)	(Blue Solid)
SPET 2023 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

SAP ENPROCON PVT. LTD. INDIA

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

SAP ENPROCON

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 4.80 VOLTS; DC Current = 3.90 AMP

DATE : 29.11.2023
REPORT NO : NOVEMBER23/19
DATE OF MONITORING : 29.11.2023

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.464	-	0.023	-	-	-	-	-	-	-	-	-	1.464	1.081	
2	D	0.425	1.434	-	0.025	1.434	0.797	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.491	-	0.021	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.488	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.456	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.412	-	0.003	1.412	0.535	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.408	-	0.006	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.410	-		-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.434	-	0.012	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.299	-	0.010	-	-	-	-	-	-	-	-	-	1.299	1.047	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

SAP ENPROCON PVT. LTD. INDIA

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

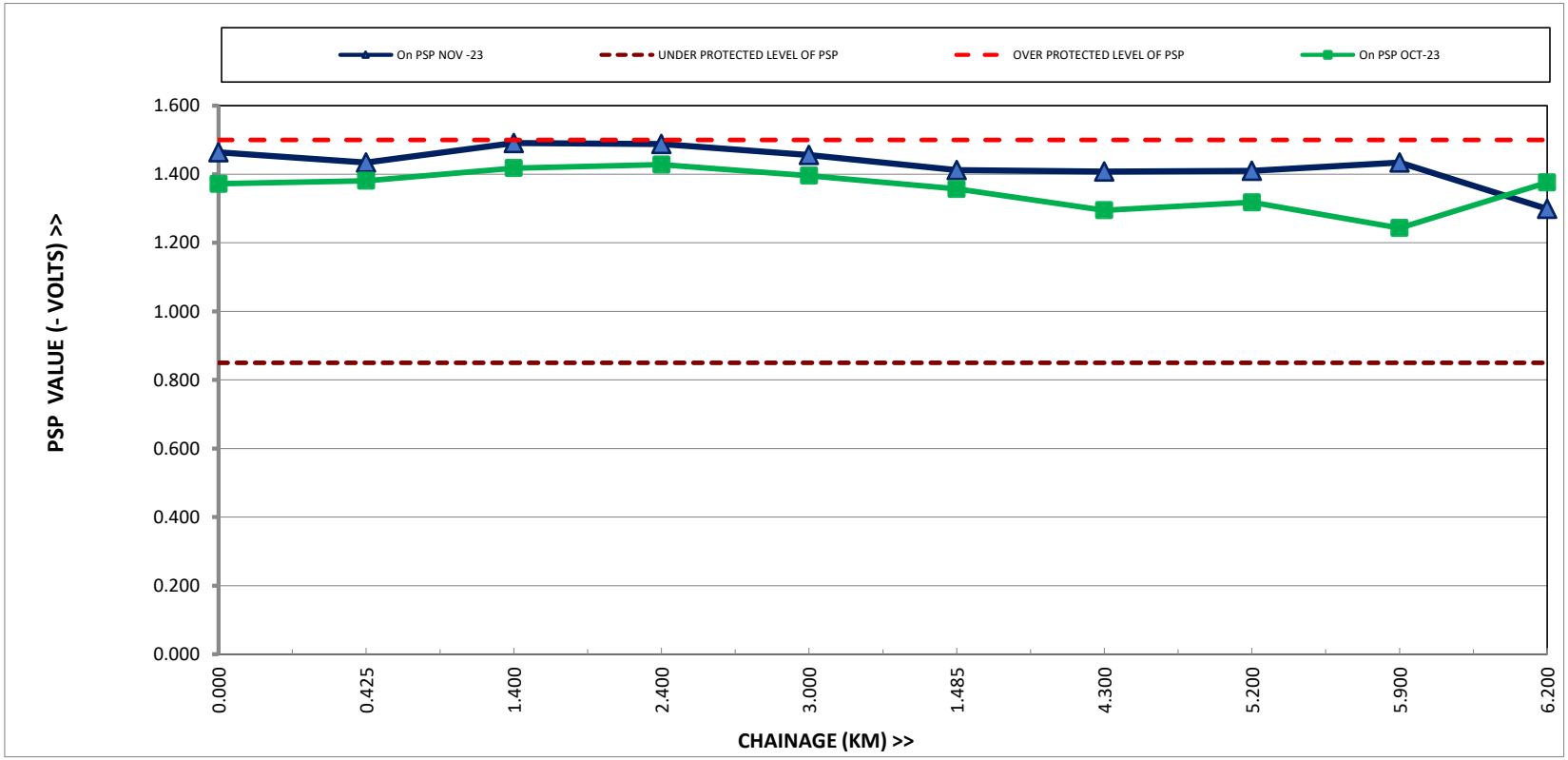
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : DC Voltage (V) = 4.80 DC Current (A) = 3.90

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
NOV 2023 ON PSP (VOLT)	(Blue Solid)
OCT 2023 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

SAP ENPROCON PVT LTD INDIA

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 5.1 VOLTS; DC Current = 4.1 AMP

DATE : 29.12.2023
REPORT NO : DECEMBER23/20
DATE OF MONITORING : 29.12.2023

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.473	-	0.024	-	-	-	-	-	-	-	-	-	1.473	1.072	
2	D	0.425	1.479	-	0.025	1.479	0.793	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.481	-	0.022	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.475	-	0.013	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.463	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.429	-	0.002	1.429	0.525	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.408	-	0.004	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.410	-	0.008	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.463	-	0.017	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.409	-	0.038	-	-	-	-	-	-	-	-	-	1.409	1.000	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

SAP ENPROCON PVT. LTD. INDIA

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

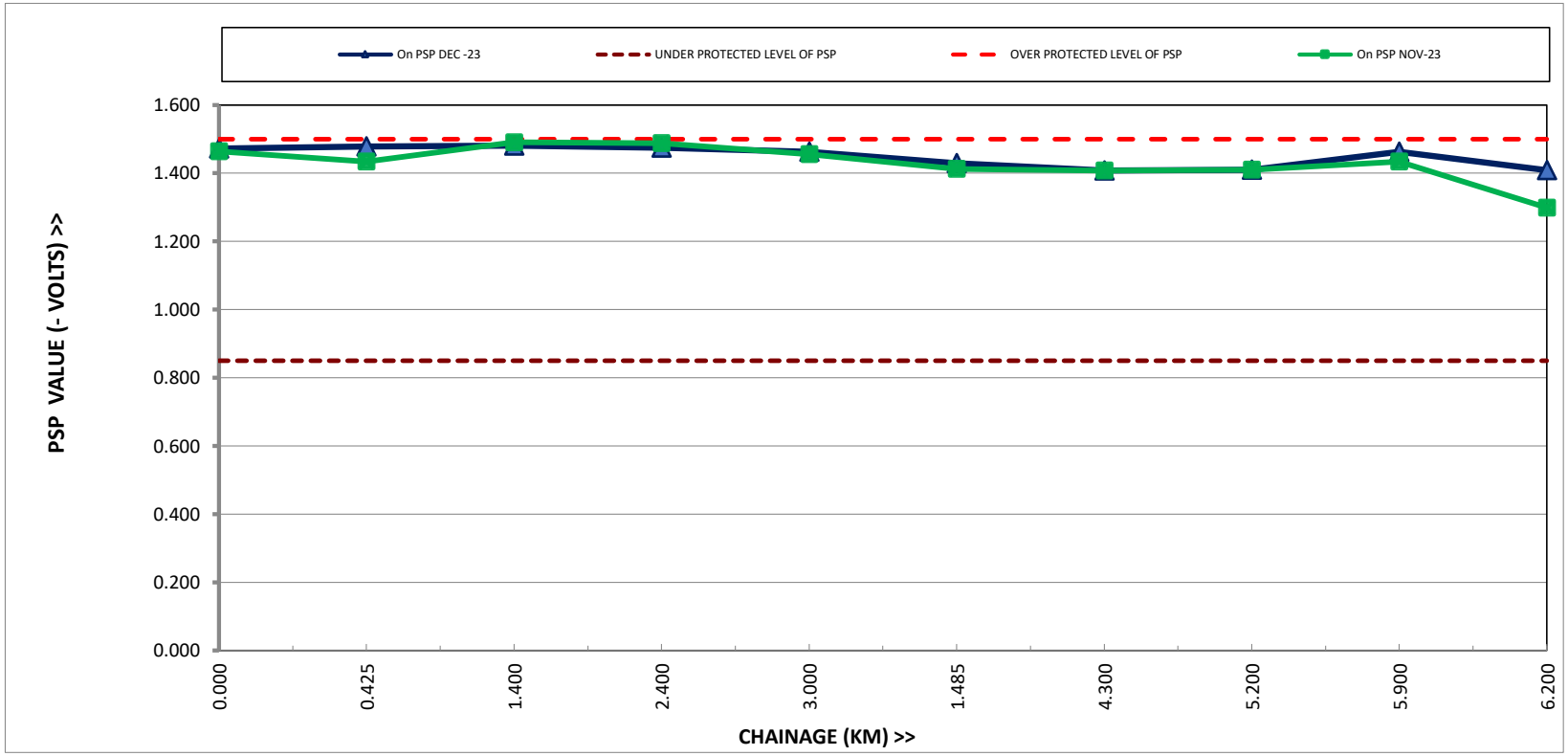
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : DC Voltage (V) = 5.1 DC Current (A) = 4.10

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
DEC 2023 ON PSP (VOLT)	(Blue Solid)
NOV 2023 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

SAP ENPROCON PVT. LTD. INDIA

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 4.94 VOLTS; DC Current = 4.1 AMP

DATE : 30.01.2024
REPORT NO : JANUARY24/21
DATE OF MONITORING : 29.01.2024

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.436	-	0.028	-	-	-	-	-	-	-	-	-	1.436	1.068	
2	D	0.425	1.490	-	0.025	1.490	0.729	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.436	-	0.020	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.479	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.456	-	0.001	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.436	-	0.001	1.436	0.715	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.454	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.459	-	0.010	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.461	-	0.011	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.441	-	0.012	-	-	-	-	-	-	-	-	-	1.441	1.048	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

SAP ENPROCON PVT. LTD. INDIA

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

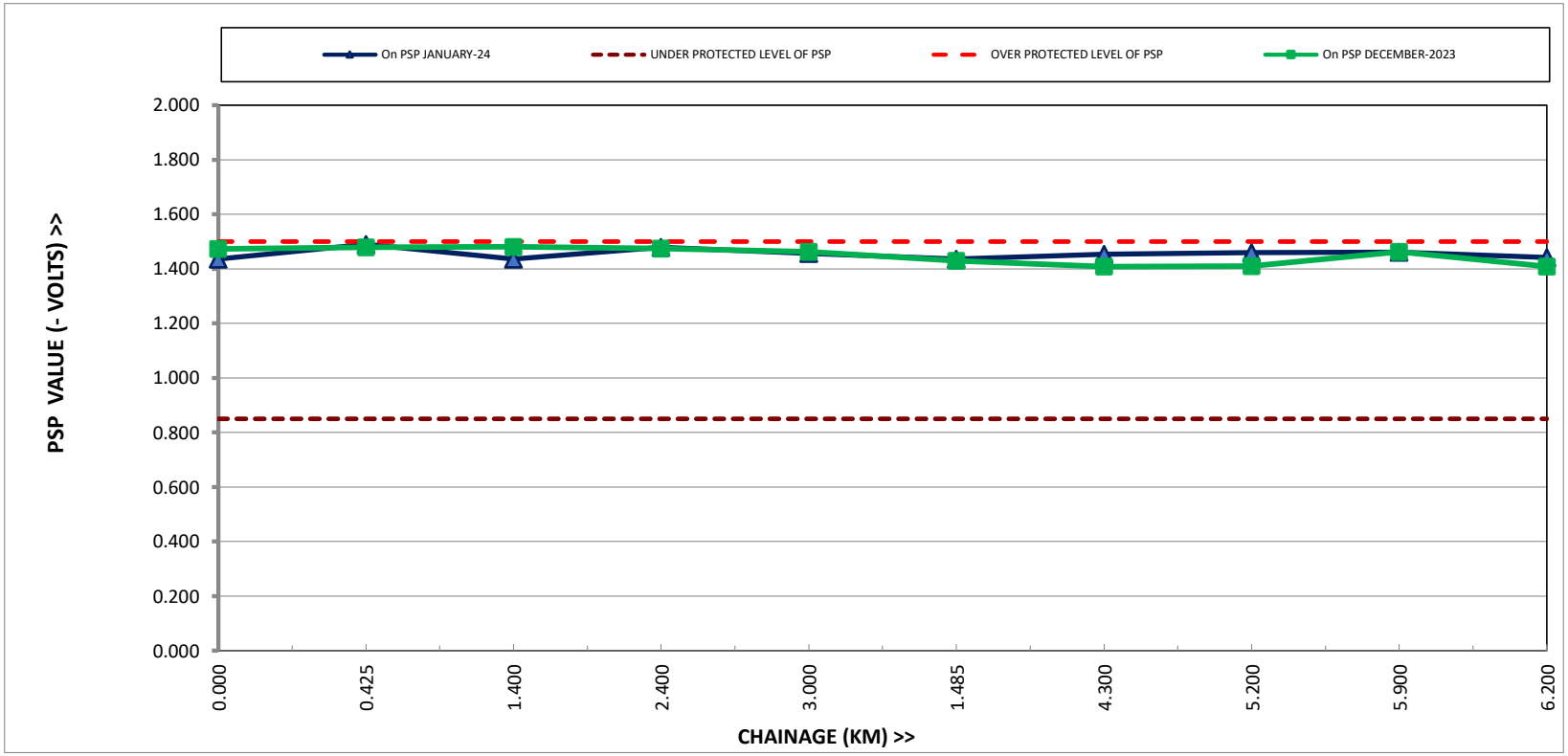
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : **DC Voltage (V) = 4.94** **DC Current (A) = 4.10**

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
JANUARY 2024 ON PSP (VOLT)	(Blue Solid)
DECEMBER 2023 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 4.64 VOLTS; DC Current = 4.11 AMP

DATE : 02.03.2024
REPORT NO : FEBRUARY24/22
DATE OF MONITORING : 29.02.2024

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.329	-	0.020	-	-	-	-	-	-	-	-	-	1.329	1.066	
2	D	0.425	1.340	-	0.022	1.340	0.709	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.351	-	0.021	-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.338	-	0.013	-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.321	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.315	-	0.004	1.315	0.534	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.327	-	0.002	-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.330	-	0.010	-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.301	-	0.010	-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.303	-	0.011	-	-	-	-	-	-	-	-	-	1.303	0.961	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

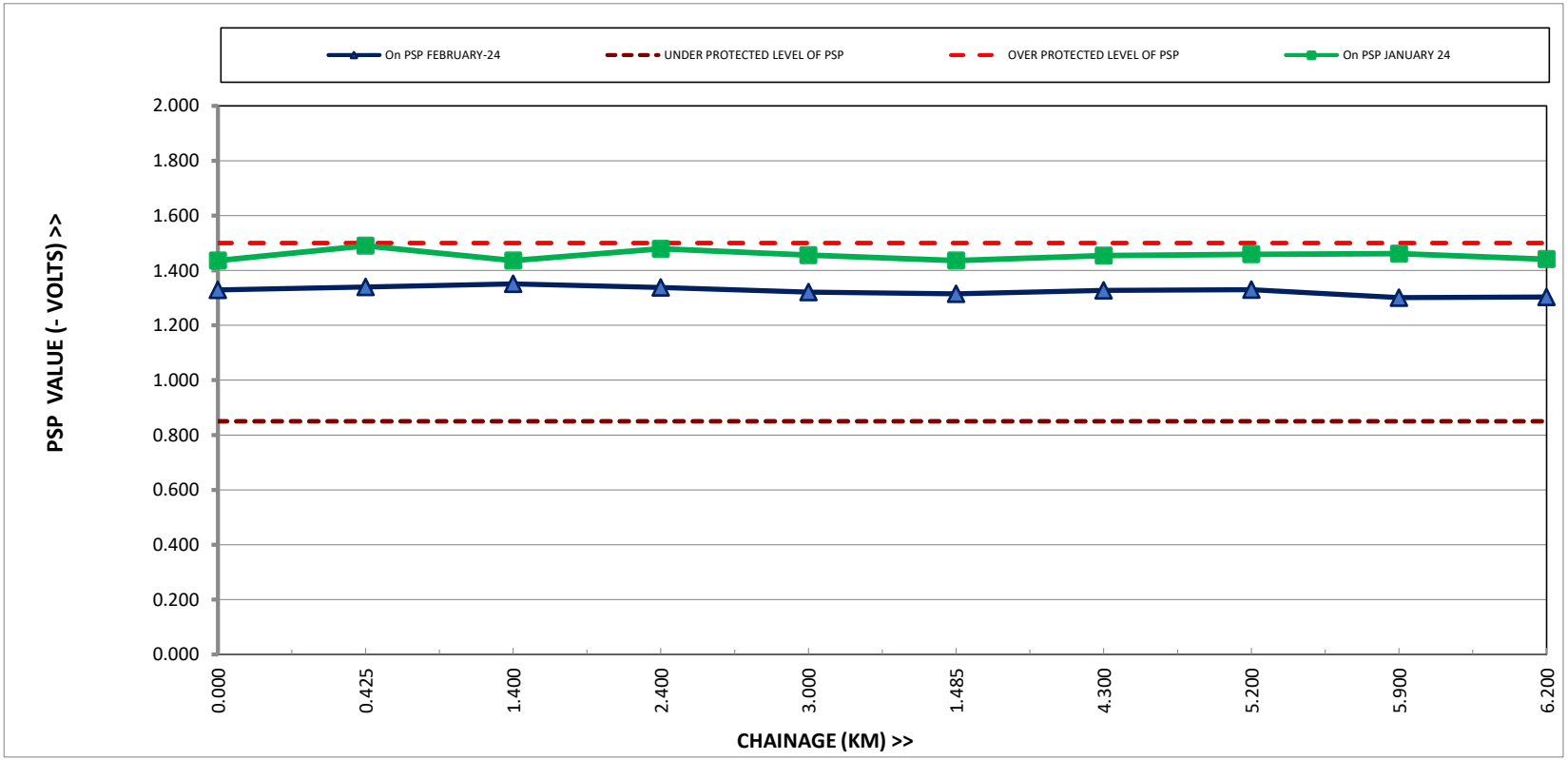
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : DC Voltage (V) = 4.64 DC Current (A) = 4.11

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
FEBRUARY 2024 ON PSP (VOLT)	(Blue Solid)
JANUARY 2024 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

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ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

PIPE - TO - SOIL MONITORING REPORT

MAINTENANCE BASE : MUNDRA
PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA
CP STATION LOCATION : TP2
CP SYSTEM PARAMETERS : DC Voltage = 4.34 VOLTS; DC Current = 4.29 AMP

DATE : 26.03.2024
REPORT NO : MARCH24/23
DATE OF MONITORING : 26.03.2024

TLP NO.	Type	Chainage KM	ON PSP (-volt)	OFF PSP (-volt)	AC VOLTAGE	Casing (-V w.r.t CSE)				Polarization coupon (-V w.r.t CSE)		HT Crossing		Foreign pipeline PSP (-V w.r.t CSE)	Isolating Joint (-V w.r.t CSE)		Remarks
						Carrier PSP	Casing PSP	Casing Anode Potential (-V)	Casing Anode Current (mA)	ON PSP	OFF PSP	ZN Anode Potential (-V)	ZN Anode Resistance		Protected side PSP	Unprotected side PSP	
1	E	0.000	1.314	-		-	-	-	-	-	-	-	-	-	1.351	1.087	
2	D	0.425	1.351	-		1.351	0.703	NA	NA	-	-	-	-	-	-	-	
3	A	1.400	1.346	-		-	-	-	-	-	-	-	-	-	-	-	
4	A	2.400	1.366	-		-	-	-	-	-	-	-	-	-	-	-	
5	A	3.000	1.334	-		-	-	-	-	-	-	-	-	-	-	-	
6	D	3.440	1.298	-		1.298	0.560	NA	NA	-	-	-	-	-	-	-	
7	A	4.300	1.289	-		-	-	-	-	-	-	-	-	-	-	-	
8	A	5.200	1.298	-		-	-	-	-	-	-	-	-	-	-	-	
9	A	5.900	1.156	-		-	-	-	-	-	-	-	-	-	-	-	
10	E	6.200	1.150	-		-	-	-	-	-	-	-	-	-	1.150	0.928	

Remarks:

Monitored by : SAP ENPROCON PVT LTD
Signature:
Name : Harsh Vardhan Singh
Designation : CP Engineer

Reviewed by :
Signature
Name :
Disignation :

Graphical Representation of ON Mesured PSP

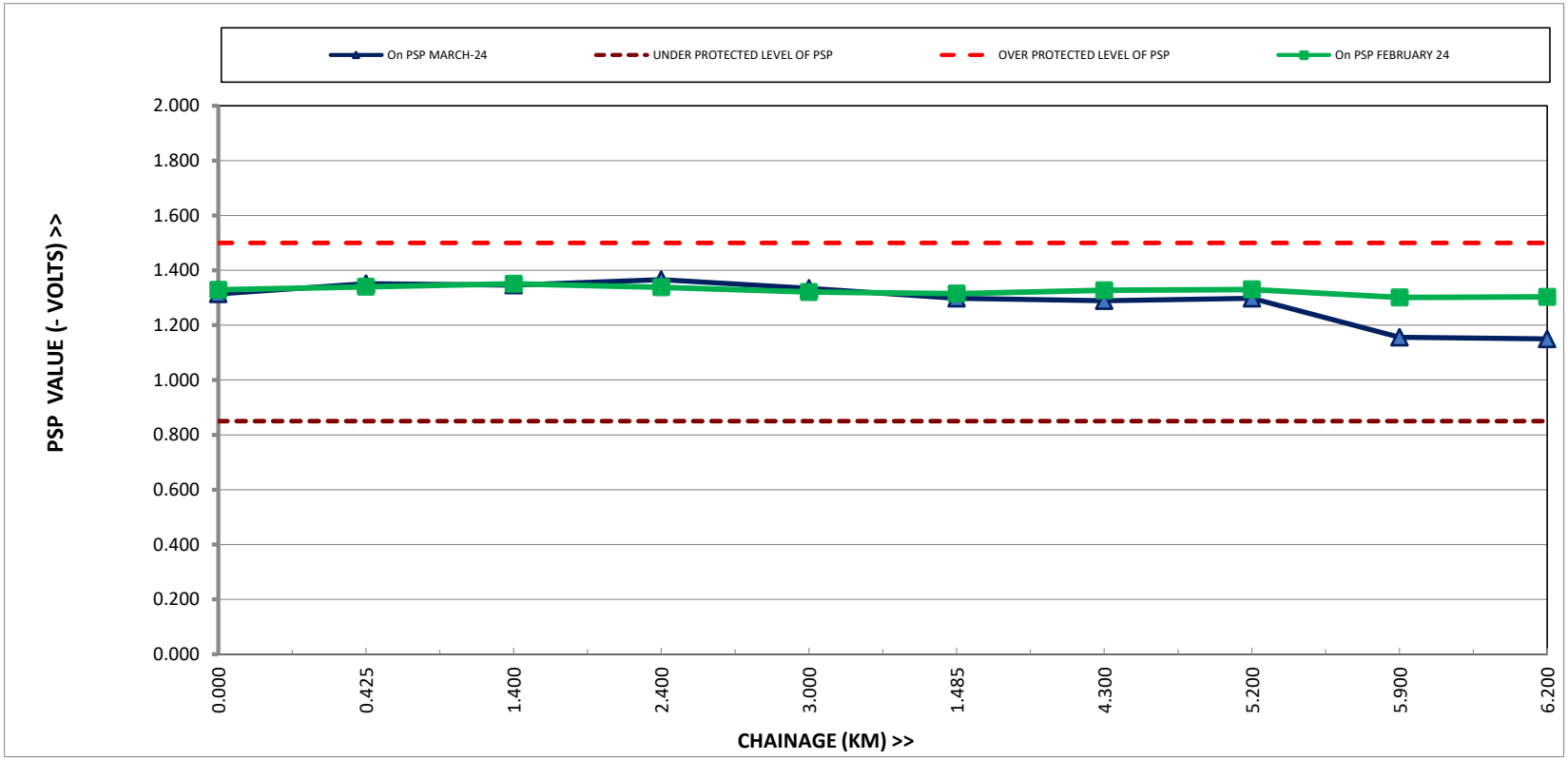
MAINTENANCE BASE : MUNDRA

PIPELINE SECTION : 48" X 6.2 KM SPM-IOCL CRUDE OIL PIPELINE AT ADANI PORTS, MUNDRA

CP STATION LOCATION : TP2

CP SYSTEM PARAMETERS : DC Voltage (V) = 4.34 DC Current (A) = 4.29

CP CONTRACTOR: SAP ENPROCON PVT LTD



LEGENDS	
MARCH 2024 ON PSP (VOLT)	(Blue Solid)
FEBRUARY 2024 ON PSP (VOLT)	(Green Solid)
UNDER PROTECTED LEVEL OF PSP	(Brown Broken)
OVER PROTECTED LEVEL OF PSP	(Red Dashed)

Note : PSP value measured wrt Cu-CuSO4 portable referance Cell.

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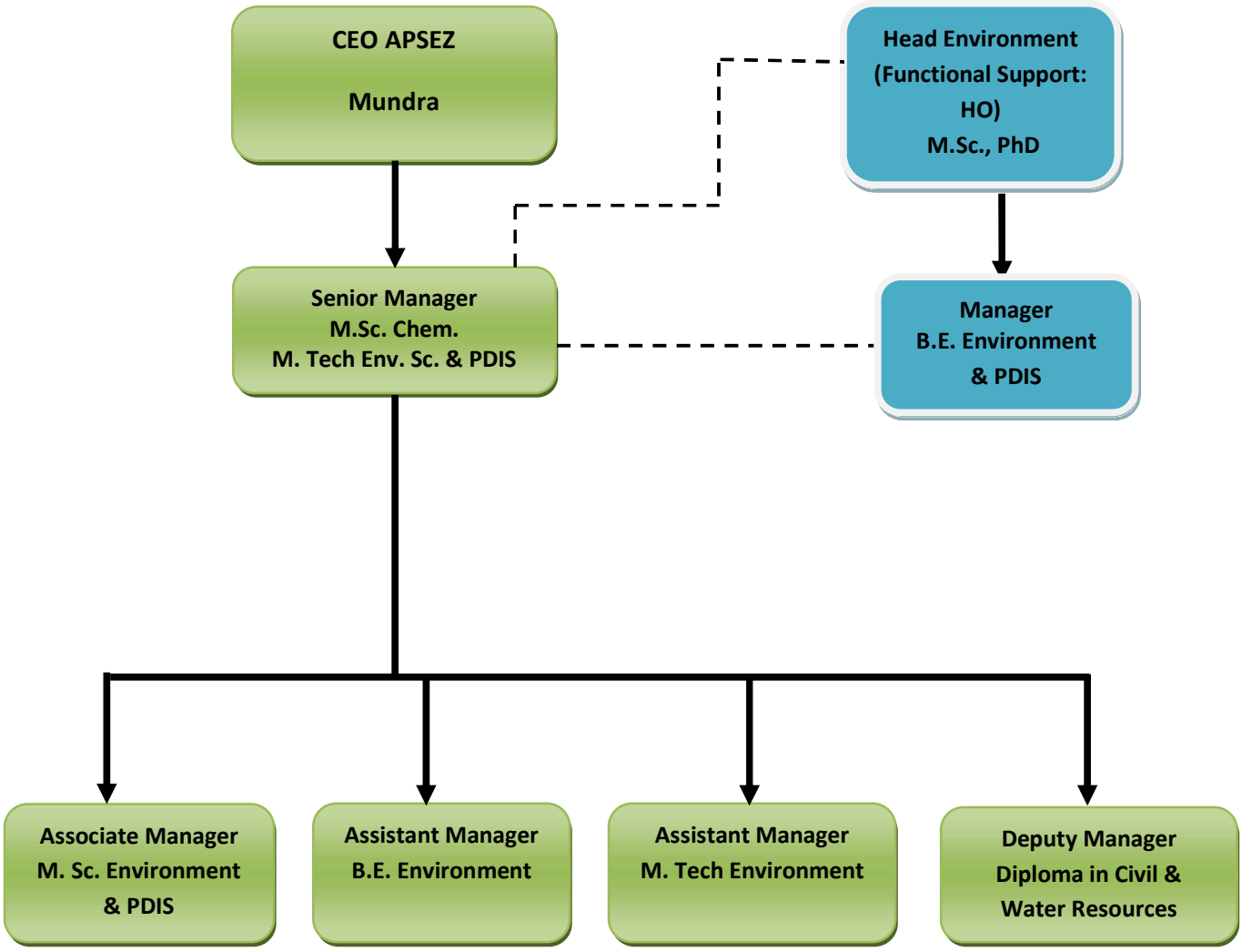
Annexure – 7

Updated Organogram of Environment Management Cell, APSEZ, Mundra



Annexure – 8

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		2021 – 22	2022 – 23	2023 – 24	2023 – 24
1.	Environmental Study / Audit and Consultancy	6.82	7.32	22.67	27
2.	Legal & Statutory Expenses	10.52	12.32	8.60	13
3.	Environmental Monitoring Services	14.31	15.32	13.37	19.20
4.	Hazardous / Non-Hazardous Waste Management & Disposal	107.09	104.035	130.11	148.68
5.	Environment Days Celebration and Advertisement / Business development	4.04	2.53	3.42	11.50
6.	Treatment and Disposal of Bio-Medical Waste	2.14	2.29	2.28	2.28
7.	Mangrove Plantation, Monitoring & Conservation	53.6	35.0	15	15.0
8.	Other Horticulture Expenses	921	956	904	904
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	252.27	141.33	186.94	212.9
10.	Expenditure of Environment Dept. (Apart from above head)	149.8	90.14	80.39	182.92
	Total	**1371.79**	**1366.28**	**1366.78**	**1536.48**

Annexure – 9

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Date: 1st April, 2024

To,
The Inspector General of Forest / Scientist C,
Integrated Regional Office (IRO),
Ministry of Environment, Forest & Climate Change (MoEF&CC),
Aranya Bhavan, A-wing, Room Number 409,
Near Ch-3 Circle, Sector 10 A,
Gandhinagar, Gujarat – 382007.
E-mail: iro.gandhingr-mefcc@gov.in

Sub : Submission of Action Taken Report w.r.t. Certified Compliance to Waterfront Development Project of M/s. Adani Ports and Logistics at Mundra, District Kutchh, Gujarat -reg.

Ref. :
1. Environment and CRZ clearance granted to M/s Adani Ports & SEZ Limited vide letter dated 12th January, 2009 and 19th January, 2009 bearing MoEF&CC letter No. 10-47/2008- IA.III.
2. Environment and CRZ clearance validity extension order vide letter dated 7th October, 2015 bearing MoEF&CC letter No. 10-47/2008- IA.III.
3. Certified Compliance Certification Report vide Letter No. J-11/14-2024-IROGNR/ I/66337/2024 dated 27th February, 2024.

Respected Sir,

With respect to the above subject and references, IRO-MOEF&CC, Gandhinagar had carried out the site visit of WFDP area, Mundra Port from 18th to 20th December, 2023 and have submitted certified EC compliance report vide Letter No. J-11/14-2024-IROGNR/ I/66337/2024 dated 27th February, 2024.

Action plan / Action taken report is prepared and being submitted as below, for further consideration -

Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
1.	**Specific Condition (i) of EC & CRZ Clearance.** No existing mangroves shall be destroyed during construction / operation of the	**Complied.** It is brought into the light of the EAC committee that the monitoring carried out by GUIDE has used LISS IV data having spatial resolution of 5.8m whereas the report submitted by NCSCM has	**Noted and Agreed.** GUIDE has carried out mangrove mapping using authentic Indian satellite imagery of the year 2019 & 2021. GUIDE study leveraged the LISS IV (5.8-meter spatial resolution) multi-spectral imageries, which represent the highest resolution available from Indian satellites.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
	Project.	used 0.6m data for the mapping. The location of sampling for ground truthing mentioned in the GUIDE report was found vague while plotting manually on the map. The interpretation from GUIDE report is quite difficult when compared with the NCSCM report. It has been advised to conduct the survey through NCSCM and submit the report for interpretation. EAC committee may take a call.	<u>**Methodology adopted by GUIDE:**</u> a) **Satellite Imagery:** GUDE meticulously utilized the LISS IV imagery to assess mangrove cover, distribution, and health. These images were obtained from only authorized Indian Government agency National Remote Sensing Centre, Hyderabad. b) **Ground Truthing:** To enhance the reliability of findings, GUIDE conducted extensive ground truthing. Field surveys were carried out to verify the accuracy of the satellite data. **Authenticity and Verifiability:** GUIDE dataset stands out for its authenticity and verifiability. By combining satellite imagery with ground truthing GUIDE data is not only accurate but also reflects the ground reality, making it a valuable resource for mangrove conservation and management. Subsequently, APSEZ has corrected the report from GUIDE w.r.t. co-ordinates. The updated survey report is attached as **Annexure – 1**. However, as per suggestion given by your good office, APSEZ agreed to conduct a mangrove monitoring survey through NCSCM for the year 2023. APSEZ has already initiated to carry out such monitoring with NCSCM to get a techno commercial offer, but still there is no response from their side. (Mail conversation is attached as **Annexure – 2**). Mangrove monitoring study report carried out through NCSCM (once agreed) will be

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
			submitted to concerned regulatory authorities for their interpretation and recommendations if any. Undertaking stating the same is attached as **Annexure – 3**.
2.	**Specific Condition (viii) of EC & CRZ Clearance.** 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** Being a vast expanse under the head, it is advised to conduct the study through the Mahatma Gandhi Labour Institute.	**Noted and Agreed.** Below studies have already been conducted by APSEZ. a) CSR Impact Assessment to *"assess the Social Impact created by the Mobile Health Care Units (MHCU) operated by the Adani Foundation in the villages of Mundra intends to find out the change/improvement in the health status of the beneficiaries"* carried out through M/s. SOULACE CONSULTING PVT LTD. during the period FY 2022-23 (Report's cover page is attached as **Annexure – 4**). b) Assessment of Water Conservation Programs to *"assess changes in the various activities that may be attributed to the Foundation's water harvesting initiatives"* carried out in the year 2022 through M/s. THINKTHROUGH CONSULTING (Report's cover page attached as **Annexure – 5**). The frequency to carry out CSR Impact Assessment is once in two years. As per recommendations, APSEZ will approach the Mahatma Gandhi Labor Institute to conduct the upcoming CSR assessment study in FY 2024-25. The assessment reports will be submitted along with half yearly EC compliance report and recommendations given in study report will be implemented in proper manner.

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
3.	**Specific Condition (6) of CRZ Recommendations.** 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 rainwater during rainy seasons.	**Partly Complied.** The unit has developed a garland drain all along the coal storage area through which water goes into a common sump. It is advised to clean the garland drains. It is advised to use collected wastewater for dust suppression after filtration. The first wash of the storm drain should be diverted into the sump.	**Complied.** Cleaning of garland drains is being done on regular basis and water collected in the sump is being used for dust suppression after proper filtration / sedimentation. Photographs showing garland drain & common sump / dump pond are attached as **Annexure – 6**. The first wash of storm water drain during monsoon will be diverted into common sump for sedimentation and reused for dust suppression.
4.	**Specific Condition (16) of CRZ Recommendations.** 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	**Partly Complied.** As the port is handling coal, certain specialized infrastructure is required to be installed at the port: a) Installation of hooks at the corner of the berths for fixing of green curtains. b) All the water outlets at the berth should be connected through pipelines from which	**Complied / Agreed to comply.** All the mitigations measures are being taken for abatement of fugitive dust emission within port premises and complying with the coal handling guidelines issued by GPCB. However, as per recommendations given by your good office to install certain specialized infrastructure, APSEZ has taken the following steps: a) APSEZ has provided hydraulic operated spill plate & side wall to prevent any spill of coal into the sea during vessel operations. Photographs of the same are

Adani Ports and Special Economic Zone Ltd
Adani House,
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Gujarat, India
CIN: L63090GJ1998PLC034182

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info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
	same to this Department after having it vetted through the Indian Coast Guard.	the floor washing will go to collection pit for further treatment. c) Floating booms should be placed along the berths to trap any coal particle which may fall over ocean surface due to high wind velocity.	attached as **Annexure – 7**. • Earlier, cargo was unloaded from grab sampler unit to conveyer system though hopper system with the height. Now, it is adhered to unload the cargo with minimum height to prevent such cargo spill into sea as well as on jetty. • The construction of toe wall on jetty edge as well as fixing of green curtain between the edge of jetty & vessel are being ruled out because of the obstruction from the vessel gang way, tiding of vessel to berth and very limited narrow space between the jetty edge and rail track of GSU. However, the team along with the Marine guys are exploring the possibility of coming up with patch toe walls as well as fixing of green curtains and that will be implemented as and when it is finalized. • APSEZ is exploring the possibilities to connect all the outlets of jetty to dump pond through pipeline in consultation with marine and operation team. The same will be implemented once it is feasible. b) APSEZ does not carry any jetty washing activity through water. • APSEZ has a dedicated housekeeping staff with a mechanized system. APSEZ is doing regular housekeeping with mechanized sweeping machine on jetty facility and the cleaning frequency has also been increased especially during vessel operations. • APSEZ is providing green curtain filters on jetty outlet gradually to

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Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
			drain rainwater into the sea during monsoon. Photographs showing the same are attached as **Annexure – 8**. • APSEZ will also explore the possibilities to install filter mechanisms into the water outlets provided at jetty before discharging rainwater into the sea during monsoon in consultation with marine and operation team. The same will be implemented once it is feasible. • Regular awareness is being done with the housekeeping staff to educate / aware them for proper housekeeping & collection of spill coal particles from jetty area including shoulders. Photographs of the awareness programme are attached as **Annexure – 9**. c) APSEZ is ensuring that there is not any coal spillage occurring into the sea during operational activities. Above mentioned mitigation measures are being taken / will be taken by APSEZ to abate the cargo spillage into the sea. • APSEZ is also exploring the fixing of floating booms along the berths to trap any coal particle which may fall over ocean surface due to high wind velocity in consultation with marine team. It will be implemented once feasible.
5.	**General Observations** Wind breaking wall installation.	Wind break and dust suppression wall should installed in a time bound manner. During the time of inspection, it was under installation.	**Complied / Agreed to comply.** APSEZ has already installed a wind breaking wall having 16m height at the west port area in the year 2016. However, it was partially damaged during the heavy cyclone "Biparjoy" in the month of June 2023.

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Sr. No.	EC & CRZ Clearance Condition	Remarks from IRO, MoEF&CC	APSEZ's Action Taken / Action Plan
			After that, APSEZ has already awarded work for refurbishing of damaged part of wind breaking wall. During the site visit it was also verified by IRO officials that refurbishing work was in progress. The same will be completed by the month of June'2024. Photographs showing installed wind breaking wall and ongoing refurbishing work are attached as **Annexure – 10**.

Requested to kindly consider our submission for further consideration and acknowledge the same.

Thanking you,
Yours Faithfully,

For, Adani Ports and Special Economic Zone Limited

Dr. Anil Kumar Trivedi
(Head – Environment)

Encl. As Above

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
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www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

ANNEXURE – 1

UNDERTAKING FOR MANGROVE MONITORING

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UNDERTAKING

I, Dr. Anil Kumar Trivedi son of Late Shri Rajkumar Sharma, age 45-years Head – Environment of Adani Ports and SEZ Limited having its registered office at Adani Corporate House, Shantigram, Near Vaishnodevi Circle, S G Highway, Ahmedabad-382421, Gujarat hereby undertake as mentioned below:

- APSEZ is carrying out mangrove monitoring in and around creek of APSEZ, Mundra at every 2 years in compliance with recommendations of approved mangrove conservation plan.
- APSEZ has carried out last mangrove monitoring through M/s. Gujarat Institute of Desert Ecology (GUIDE), Bhuj for the year 2021 (till March). Report has submitted along with half yearly EC compliance report.
- APSEZ agreed to conduct a mangrove monitoring survey through NCSCM (once agreed) / any other reputed organization for the year 2023.
- Mangrove monitoring study report carried out through reputed organization will be submitted to concerned regulatory authorities for their interpretation and recommendations if any.
- All the above-mentioned information is correct to the best of my knowledge.

For, Adani Ports and SEZ Limited

Dr. Anil Kumar Trivedi
Head – Environment

Date: 1st April, 2024

Adani Ports and Special Economic Zone Ltd
Adani House,
PO Box No. 1
Mundra, Kutch 370 421
Gujarat, India
CIN: L63090GJ1998PLC034182

Tel +91 2838 25 5000
Fax +91 2838 25 51110
info@adani.com
www.adani.com

Registered Office: Adani Corporate House, Shantigram, Nr. Vaishno Devi Circle, S.G. Highway, Khodiyar, Ahmedabad – 382421, Gujarat, India

ANNEXURE – 2

MANGROVE MONITOIRNG REPORT – GUIDE

Final Report

Monitoring and Distribution of the Mangroves Along the Creeks in and Around APSEZ, Mundra, Kachchh, Gujarat

Submitted to:

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

Submitted by: -

Gujarat Institute of Desert Ecology
P.O. Box # 83, Opp. Changleshwar Temple,
Mundra Road, Bhuj,
Kachchh-370001, Gujarat

November- 2023

Project Personnel

Project Co-Ordinator

Dr. V. Vijay Kumar, Director

Principal Investigator

Mr. Dayesh Parmar, Project Officer

Co-Principal Investigator

Dr. Kapilkumar Ingle, Project Scientist

Team Member

Mr. Deep Dudiya, JRF

Mr. Raj Joshi

Mr. Arjan Rabari

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1. INTRODUCTION

The Kachchh district of the Gujarat State is located between latitude 23.13°-24.68°N and longitude 68.10°-71.80°E, encompassing an area of 45,612 km2. The coastal stretch of the district constitutes the entire northern coast of Gulf of Kachchh (GoK) which is one of the three major Gulf systems in India and is endowed with high biological diversity along with physical and chemical peculiarities. Kachchh coast constitutes about 25.37% and 5.3% of the coastal stretch of Gujarat and India respectively. In spite of its high aridity (4 in a scale of 1- 4) along with scanty and erratic rainfall with an annual average of 520.9 mm (1988-2017). 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 its natural resources. Besides, extensive mangrove formations and a vast continental shelf of 1,64,000 km^2 facilitates a rich fishery resource.

Kachchh coast supports the mangrove extent of 798.74 km^2, constituting 68% of state's mangroves (1175 km^2) which is the largest mangrove entity in India's western coast as per Forest Survey of India 2021 (FSI report 2021). Due to the presence of rich natural resources and favourable natural conditions, Kachchh coast has become a zone of intensive industrial development. Since late 1990's, industrial development is being promoted aggressively in view of its very rich mineral deposits, shortest sea route to Gulf countries and easy availability of land which is at premium in other coastal regions of the state. Announcement of tax holidays during the post-earthquake in 2001 by the state government has provided further impetus for coastal industrial development. Many of these developments are beginning to have implications on ecological, social and economic spheres. Kachchh coast faces threats from climate change, pollution and habitat changes which are also important to understand the impacts on the mangroves.

Adani Port is one of the fastest growing and largest private ports in the country and also encompassing a SEZ (Special Economic Zone) area. The port in year 2013-14 has handled >100 million tons of cargo. The port is equipped with road, rail and air connectivity which has attracted few big and many small industries of this area.

On the other hand, the area also harbours a luxuriant mangrove forest which is very close to the Port and SEZ.

1.1. 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 during the year 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 and its associated infrastructure facilities. In addition to these, port-based special economic zone and two thermal power plants exists which form a major industrial cluster of this coast.

1.2. Origin of the Study

The northern Gulf of Kachchh in the western coast of India has extensive formation of mangrove. Ministry of Environment, Forest and Climate Change have accorded Environment and CRZ Clearance (EC) vide Letter No. F.No.10-138/2008-IA.III dt. 15th July, 2014 & 12th February, 2020 to M/s Adani Ports and Special Economic Zone Ltd (APSEZ), to set up a multi-product SEZ at Mundra, Kachchh, Gujarat. The project involves development of SEZ in a notified SEZ area of 8481.2784 ha. Adani Ports and Special Economic Zone Ltd. (APSEZL) covering a total area of 9625 ha, over and above 10,000 ha including port and its back-up area.

While issuing the Environmental Clearance (EC) to the project, the MoEF & CC have stipulated General and Special conditions in their Environment Clearance. Further,

inline to the MoEF&CC final order, vide F.No.10-47/2008-IA.III dated 18th Sept. 2015 which also contained special conditions, two of which (sr. no *iv* and *v* of the order) are as follows:

(iv) 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 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 the 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 Baradi mata 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 of the implementation will be carried by NCSCM.

Accordingly, Adani Ports and Special Economic Zone Limited (APSEZ) had requested the National Centre for Sustainable Coastal Management (NCSCM) for preparation of

Comprehensive and Integrated plan for preservation and conservation of mangroves and associated creeks. The components of plan are analysis of mangrove health by comparing the coverage between 2011 and 2016, bathymetry of creeks, socio-economics of villages adjoining creeks of APSEZ. One of the key recommendations is monitoring of coverage of mangrove in the late 2019 and comparing its extent of distribution with the data reported in 2016-17. As per reported in the Conservation plan there has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. It was recommended that the trend of mangrove cover needs to be studied in Jan/March

2020 using satellite images of late 2019 and if the trend continues, only monitoring is needed. The Conservation plan was submitted to the Gujarat Coastal Zone Management Authority and in its meeting held in October, 2019, then plan was approved as per their email dt 22nd Sept 2020. The major recommendation relating to mangroves that were specified in the conservation plan are as follows:

2.1. There has been overall increase in mangrove area by 246 ha in 2016-17 in the creeks in and around APSEZ compared to 2011 indicating existence of near healthy conditions for growth of the mangroves. No action is needed at present except at Navinal creek, Bocha island and off Bocha creek. The trend of mangrove cover needs to be studied in Jan/March 2020 using satellite images of late 2019 and if the trend continues, only monitoring needed. The tidal range in the mangroves is also to be observed annually using tide poles to ensure that the flow of tidal water remains same as observed in April 2017 during the field study. If degradation of mangroves to the extent of 10% due to inadequate seawater is observed in Kotdi and Baradimata creeks, initially the mouth areas need to be made free from silt. If tidal flow does not improve after one year and if the extended banks are noticed which might be due to siltation, silt need to be removed on the banks where there are no mangrove roots. If the tidal conditions still do not improve after one year, the interior parts of the creeks need to be dredged in a phased manner from 0.5 m to 1 m. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs tobe implemented.

2.2. In the Navinal creek, if degradation of mangroves or reduction of mangrove cover by even 10% is noticed in 2020 due to decrease in tide water flow, dredging of Navinal creek from beyond port operation areas up to 4.5 km to increase the depth by 1 m in a phased manner must be taken up to facilitate increased tidal water flow into the mangrove areas of Bocha island. Otherwise, the monitoring of mangrove needs to be carried out once in two years and whenever, degradation is noticed the above strategy needs to be implemented.

In view of the above, Adani Ports and Special Economic Zone Ltd. (APSEZL) has approached M/s. Gujarat Institute of Desert Ecology (GUIDE) to conduct a detailed study of the mangrove coverage using the satellite images of 2021 and also the changes in the mangrove areas of APSEZ between 2019 and 2021. In order to comply with the above recommendations relating to monitoring of mangrove, the plant distribution in the creeks in and around APSEZL, Mundra, Gujarat with the following objectives were formulated.

1.3. Objectives of the Study

1. To map the current extent of mangrove cover and its changes in comparison to 2021 data, through GIS and RS in the APSEZ area.
2. To assess and monitor the changes in the mangrove cover between 2019 and 2021 by using RS and GIS in the APSEZ area.
3. LISS-IV (MSS) ortho rectified imagery data will be used for the mangrove mapping study.
4. Monitoring of mangrove density in the APSEZ area at Mundra through assessment of the vegetation cover in the area.
5. Formulating an appropriate management plan based on the results for the sustained well being and conservation of mangroves in APSEZ area, Mundra.

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 Mangrove cover of the Mundra taluka is about 19.1 km^2 distributed mostly along the creek systems. The coastal stretch of Mundra is dissected by extensive mudflats and creek systems, many of which harbour good mangrove formations. Major creek systems in the area are Navinal, Bocha, Baradi mata and Kotadi creeks. These creeks again divide into minor creek complexes. Many of these creeks support mangrove stands, especially along the eastern and western side of the waterfront area of APSEZ. Koylavali creek is luxuriantly lined by mangrove patches, predominantly with the species, *Avicennia marina*. The Adani Port and Special Economic Zone Ltd.-APSEZ is located at about 3 km from Bacha mouth towards eastern extension. The present study was focused towards the mangrove stand at Bocha / Navinal creek, Kotdi creek, Baradi Mata creek and Khari creek adjoining to the waterfront area of APSEZ which falls within the conservation zone of APSEZ (Figure 2.1) that earmarked as conservation zone.

Bocha/Navinal and East of Bocha Mangrove Stand

Bocha Island is a finger like projection surrounded by the Bocha creek on the west and Navinal creek on the eastern part. The Adani/MICT container terminal is located right across the Bocha Island at a distance of 100m. The island supports mature and healthy mangrove stands.

Kotadi and Baradi mata

Kotadi and Baradi mata creek systems on the western part of APSEZL area include luxuriant mangrove patches. These two creeks bifurcate further at their tail end into several minor creeks forming a complex water way with many small Islands. Many of these Islands harbour healthy mangrove stands.

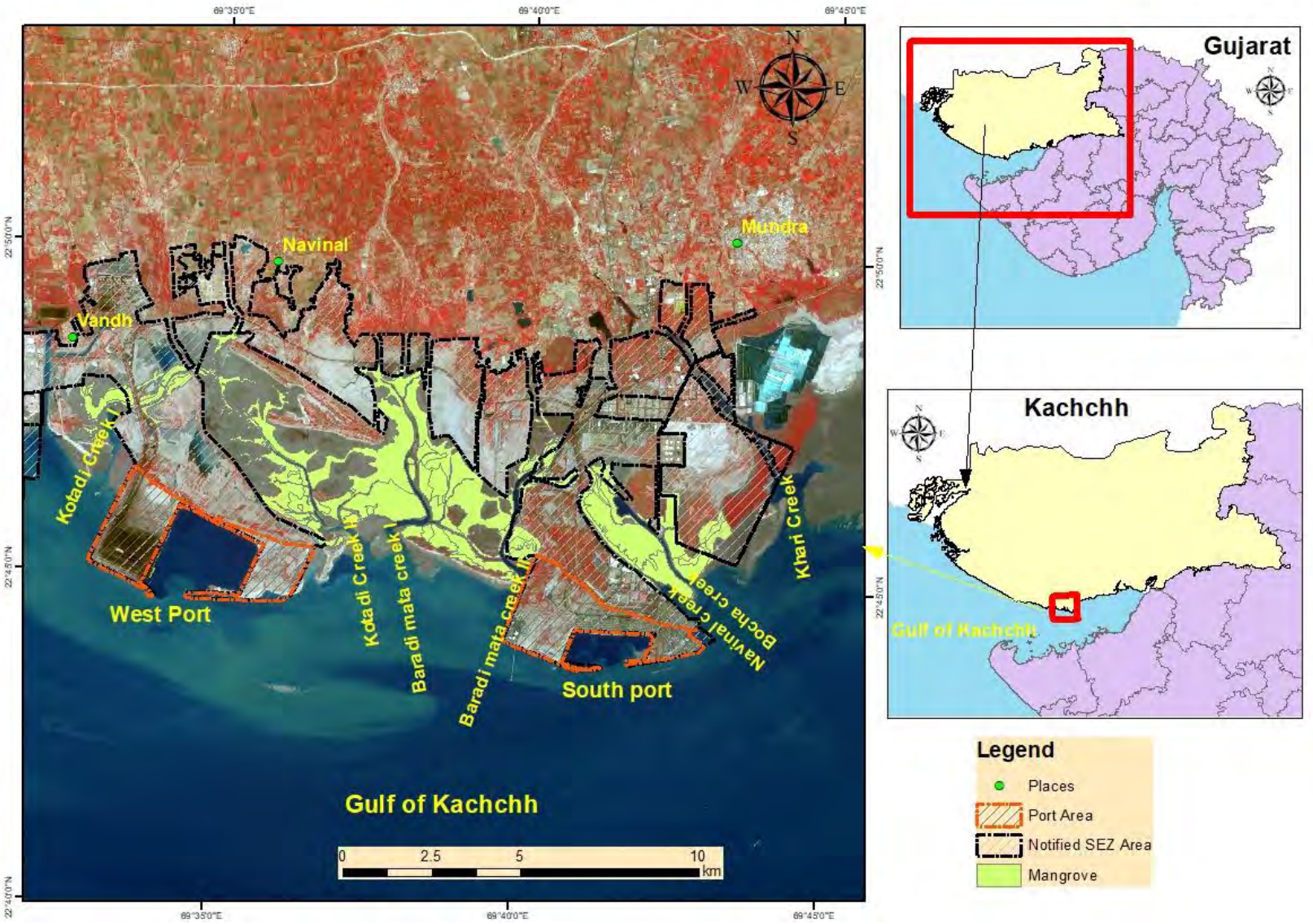


Figure 2.1: Location Map of The Study Area

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 generally poor, ranging from 250-350 mm which is often irregular. However, the mean annual rainfall during 1932 to 2021 was higher at Mundra (407 mm) comparing to other coastal talukas of Kachchh district due to good rainfall during the last 3-4 years. 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).

2.2.1. Tidal Regime

Tides at Mundra are the mixed type, predominantly semi-diurnal 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 hence high density. In the absence or minimum of freshwater inflow, the salinity varies from 35.9 to 38.0 ppt.

Due to its arid nature, annual rainfall in Kachchh is generally poor, ranging from 250-350 mm which is often irregular. However, mean rainfall (1932 to 2001) was higher at Mundra (407 mm) due to very good rainfall during the last 3-4 years. Except very good rainfall years, freshwater input into the near coastal waters is quite low and appears to influence coastal flora like mangroves explaining poor floral diversity. Annual temperature fluctuation in the district is extreme, ranging from 7- 47^oC with a yearly average humidity of 60% which increases to 80% during south-west monsoon and decreases to 50% during November-December. The phenomenon of drought is common, with 2 drought years in a cycle of 5 years.

3. METHODOLOGY AND DATA USED

Basic approach for the present exercise was identification of the threats and pressures on the mangrove ecosystem.

3.1. Methodology

Satellite imageries were procured from National Remote Sensing Centre (NRSC) who are the only authorized distributor of satellite images in India, for availability of high-resolution satellite imagery especially multi-spectral images similar to the images used to study the mangrove distribution. The present report on mangrove distribution is based on LISS IV satellite images of March 2019 and March 2021, as cloud free images. The details of the satellite imagery used for the present study are given below (Table 3.1). The methodology adopted to map the distribution of mangroves is by NDVI method using ERDAS Software by using satellite images which delineate vegetation and non -vegetation data. Further, based on the Ground truthing, colour and tone of satellite data of the mangrove and other vegetation are delineated by using manually digitizing on the computer screen. Further, it has limitations as it is not a direct digital data and the mangroves details are obtained from satellite images by directly digitizing from the computer screen.

The categories of mangrove cover as dense, sparse and scattered area evaloved based on the percentage of mangrove cover in the study area. The percentages used for different classes are dense mangrove (40-70% cover), sparse mangrove (10-40% cover) and scattered mangrove (< 10% cover) (Kathiresan, K. (2022). There could be a possible error of less than 10 % in mangrove categorization (as dense, sparse and scatter) and also extent of total coverage in terms of hectare.

3.2. Data Used

The Multi-date satellite LISS-IV imageries, were procured from NRSC, Hyderabad, was used for the analysis of the present study.

Table 3.1: Satellite Data for Mangrove mapping procured from NRSC

Satellite	Date	Sensor	Resolution (m)
IRS-R2	23 March 2019	LISS -IV	5.8
IRS-R2A	19 March 2021	LISS -IV	5.8

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

Radiometric Correction: The 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: The Geometric correction addresses errors in the relative positions of pixels. These errors are induced by the sensor viewing the 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.

3.3. Zonation

Zoning of the Study Area: Considering the extent of the area, the whole Mundra mangrove formation was divided into smaller zones in order to facilitate better evaluation and understanding of the ecosystem. Moreover, this kind of zoning helps to analyse the root cause of the issues, enabling better understanding of the ecosystem level problems. Accordingly, Mundra coast was divided into four zones as indicated below for the purpose of this study;

Zone 1: Bocha-Navinal creek Zone (The Island proper and areas in and around Adani house and between Bocha and Navinal creek)

Zone 2: Baradi mata creek zone (Creek's west of south port to surrounding to Baradi mata temple)

Zone 3: Kotadi creek Zone (Creeks surrounding to West Port)

Zone 4: Khari creek Zone (Area both the side of Khari creek)

Representative study points covering all the zones were studied on ground and documented for status, Figure 3.1 shows the earmarked zones in the study area.

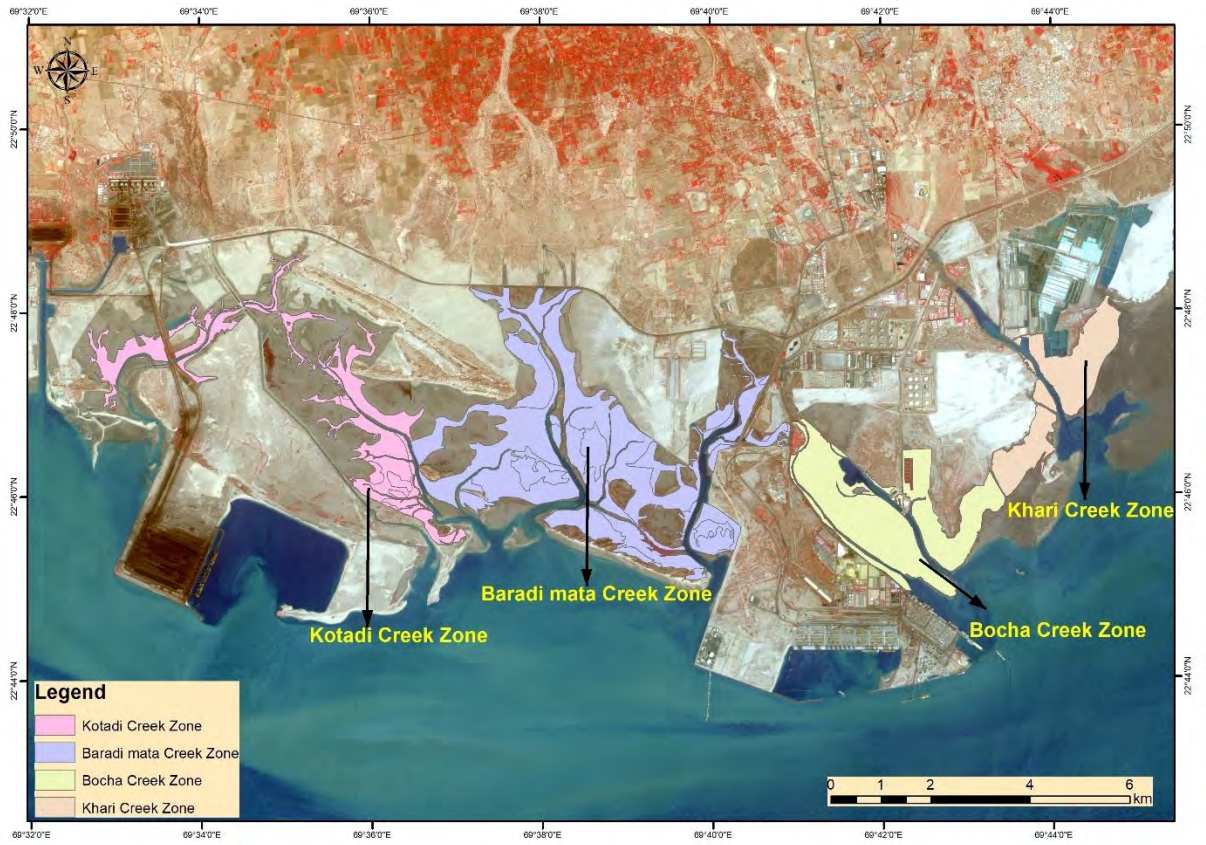


Figure 3.1: Study Area in Four Different Zone

3.4. Mangrove Vegetation

The survey area of APSEZ was divided in the three zones for the survey. During the survey of the mangroves in these three areas, the density and diversity of mangroves in prefixed sites was carried out. The selected sites were located in the intertidal belts and the adjacent estuarine environment of APSEZ area. The major part of assessment was done during low tide of the project sites. The density of the

tree class along with the regeneration and recruitment classes were recorded from the study area. In general, plants or seedlings with a height <50 cm were considered as regeneration class and those are in between 50 cm to 100 cm as recruitment class. For regeneration class, 1 m × 1 m and for recruitment class plants, 2 m x 2 m quadrates were used randomly for the measurement. For mature plants, 10 m x 10 m quadrate was used at the selected sites. The mature plants with height more than 100 cm and girth more than 7 cm were considered as trees. The equipments utilized in this study were user-friendly and easy to carry such as ranging rods, pipes, measuring tape, rope, etc.

Figure 3.2: Mangrove Data Collection During Field Visits

3.5. Field Work

Field investigation is a vital part of the project. Fieldwork helps to check and collect most of the ground information required for mangrove mapping. The reconnaissance field survey had been undertaken to get acquainted with the general patterns of vegetation of the area. The variation and tonal patterns had observed on existing images. Traverses along all dense mangrove, sparse mangrove, scatter mangrove and major creeks have been noticed and were considered for collecting ground truth data between maps/images and on the ground. The fieldwork was conducted during the period between 03rd to 07th July 2023; 11th to 16th September 2023 and 16th to 20th October 2023 for collecting ground truthing data to cover the entire APSEZ area.

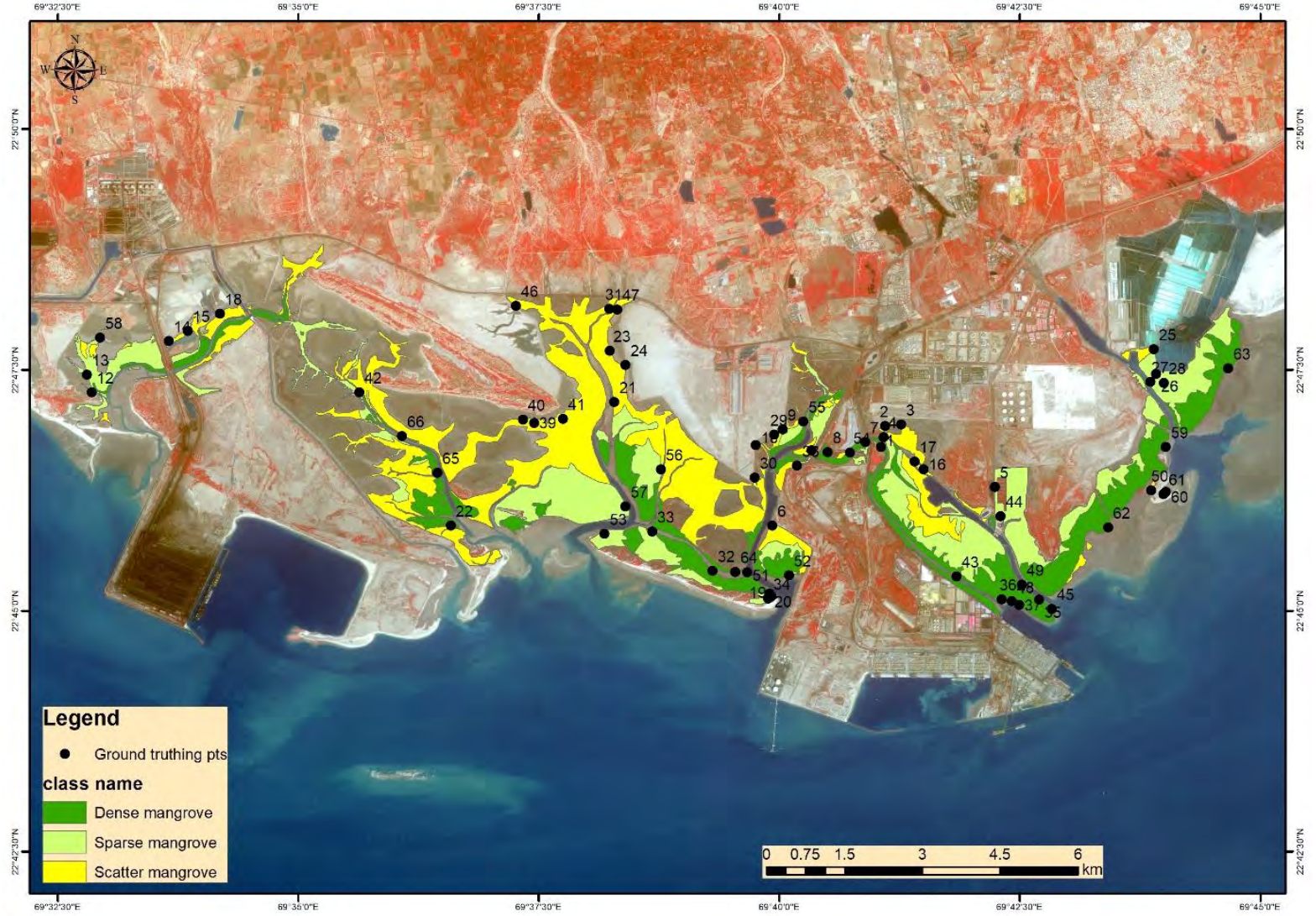
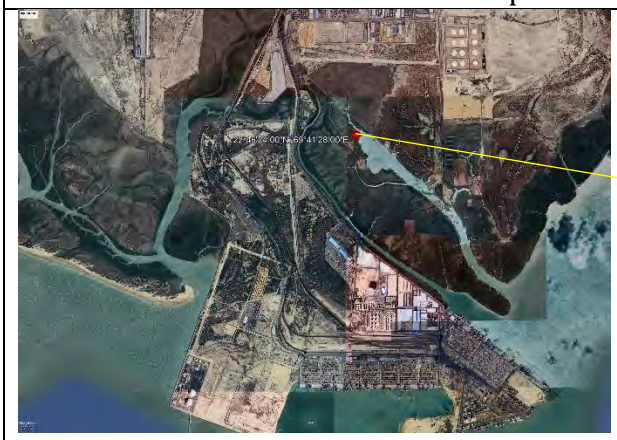
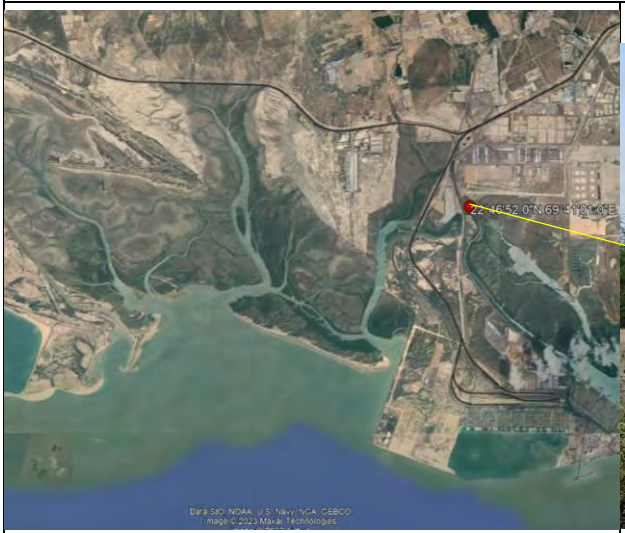


Figure 3.3: Ground Truthing Data and Mangrove Data Collection Points

Kotadi Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

Baradi mata Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

Bocha-Navinal Creek Block	
Dense Mangrove	
	
Sparse Mangrove	
	
Scattered Mangrove	
	

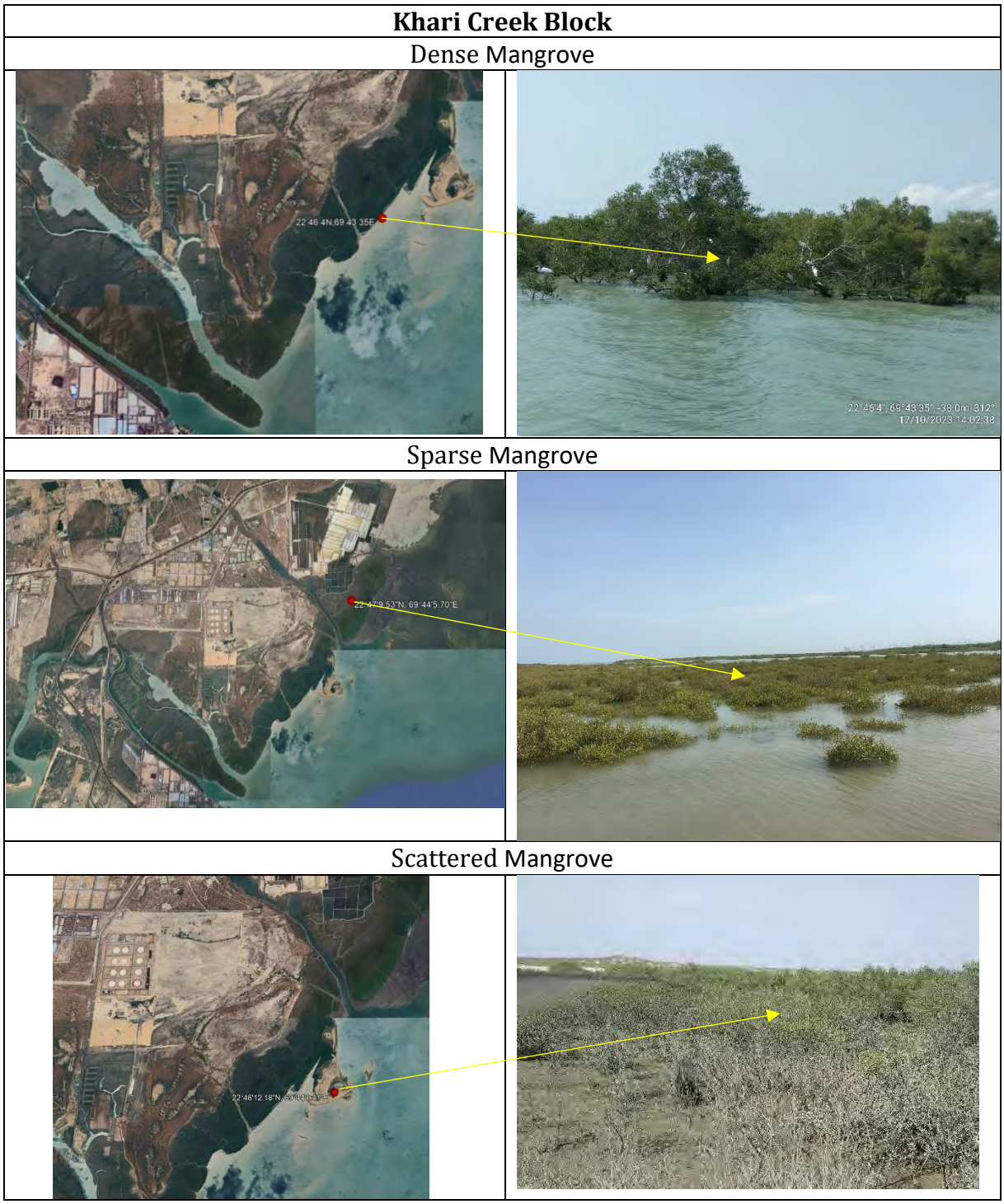


Figure 3.4: Surveyed and Collected Ground Truthing Data Various Categories of Mangroves

4. RESULTS AND ANALYSIS

The Kotadi, Baradi mata, Navinal, Bocha-Navinal and Khari creeks experience high tidal ranges up to 6m and with average tidal range of 2 to 4.5m which varies annually. The creeks have mangrove formation due to muddy substratum and the mangroves are tide fed and tidal flow into the mangroves occurs only during high tide. This makes the mangroves as intertidal one and any change of tidal conditions in the creeks affect the growth and distribution of mangroves. Distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images (2019 March and 2021 March).

4.1. Overall APSEZ Mangrove Assessment

Mangrove areas are known to vary over time and may be mixed with associate vegetation. However, by analysing the colour and tone of multi-spectral high-resolution LISS IV (5.8 m spatial resolution) satellite data and extensive ground truthing survey data in each block of the study area, mangrove coverage could be more accurately estimated. The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670.08 ha which has increased to 2722.87 ha during the year 2021 (Table 4.1). This indicates that the mangrove and the tidal system in the creeks were not adversely affected by any anthropogenic or natural disturbances during this period. The analysis of the data revealed that the dense mangrove category has increased by 3.01 ha (0.11%) due to sparse mangrove converted to dense mangrove, while sparse mangrove category has increased by 45.90 ha (1.7%) which is mainly due to the conversion of scattered mangroves into sparse mangroves. The scattered mangrove category has also showed an increase by 3.88 ha (0.14%), which is suggesting the recruitments and regeneration of mangroves in the area. The changes in the mangrove cover are summarized in Table 4.1and Figure 4.3.

Table 4.1: Distribution of Various Categories of Mangroves in APSEZ During 2019 and 2021

Class	Area (ha)		
	2019	2021	Change
Dense Mangrove	706.02	709.03	3.01
Sparse Mangrove	927.31	973.22	45.90
Scattered Mangrove	1036.74	1040.62	3.88
Total	2670.08	2722.87	52.79

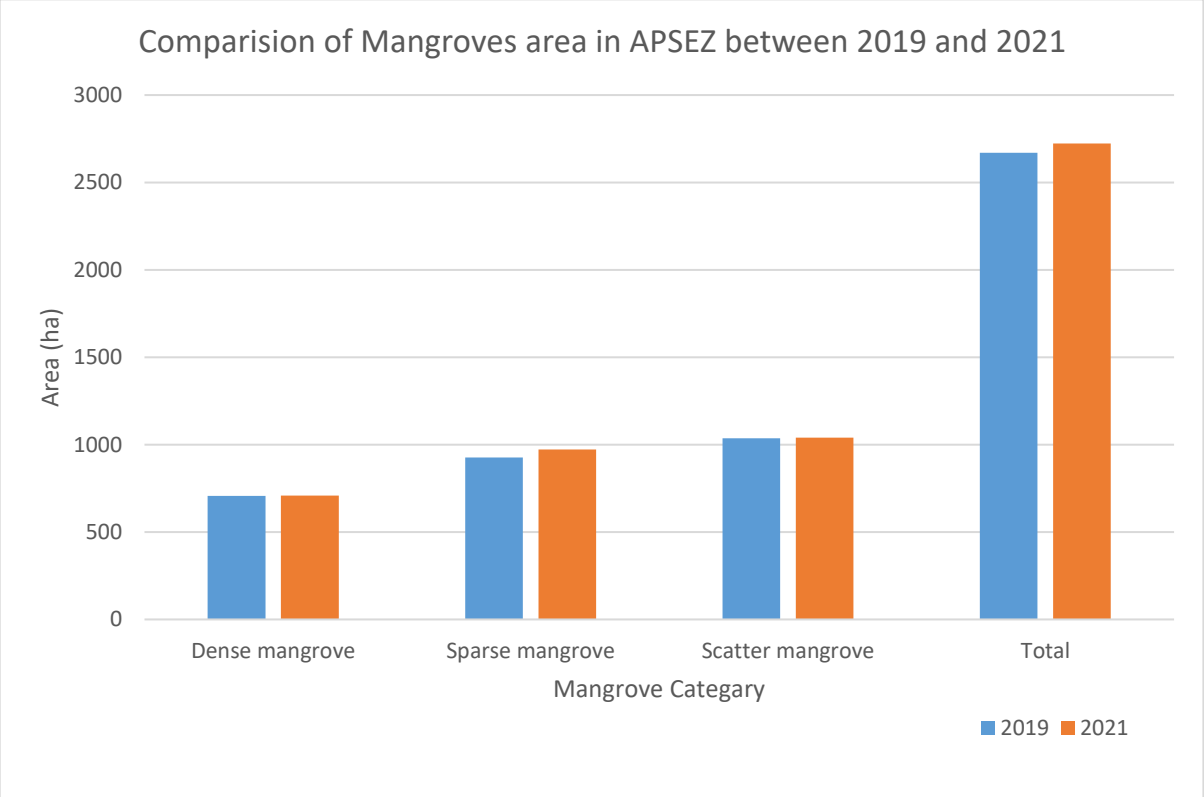


Figure 4.1: Comparison of Various Categories of Mangroves in APSEZ Between 2019 and 2021

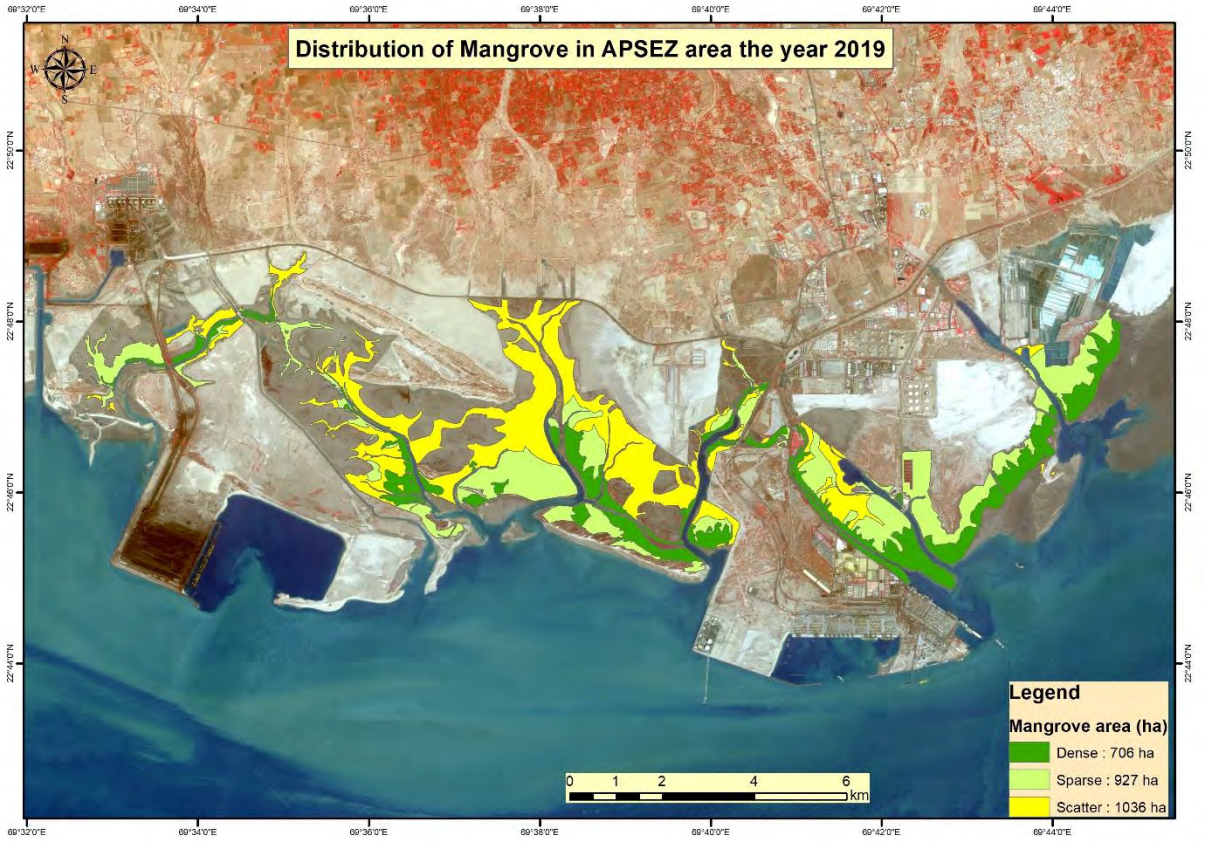


Figure 4.2: Distribution of Various Categories of Mangroves in March 2019

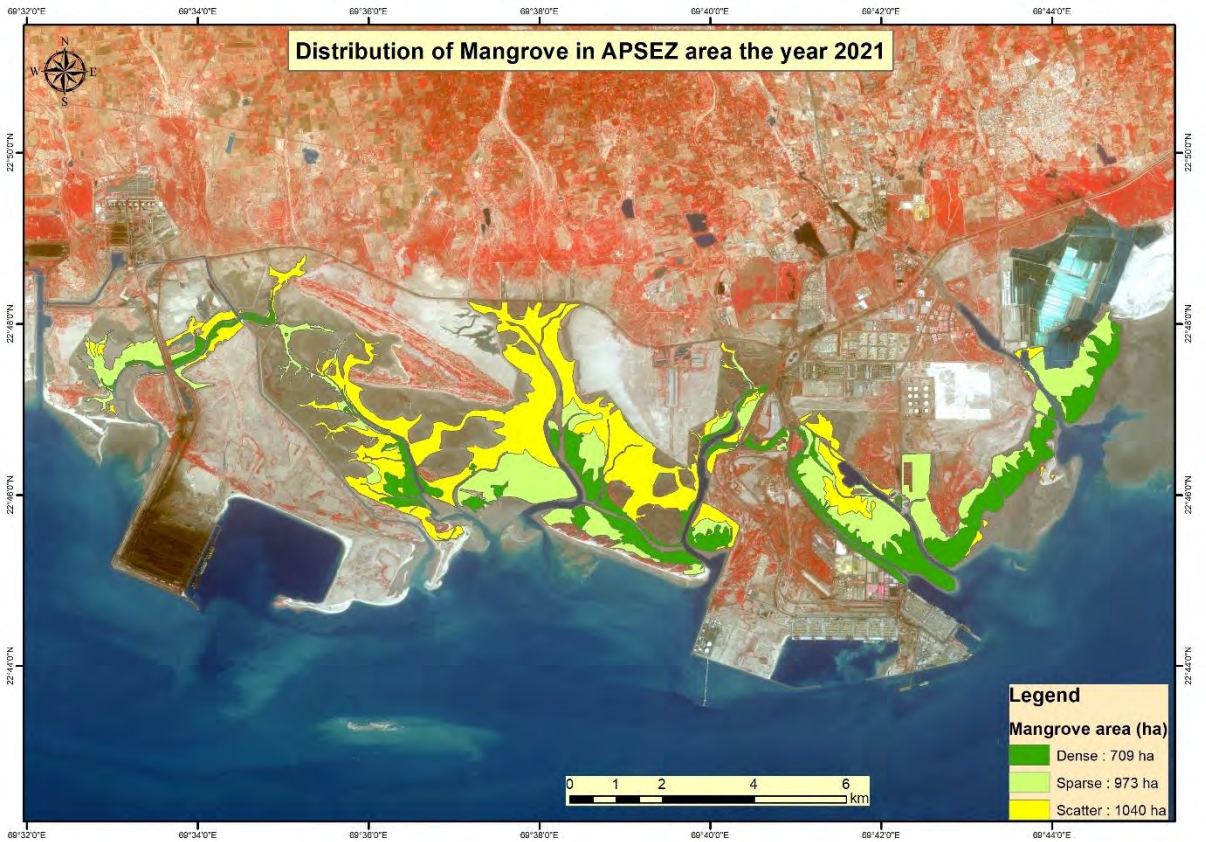


Figure 4.3: Distribution of Various Categories of Mangroves in March 2021

4.2. Creek Wise Assessment

4.2.1. Kotadi Creek Area

The study site Kotadi creek, which has two mouths: Kotadi-I on the western end of west port of Adani and Kotadi-II located east of Kotdi-I. The tidal flow reaches up to 4.5 km in Kotadi-I and up to 7.4 km in Kotadi-II during high tide periods. The mangrove cover at these sites were compared for the period, during March 2019 and March 2021 using satellite images and field surveys. There are three categories: dense, sparse, and scattered mangroves and it was found that the total mangrove area increased by 21.43 ha (4.1%) from 2019 to 2021 (Table 4.2). The dense category increased by 0.3% (1.78 ha), while the sparse category increased by 39.71 ha and the area of scattered category decreased by 20 ha (Figure 4.4 to Figure 4.7) from the 2019 imagery. These results indicate that the mangroves in Kotadi creek are healthy and benefited from the regular tidal flow. The decrease in the area of the of scattered category and increase of sparse are due to natural transitions in mangrove growth stages, from scattered to sparse category.

Table 4.2: Distribution of Various Categories of Mangroves in Kotadi Creek Zone During 2019 and 2021

Class Name	Area(ha)		
	2019	2021	Change
Dense Mangrove	98.12	99.89	1.78
Sparse Mangrove	166.21	205.92	39.71
Scattered Mangrove	255.01	234.96	-20.05
Total	519.34	540.77	21.43

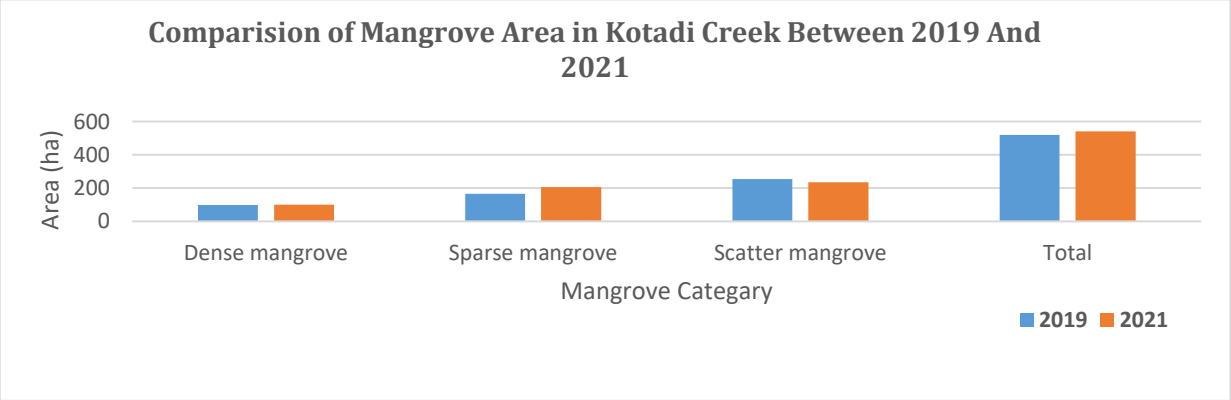


Figure 4.4: Comparison of Various Categories of Mangroves in Kotadi Creek Zone Between 2019 and 2021

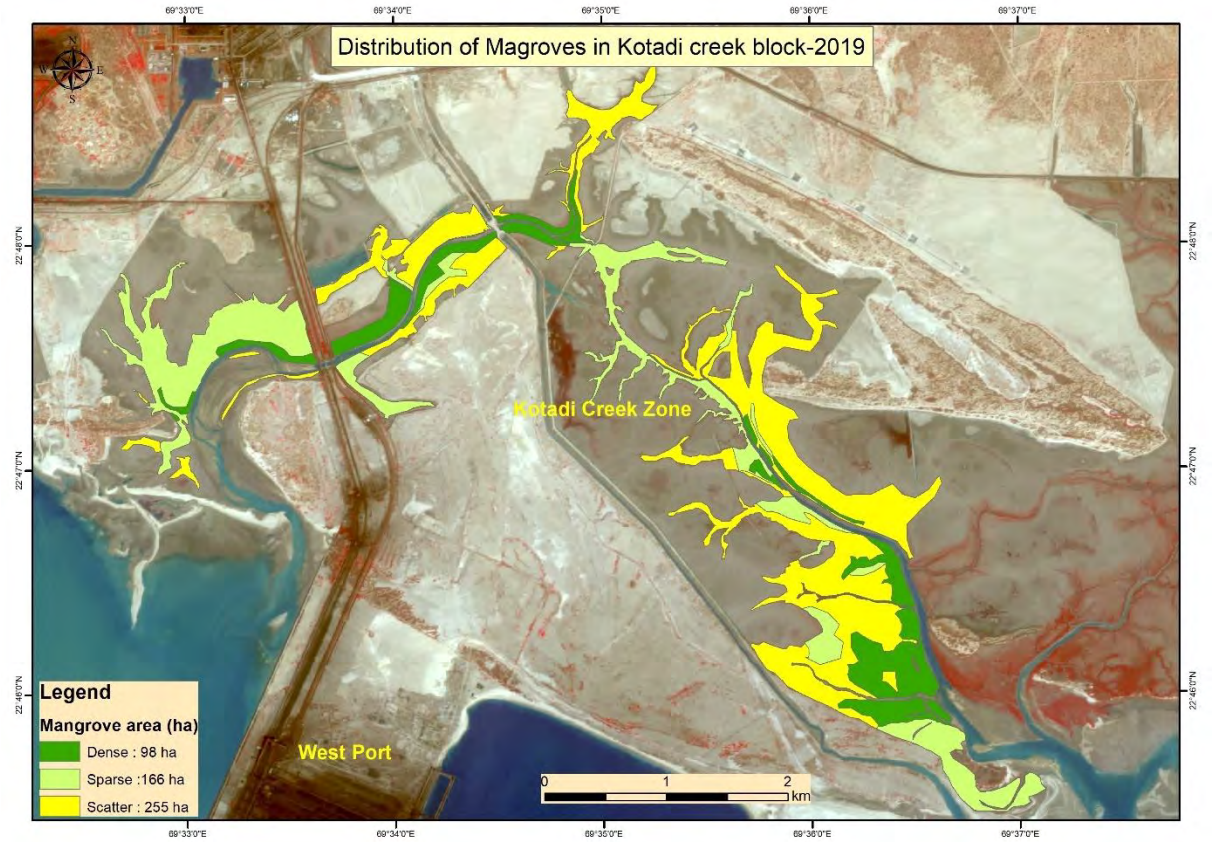


Figure 4.5: Distribution of Mangroves in 2019 in Kotdi Creek Zone System.

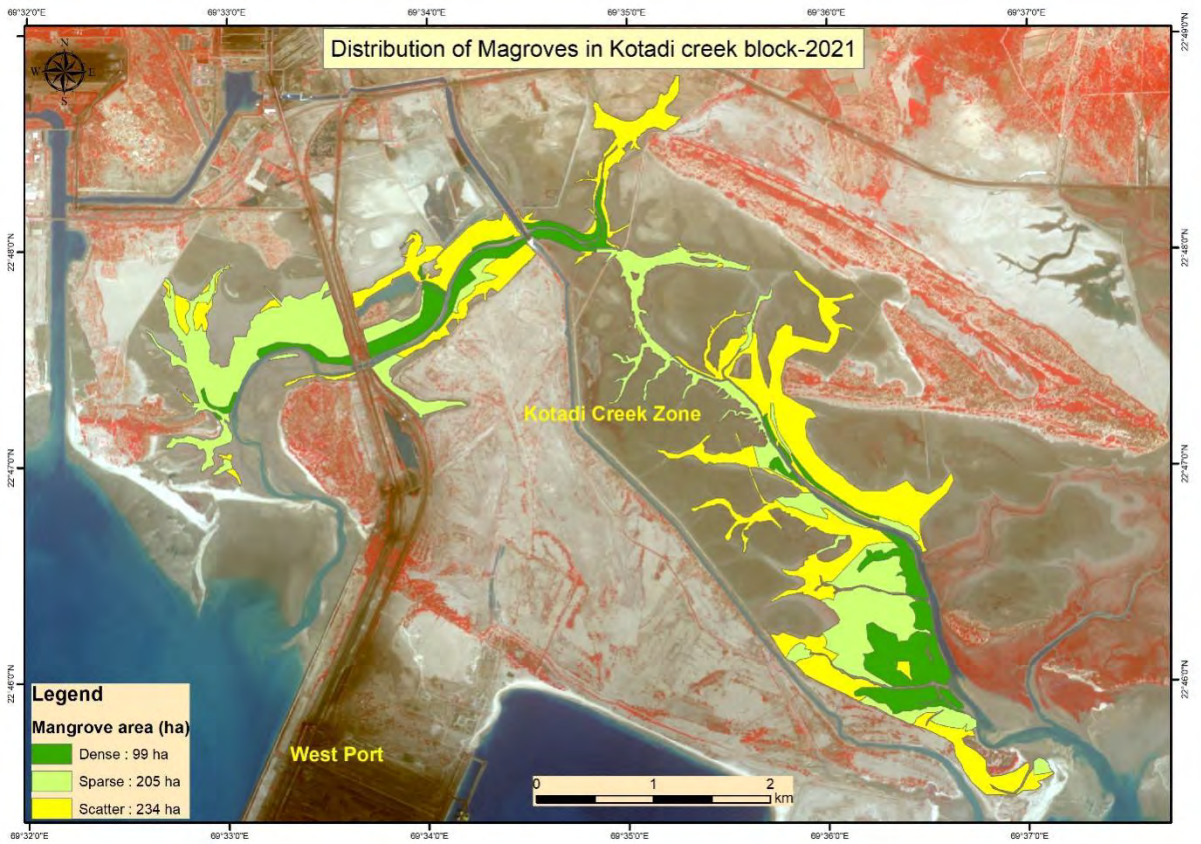


Figure 4.6: Distribution of Mangroves in 2021 in Kotdi Creek Zone System.

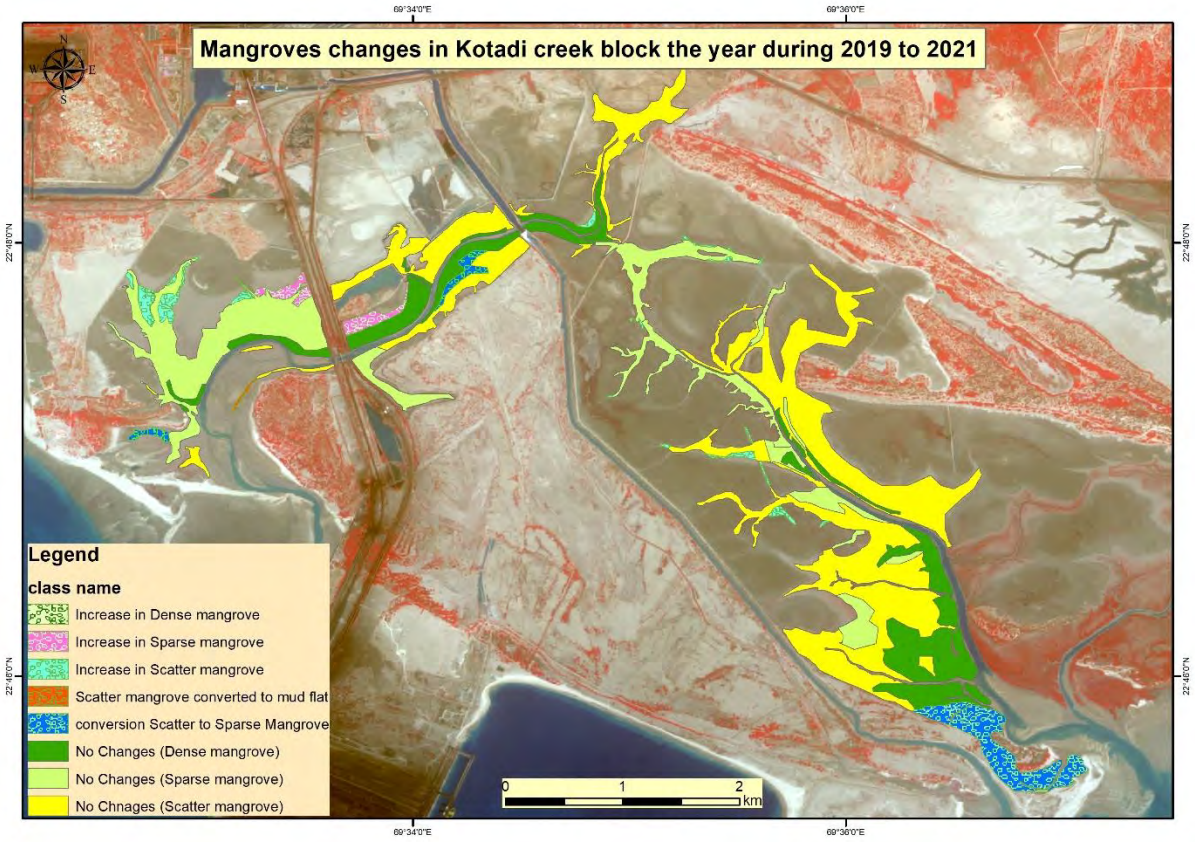


Figure 4.7: Change Analysis from 2019 to 2021 on Categories of Mangroves in Kotadi Creek System

4.2.2. Baradi mata Creek area

This creek remains uninfluenced by human interventions except for navigation by the fishing community from the nearby villages. The status (growth cover) of the mangroves was assessed between 2019 and 2021 and the results are shown in (Table 4.3 and to Figure 4.11). The comparative study of the images revealed the overall improvement in mangrove coverage to the extent of 15.91 ha (1.2% increase) mostly with formation of new mangroves in the form of scattered mangroves with minor inter-conversion in categories of sparse to dense, The data on mangrove distribution has showed an increase from 2019 to 2021 especially improvement to higher categories (i.e., from scattered to sparse and further to dense) and also the formation of new mangroves was also significant. These results lead to infer that the mangroves in the creek are in a healthy condition with normal regular tidal flow.

Table 4.3: Distribution of Various Categories of Mangroves in Baradi Mata Zone Creek During 2019 and 2021

Class Name	Area (Ha)		
	2019	2021	Change
Dense Mangrove	245.22	245.94	0.72
Sparse Mangrove	344.83	345.92	1.09
Scatter Mangrove	683.76	697.86	14.10
Total	1273.81	1289.72	15.91

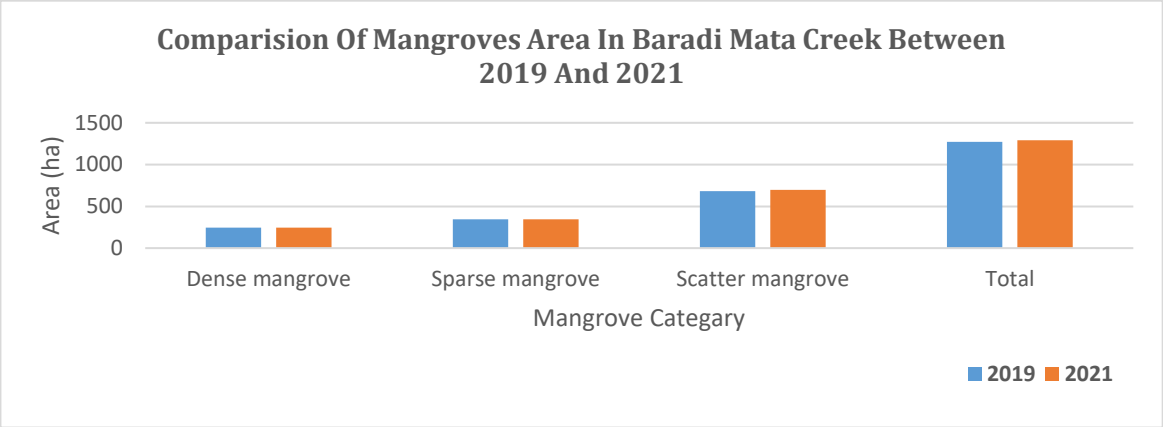


Figure 4.8: Comparison of Various Categories of Mangroves in Baradi Mata Creek Zone Between 2019 and 2021

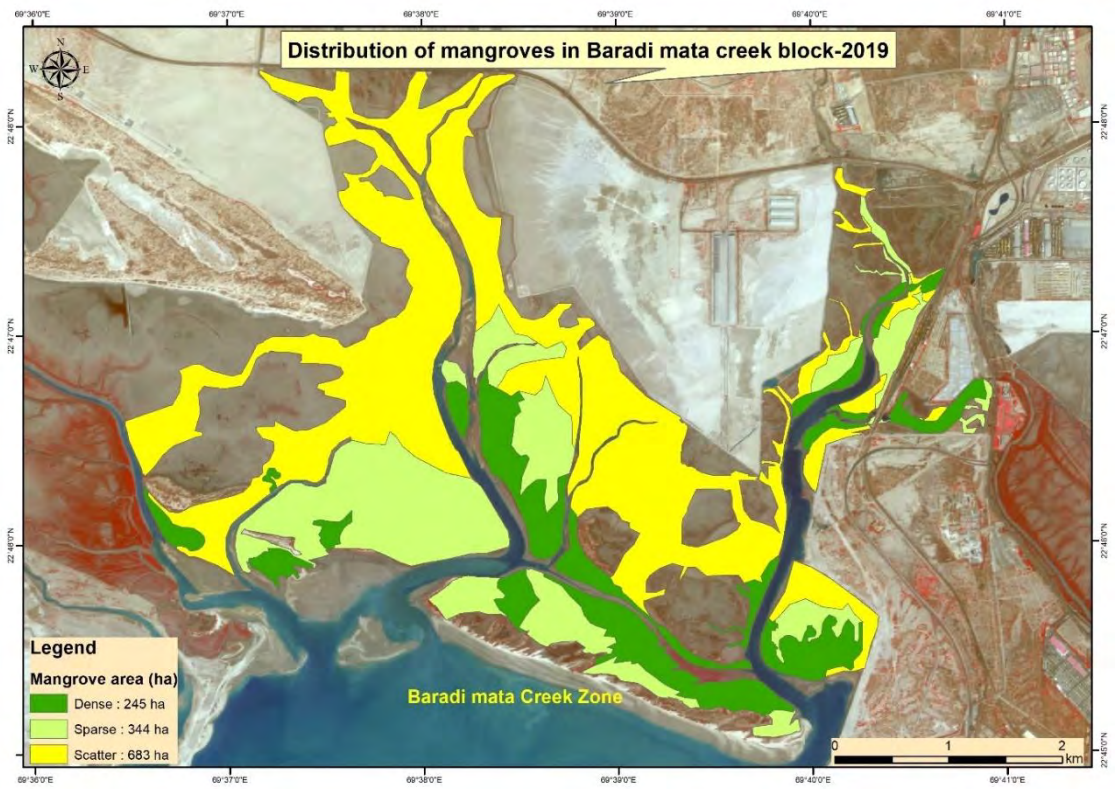


Figure 4.9: Distribution of Mangroves at Baradi Mata Creek Zone in 2019

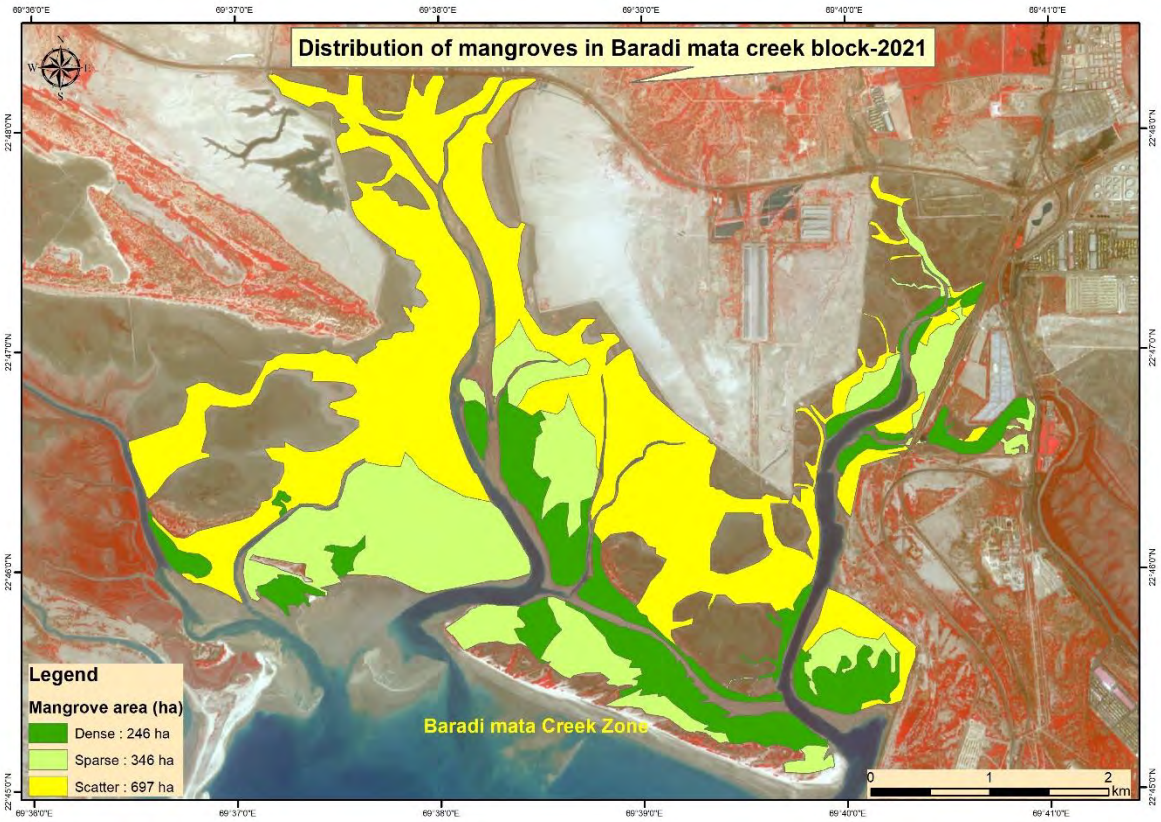


Figure 4.10: Distribution of Mangroves at Baradi mata Creek Zone in 2021

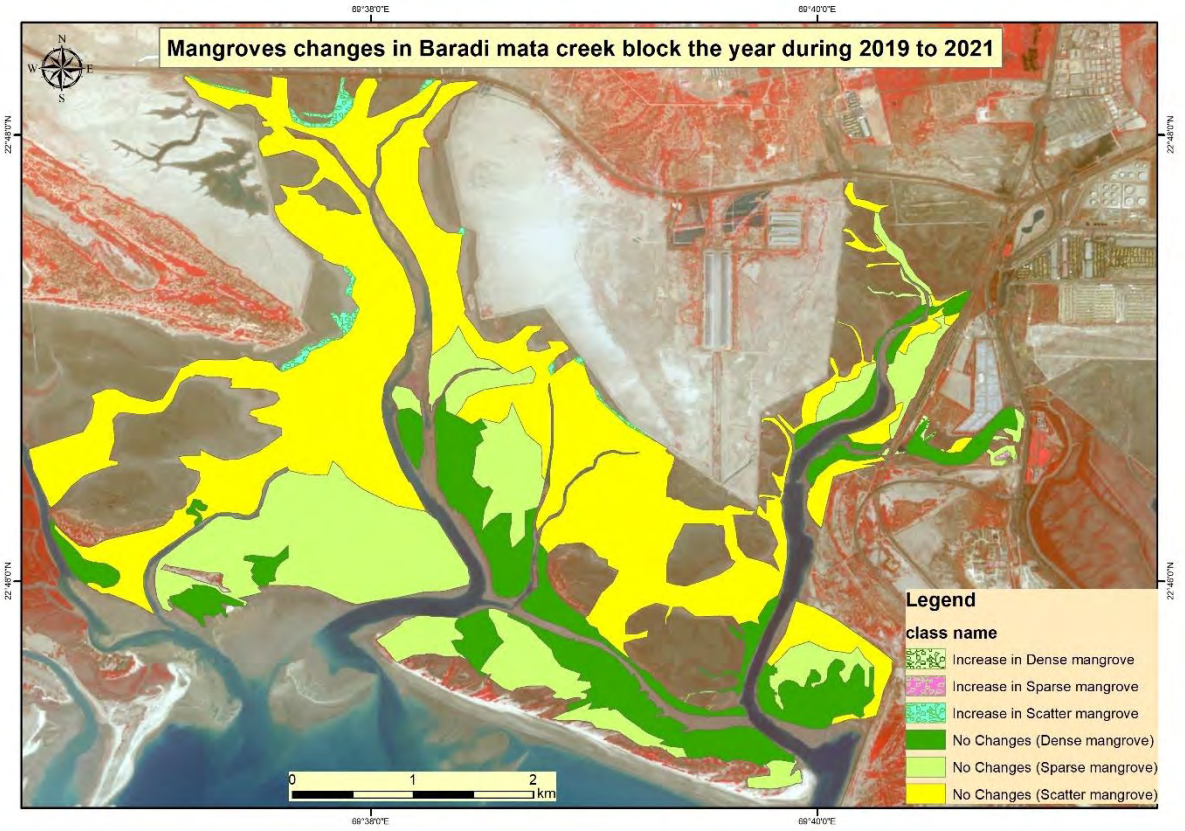


Figure 4.11: Change Analysis From 2019 To 2021 On Categories of Mangroves in Baradi Mata Creek System

4.2.3. Bocha-Navinal Creek Area

The study area comprises two creeks, Navinal creek, Bocha creek, and bocha island, thus form a complex of creek system. The Navinal creek is adjacent to Adani Port and joins the Bocha creek in the north, forming Bocha island that has dense mangroves. The mouth of Navinal creek is also known as the entrance to the Port and receives good tidal inflow. The Navinal creek narrows down as it flows northward and eastward to merge with Bocha creek (Figure 2.1). The banks of all the two creeks have fair to good mangrove growth, with dense mangroves particularly along the border of the Bocha island and the nearby minor creeks (Figure 4.12 to Figure 4.15). For the comparative study, the satellite images and field survey results on the mangrove cover for the period March 2019 and March 2021 were considered. The three classes of the mangrove types: dense, sparse, and scattered were observed. The total mangrove area has increased by 7.74 ha (1.3%) from 2019 to 2021 data (Table 4.4). These results suggest that the mangroves in

Bocha -Navinal, creek and Bocha island system are healthy and influenced by the normal regular tidal flow.

Table 4.4: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone During 2019 and 2021

Class Name	Area (ha)		
	2019	2021	Changes
Dense Mangrove	207.42	206.30	-1.13
Sparse Mangrove	269.44	271.43	1.98
Scatter Mangrove	89.17	96.06	6.89
Total	566.04	573.78	7.74

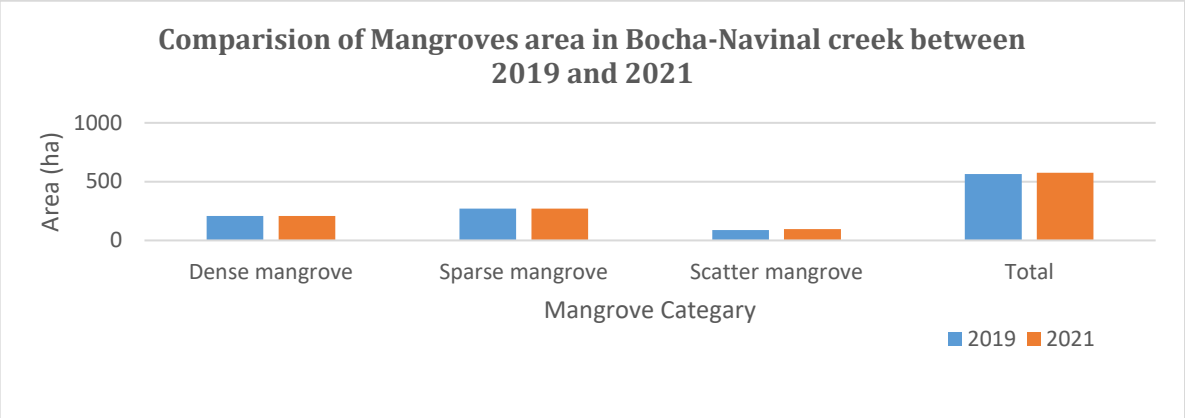


Figure 4.12: Comparison of Various Categories of Mangroves in Bocha-Navinal Creek Zone Between 2019 and 2021

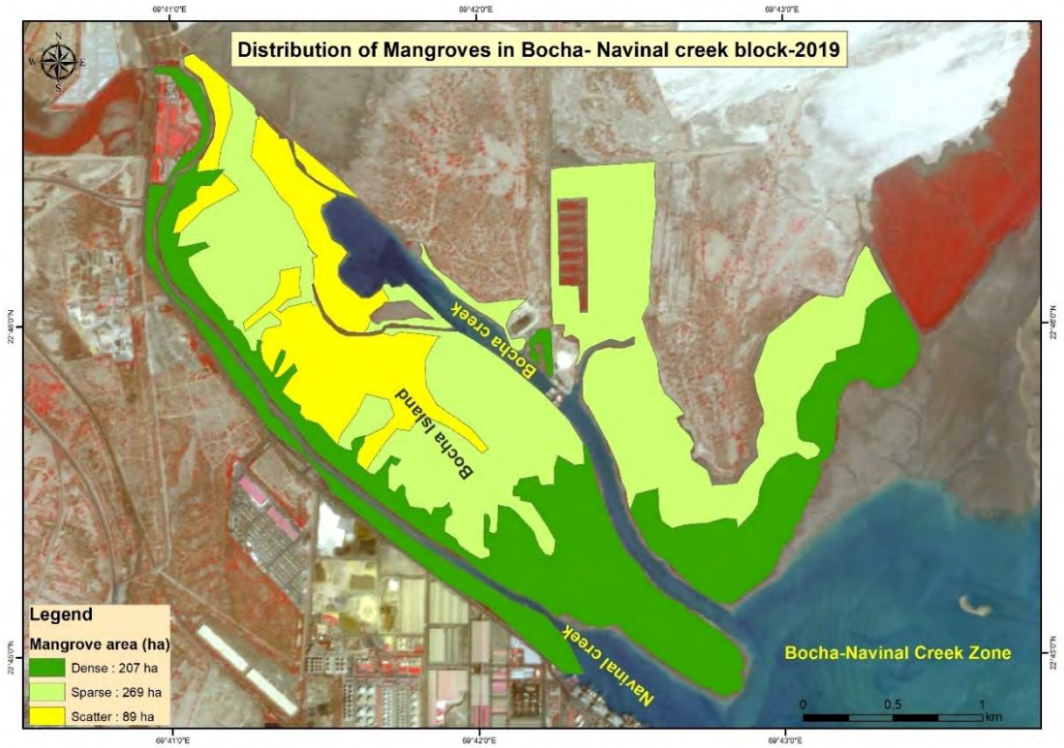


Figure 4.13: Distribution of Various Categories of Mangroves in Bocha- Navinal Creek Zone System for The Year 2019

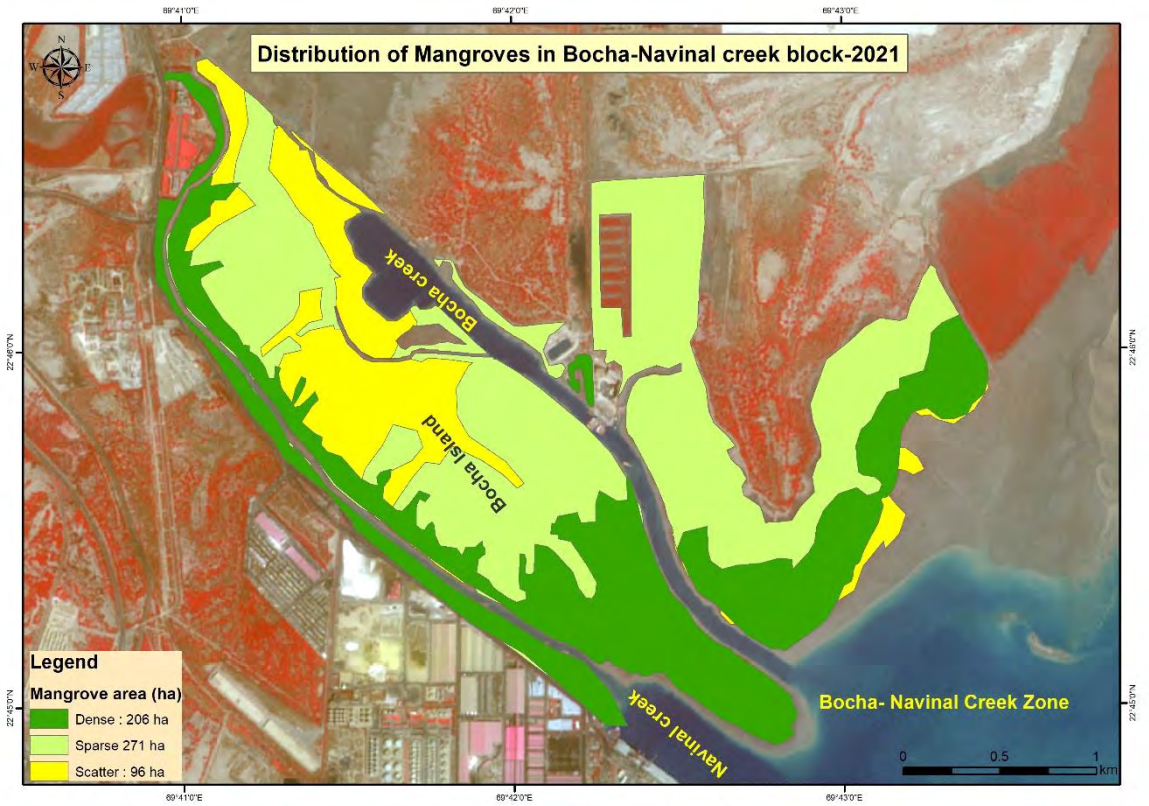


Figure 4.14: Distribution of Various Categories of Mangroves in Bocha - Navinal Creek Zone System for The Year 2021

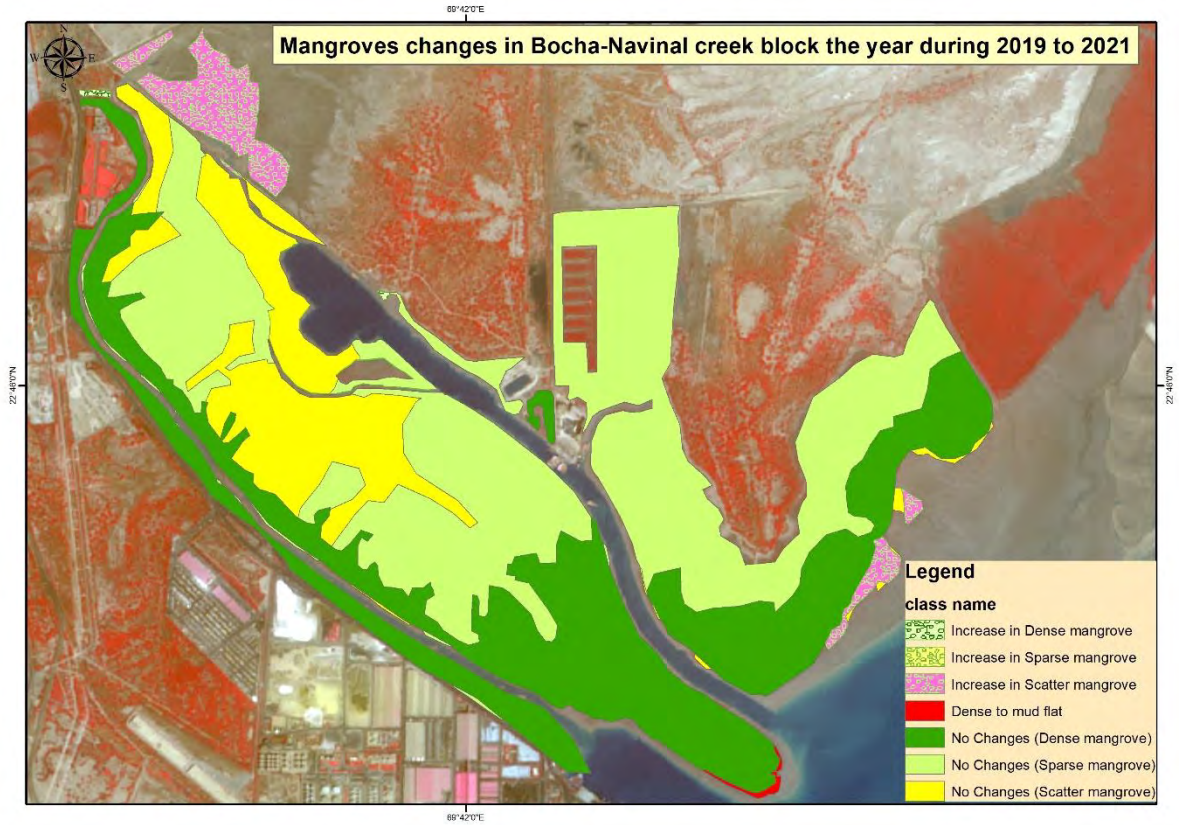


Figure 4.15: Change Analysis From 2019 To 2021 On Categories of Mangroves in Bocha- Navinal Creek System

4.2.4. Khari Creek

The creek experiences normal tidal flow with settlements located in the northern part of the creek (Junabunder village). Study is to assess the changes in mangrove distribution and density in Khari creek (Junabunder) between March 2019 and March 2021, using satellite imagery and field surveys and the data is given in Table 4.5 and Figure 4.16. and categories of mangroves are indicated in Figure 4.17 to Figure 4.19. The data indicates that there is a marginal increase of mangroves to the extent of 7.71 ha which is 2.47% compared to 2019 level. Dense mangrove is marginally increased mostly due to conversion of sparse mangrove to dense mangrove. Sparse mangrove has been increasing due to transformation of scatter to sparse category. The minor increase in scatter category is due to regeneration and recruitment class. Overall, mangrove is healthy in this block due to the favourable tidal regime and the low human pressure in the creek. the mangrove density has increased mainly due to the conversion of sparse and scatter mangroves to dense mangroves, indicating an improvement in mangrove quality.

Table 4.5: Distribution of Various Categories of Mangroves in Khari Creek Zone During 2019 and 2021

Class Name	Area (ha)		
	2019	2021	Changes
Dense Mangrove	155.26	156.90	1.64
Sparse Mangrove	146.84	149.95	3.11
Scatter Mangrove	8.80	11.75	2.95
Total	310.90	318.60	7.71

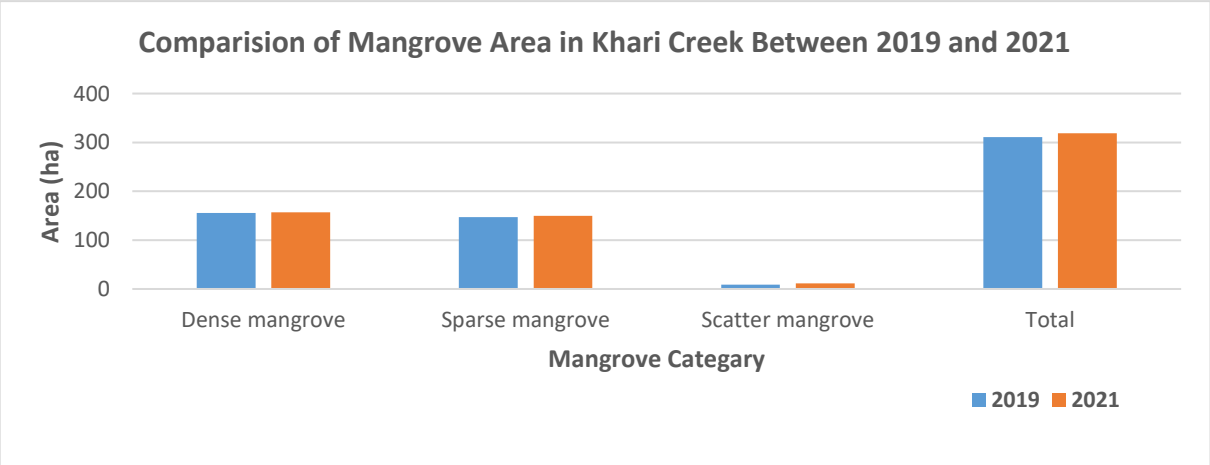


Figure 4.16 : Comparison of Various Categories of Mangroves in Khari Creek Zone Between 2019 and 2021

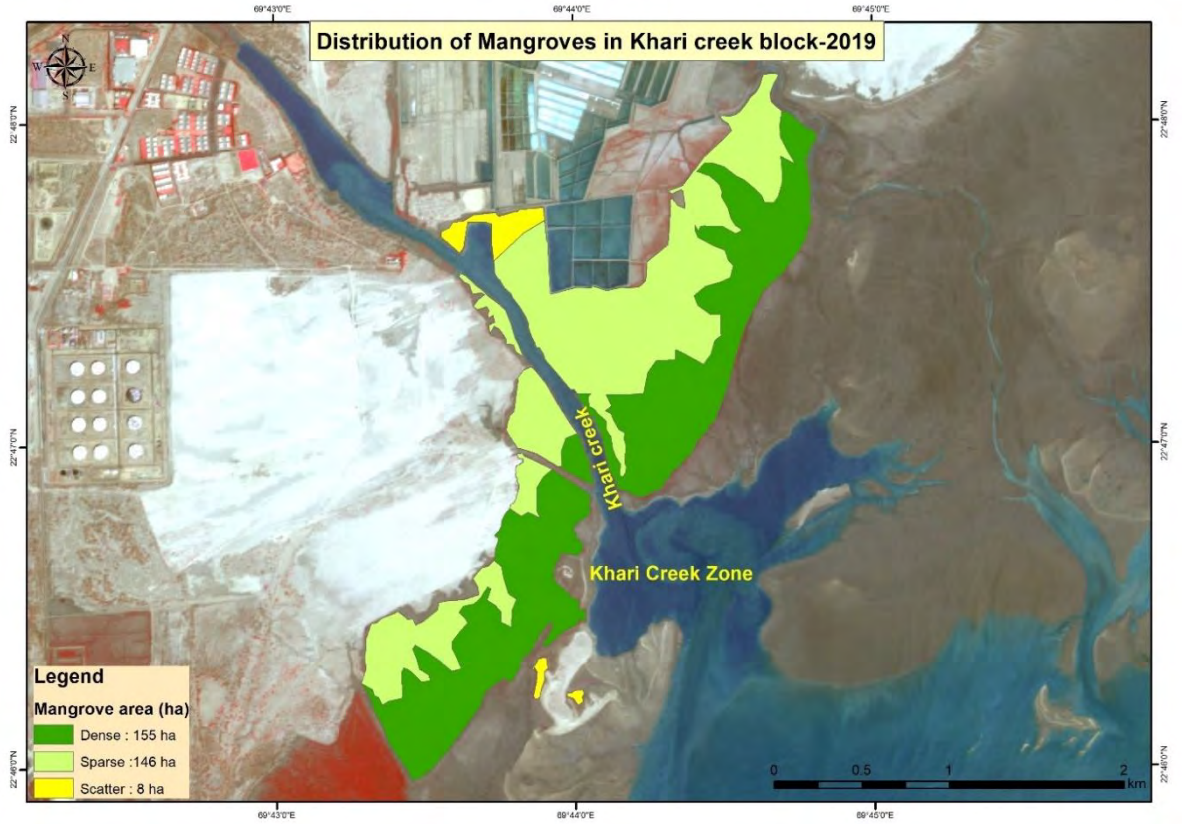


Figure 4.17 : Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2019

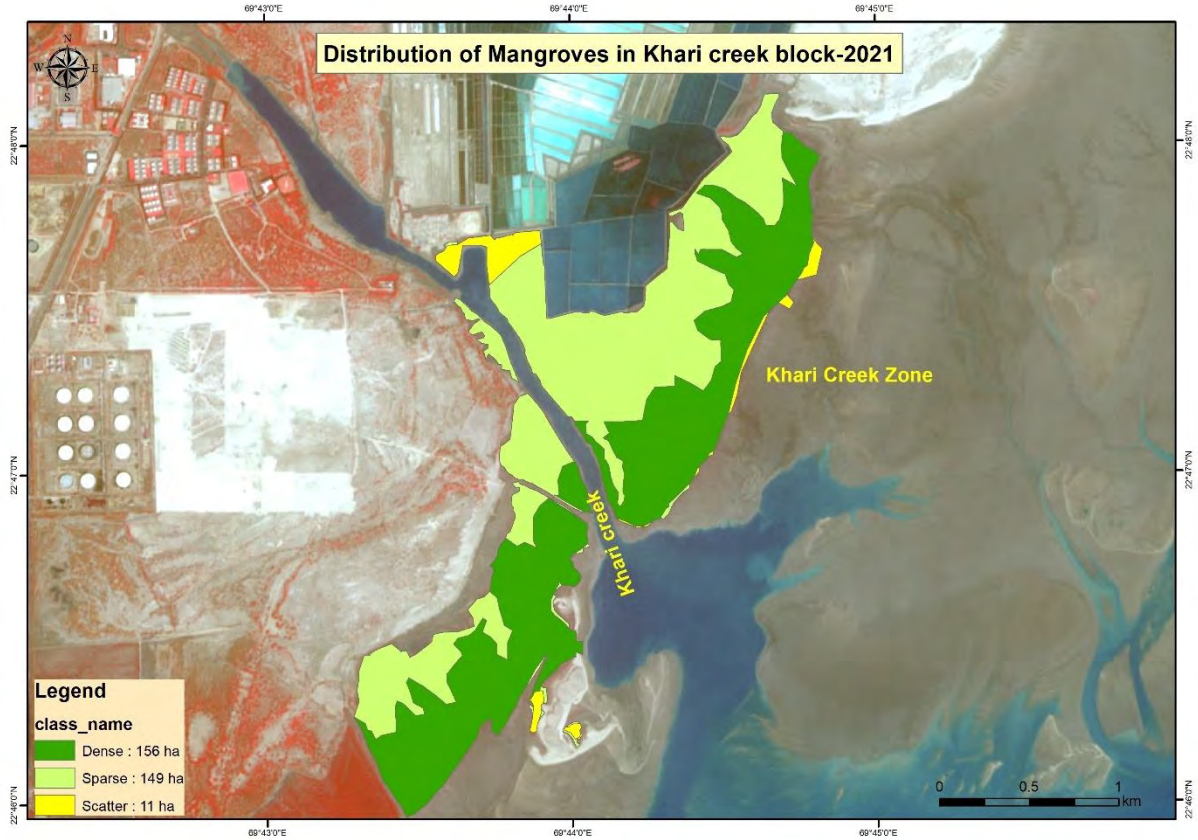


Figure 4.18: Distribution of Various Categories of Mangroves in Khari Creek Zone System for The Year 2021

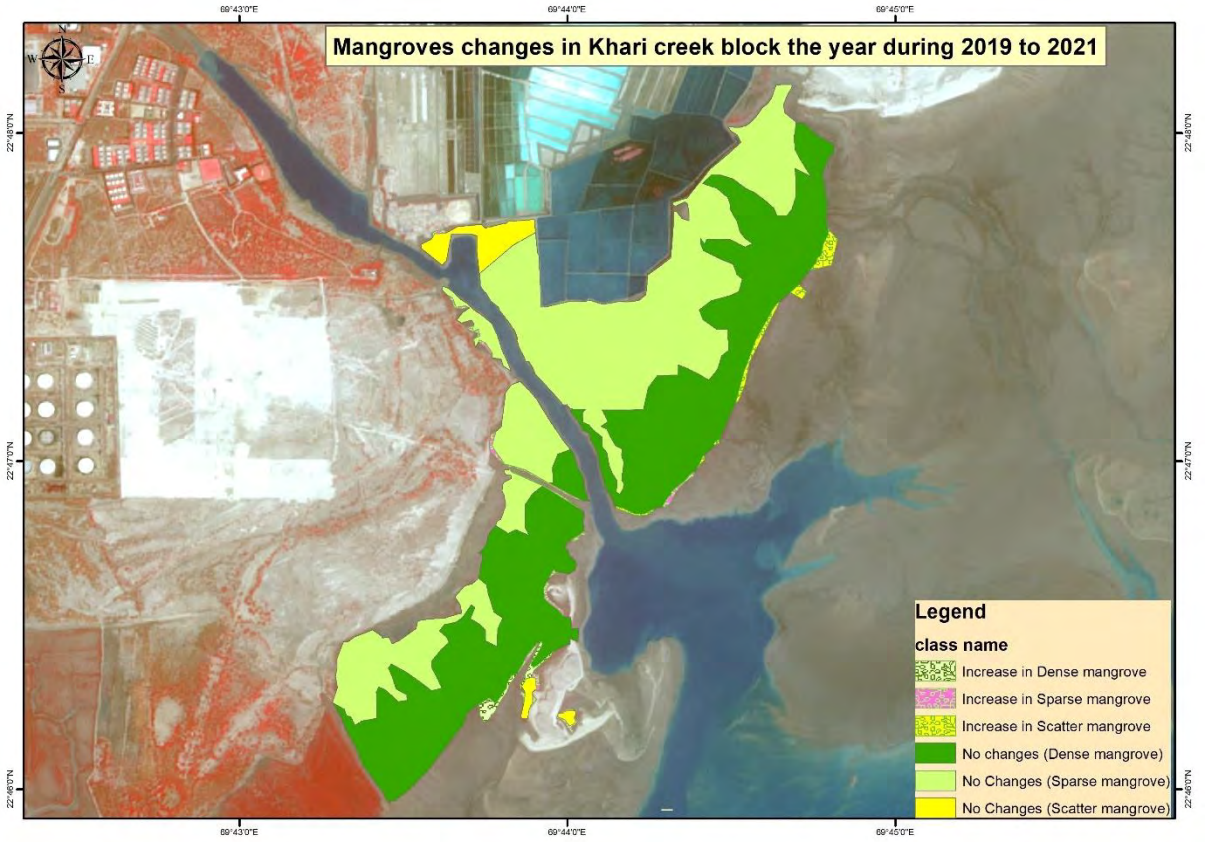


Figure 4.19: Change Analysis From 2019 To 2021 On Categories of Mangroves in Khari Creek System

4.3. Mangrove Vegetation

In India, the state of Gujarat encompasses the longest coastline (1650 km) and largest coastal area (28,000 km^2), which supports the second largest mangrove cover of the country, which is almost 23 % of the Indian mangrove cover (Devi and Pathak, 2016). Gujarat mangrove cover is divided in three parts, Kachchh and Gulf of Kachchh (GOK), Saurashtra, and Gulf of Khambhat and South Gujarat.

4.3.1. : Diversity

In Gujarat a total of 15 species of mangrove have been recognized as true mangroves (Ragavan *et al*., 2016), but this diversity is very less compared to the other Indian states. The diversity of mangroves in Gujarat is concentrated mainly in the Gulf of Khambhat and South Gujarat regions. The availability of freshwater inflow into this area resulted in the highest floristic diversity of mangroves than the other parts of the state. In general, the Gujarat mangrove cover is fully dominated by single mangrove species (Mono-floral) which is *Avicennia marina*

specifically along the coastal belt of the the Gulf of Kachchh. The extreme tolerance to low rainfall, higher salinity, evapo-transpiration and temperature, etc. of this species made it successful in the Gujarat coasts. A few true mangroves species can be found in the Gulf of Kachchh sporadically. The distribution of the other halophytes such as *Suaeda, Salvadora, Salicornia,* etc. and mangrove associate plants was also recorded. At the survey sites, two more true mangrove species which are *Rhizophora mucronata* and *Cerops tagal* plants were also found however, they are very less in number and present in small patches.

4.3.2. : Density

The overall average mature tree density (>100 cm) recorded was 1471 trees/ha (Ranging from 1120 to 1944 trees/ha) in the entire study area of APSEZ. The area wise density recorded was higher in Khari creek area (1944 trees/ ha) followed by Baradi mata area (1565 trees/ ha) and Bocha/Navinal creeks (1256 trees/ha). Among the study locations, lowest tree density was observed in the Kotadi creek area which was 1120 trees/ha. Further, major part of Bocha Island and surrounding areas supports good population of well matured and grown-up trees of *A. marina,* along with the presence of a few well matured trees of *Rhizophora mucranata* and *Cerops tagal.*

Table 4.6: Density of Trees in the Kotadi Creek Area

Q. Number	Latitude	Longitude	No of Tree Per Ha
12	22° 47' 16"	69° 32' 51"	1100
13	22° 47' 27"	69° 32' 48"	1100
14	22° 47' 48"	69° 33' 39"	500
15	22° 47' 54"	69° 33' 51"	600
18	22° 48' 5"	69° 34' 11"	0
22	22° 45' 53"	69° 36' 35"	2500
42	22° 47' 16"	69° 35' 38"	700
58	22° 47' 50"	69° 32' 56"	400
65	22° 46' 25"	69° 36' 32"	2500
66	22° 46' 49"	69° 36' 5"	1800
Average			1120

Table 4.7: Density of Trees in the Baradi mata Area

Q. Number	Latitude	Longitude	No of Tree per Ha
6	22° 45' 53"	69° 39' 56"	1200
7	22° 46' 45"	69° 40' 54"	1700
8	22° 46' 39"	69° 40' 30"	1200
9	22° 46' 53"	69° 40' 2"	1800
10	22° 46' 43"	69° 39' 45"	1200
11	22° 46' 40"	69° 40' 20"	600
19	22° 45' 9"	69° 39' 55"	2000
20	22° 45' 11"	69° 39' 54"	600
21	22° 47' 10"	69° 38' 17"	400
23	22° 47' 42"	69° 38' 14"	2400
24	22° 47' 33"	69° 38' 24"	3300
29	22° 46' 50"	69° 39' 57"	600
30	22° 46' 23"	69° 39' 45"	800
31	22° 48' 8"	69° 38' 14"	1300
32	22° 45' 25"	69° 39' 18"	1700
33	22° 45' 49"	69° 38' 41"	2300
34	22° 45' 8"	69° 39' 53"	1600
38	22° 46' 30"	69° 40' 11"	1200
39	22° 46' 57"	69° 37' 27"	2100
40	22° 46' 59"	69° 37' 20"	1400
41	22° 46' 60"	69° 37' 45"	1700
46	22° 48' 10"	69° 37' 16"	800
47	22° 48' 8"	69° 38' 19"	300
51	22° 45' 24"	69° 39' 40"	2900
52	22° 45' 22"	69° 40' 6"	2800
53	22° 45' 48"	69° 38' 11"	1900
54	22° 46' 39"	69° 40' 44"	4400
55	22° 46' 58"	69° 40' 15"	700
56	22° 46' 28"	69° 38' 46"	900
57	22° 46' 5"	69° 38' 24"	700
64	22° 45' 24"	69° 39' 33"	2000
Average			1565

Table 4.8: Density of Trees in the Bocha-Navinal Creek Area

Q. Number	Latitude	Longitude	No of Tree per Ha
1	22° 46' 42"	69° 41' 3"	200
2	22° 46' 55"	69° 41' 6"	200
3	22° 46' 56"	69° 41' 16"	1000
4	22° 46' 48"	69° 41' 5"	2100
5	22° 46' 17"	69° 42' 15"	2600
16	22° 46' 28"	69° 41' 30"	1500
17	22° 46' 33"	69° 41' 24"	1200
35	22° 45' 7"	69° 42' 42"	1800
36	22° 45' 7"	69° 42' 19"	1500
37	22° 45' 4"	69° 42' 30"	1500
43	22° 45' 21"	69° 41' 51"	1800
44	22° 45' 59"	69° 42' 18"	1100
45	22° 45' 1"	69° 42' 50"	1200
48	22° 45' 6"	69° 42' 25"	900
49	22° 45' 16"	69° 42' 31"	700
62	22° 45' 52"	69° 43' 25"	800
Average			1256

Table 4.9: Density of Trees in the Khari Creek Area

Q. Number	Latitude	Longitude	No of Tree per Ha
25	22° 47' 43"	69° 43' 54"	1800
26	22° 47' 28"	69° 43' 55"	3500
27	22° 47' 23"	69° 43' 52"	1700
28	22° 47' 22"	69° 43' 60"	1200
50	22° 46' 15"	69° 43' 52"	1800
59	22° 46' 42"	69° 44' 1"	1600
60	22° 46' 14"	69° 44' 1"	2200
61	22° 46' 13"	69° 43' 60"	2500
63	22° 47' 31"	69° 44' 40"	1200
Average			1944

4.3.3. Regeneration and Recruitment Class of Mangroves

The average density of the regeneration class of mangroves in the sampling site (saplings with a height of <50 cm) was recorded at 62,727 plants/ha (Ranging from 22,500 to 96,250 plants/ha) and for recruitment class mangrove, the overall average was recorded as 10,455 plants/ha (Ranging from 8,125 to 14,167 plants/ha) during the study. The highest regeneration class (96,250 plants/ha) was recorded in Bocha/Navinal and is followed by Kotadi creeks (78,889 plants/ha) and this creak system also supports highest density of recruitment class (14,167 plants/ ha) in the entire study area. Although, the density of trees is comparatively less in this area, it is favourable for the dispersal of seeds and germination for younger classes. This can further be representing that ecosystem is favourable for younger class mangrove formation. The lowest regeneration (22,500 plants/ ha) and recruitment (8,125 plants/ha) class was recorded in the Khari creek area; however, the mature tree density was highest in this area (1944 trees/ha. The ratio of recruitments to tree is 1:7 and regeneration to recruitment is 42:7 in the study area. The density of mature trees and younger classes (recruitment and regeneration) in the APSEZ showed that this area supports healthy mangrove ecosystem and that the mangrove area as well as the density will increase significantly in the near future.

Table 4.10: Density of Younger Classes in the Kotadi Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	12	22° 47' 16"	69° 32' 51"	10000	0
2	13	22° 47' 27"	69° 32' 48"	40000	10000
3	14	22° 47' 48"	69° 33' 39"	350000	10000
4	15	22° 47' 54"	69° 33' 51"	60000	15000
5	18	22° 48' 5"	69° 34' 11"	90000	17500
6	42	22° 47' 16"	69° 35' 38"	100000	32500
7	58	22° 47' 50"	69° 32' 56"	30000	10000
8	65	22° 46' 25"	69° 36' 32"	30000	15000
9	66	22° 46' 49"	69° 36' 5"	0	17500
Average				78,889	14167

Table 4.11: Density of Younger Classes in the Baradi mata Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	6	22° 45' 53"	69° 39' 56"	170000	7500
2	7	22° 46' 45"	69° 40' 54"	30000	10000
3	8	22° 46' 39"	69° 40' 30"	60000	20000
4	9	22° 46' 53"	69° 40' 2"	140000	10000
5	10	22° 46' 43"	69° 39' 45"	80000	0
6	11	22° 46' 40"	69° 40' 20"	40000	5000
7	19	22° 45' 9"	69° 39' 55"	0	7500
8	21	22° 47' 10"	69° 38' 17"	60000	17500
9	29	22° 46' 50"	69° 39' 57"	30000	2500
10	30	22° 46' 23"	69° 39' 45"	90000	12500
11	31	22° 48' 8"	69° 38' 14"	30000	10000
12	39	22° 46' 57"	69° 37' 27"	30000	5000
13	40	22° 46' 59"	69° 37' 20"	50000	7500
14	41	22° 46' 60"	69° 37' 45"	20000	7500
15	46	22° 48' 10"	69° 37' 16"	30000	20000
16	47	22° 48' 8"	69° 38' 19"	40000	37500
17	52	22° 45' 22"	69° 40' 6"	10000	0
18	53	22° 45' 48"	69° 38' 11"	20000	7500
19	54	22° 46' 39"	69° 40' 44"	10000	0
20	55	22° 46' 58"	69° 40' 15"	40000	5000
21	56	22° 46' 28"	69° 38' 46"	60000	7500
22	57	22° 46' 5"	69° 38' 24"	100000	10000
23	64	22° 45' 24"	69° 39' 33"	50000	7500
Average				49,583	9,063

Table 4.12: Density of Younger Classes in the Bocha-Navinal Area (Plant/Ha)

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
1	1	22° 46' 42"	69° 41' 3"	10000	5000
2	2	22° 46' 55"	69° 41' 6"	20000	7500
3	3	22° 46' 56"	69° 41' 16"	110000	10000
4	4	22° 46' 48"	69° 41' 5"	140000	12500
5	5	22° 46' 17"	69° 42' 15"	260000	5000
6	16	22° 46' 28"	69° 41' 30"	140000	10000
7	17	22° 46' 33"	69° 41' 24"	50000	17500
8	43	22° 45' 21"	69° 41' 51"	40000	15000
				96,250	10,313

Table 4.13: Density of Younger Class in Khari creek

Sr No	Q. Number	Latitude	Longitude	Regeneration	Recruitment
9	50	22° 46' 15"	69° 43' 52"	20000	2500
10	59	22° 46' 42"	69° 44' 1"	20000	10000
11	60	22° 46' 14"	69° 44' 1"	20000	0
12	61	22° 46' 13"	69° 43' 60"	30000	20000
Average				22,500	8,125

Figure 4.20 : Diversity of Mangrove Species in APSEZ Area, Mundra

5. CONCLUSION

5.1. Shoreline and Mangrove Cover Changes

The distribution of mangroves in the creeks in and around APSEZ was analysed using satellite images from March 2019 and March 2021. The major findings are:

- ✓ The mangrove cover in the study area has increased by 52.79 ha from 2019 to 2021, indicating that the mangrove ecosystem and the tidal regime were not adversely affected during this period.
- ✓ The tide levels in the creeks were observed to be normal and adequate for the growth of mangroves.
- ✓ The dense mangrove cover has showed an increase in Kotadi creek, Khari Creek and Baradi mata creeks while it was not much changed in Bocha/Navinal creek system.
- ✓ Further Kotadi creek showed highest increase of sparse mangrove area (39.71ha) while Baradi mata creeks (14.10ha) and Bocha/Navinal creek system (6.89ha) showed an increase in scattered mangrove areas.
- ✓ Nevertheless, overall, an increase in all three categories of mangroves in the study area between 2019 and 2021, indicating a healthy status of mangroves.
- ✓ The study measured the density of mature trees, recruitments (young trees), and regeneration (seedlings) in different locations. Mangrove tree density is influenced by many factors like salinity, tidal inundation, fresh water flow, sediment characterises, etc. The ratio between mature tree density and recruitment class among all the stands (1:7) indicating good entrance of recruitment classes into mature tree category. A conducive physical milieu with favourable tidal range and less anthropogenic pressure seems to favour the present mangrove strands in a healthy state.
- ✓ The conservation and management and recommendation plan are indicated below:

5.2. Recommendations

- The mangrove cover in the APSEZ area was found in healthy condition with dense, sparse and scattered mangroves, which has overall increase of 52.79 ha between 2019 and 2021, indicating that the mangrove ecosystem and the tidal regime were not adversely affected during this period. Therefore, future attempt should be restoration of sparse and scattered mangrove areas and convert it into dense patches. This could be restored to dense formation through physical amendment measures *viz*., canal digging, removing blockage in natural canal systems, and by other physical means.

- The Mundra coastal scenario supports *A. marina* which is predominant, due to lack of continuous fresh water source which is atypical in this part. Nevertheless, presence of other mangrove species though sporadically recorded, *viz*., *R. mucronate* and *C. tagal,* which gives a confidence for plantation in the sparse and scattered mangrove areas following zonation techniques. Plantation of these species is expected to create a seed bank in due course of time which would eventually convert single species stand of *A. marina* into multi species formation which in turn enhance the marine biodiversity of the area.

- Kotadi creek area has highest recruitment class mangroves while highest regeneration class was recorded from Bocha/Navinal creeks. Promoting natural regeneration where the mangrove stand has got the capacity to self-renewal will ensure sustained well-being on the stand and its succession. Natural regeneration capacity of the stand is based on the extent of entrance of younger classes such as saplings into mature tree category. The observation that natural seedling recruitment is occurring normally will indicate that the system is functioning normally. The present study shows that natural regeneration in the studied mangrove formations is normal as indicated by the entrance of younger classes into adult categories. Continued observation of this natural succession in regular mangrove monitoring studies is necessary to assess and ascertain that the natural procession of succession is maintained.

- 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 three years.

- Periodical monitoring, preferably once in 2 years, and comparison of results with baseline data to underline changes will pave way for the formulation of mitigation and conservation efforts.

- 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 – 3

MAIL COMMUNICATION WITH NCSCM

Chiragsing Rajput

From: Chiragsing Rajput
Sent: Thursday, March 28, 2024 4:10 PM
To: edcprojects@ncscm.org; Purvaja Ramachandran
Cc: Ashvin Kumar Patni; Dhanesh Tank; Bhagwat Swaroop Sharma; Piyush Bhanji Sanghani; Robin Rs; Deepak S; Radheshyam Singh; Anil Trivedi
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

From: Chiragsing Rajput <Chiragsing.Rajput@adani.com>
Sent: Thursday, March 21, 2024 9:06 AM
To: edcprojects@ncscm.org; Purvaja Ramachandran <purvaja@ncscm.res.in>
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>; Anshul Sanduja <Anshul.Sanduja@adani.com>
Subject: Re: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

Get Outlook for Android

From: Chiragsing Rajput <Chiragsing.Rajput@adani.com>
Sent: Friday, March 15, 2024 12:34:08 PM

To: edcprojects@ncscm.org <edcprojects@ncscm.org>; Purvaja Ramachandran <purvaja@ncscm.res.in>
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput

-----Original Message-----
From: Chiragsing Rajput
Sent: Monday, March 4, 2024 4:41 PM
To: edcprojects@ncscm.org; Purvaja Ramachandran <purvaja@ncscm.res.in>
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Thanks & Regards,
Chiragsing Rajput
Environment Cell | Adani Ports & Special Economic Zone Ltd.
Mob +91 9687678443 | Ext. 59523 | chiragsing.rajput@adani.com | www.adani.com Adani Corporate House, 3rd Floor, North Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.

-----Original Message-----
From: Chiragsing Rajput
Sent: Wednesday, February 28, 2024 10:39 AM
To: edcprojects@ncscm.org

Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Anil Trivedi <Anil.Trivedi@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----
From: Chiragsing Rajput
Sent: Tuesday, February 20, 2024 11:00 AM
To: edcprojects@ncscm.org
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>; Charanjit Singh <Charanjit.Singh@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----
From: Chiragsing Rajput
Sent: Monday, February 12, 2024 5:19 PM
To: edcprojects@ncscm.org
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>; Radheshyam Singh <Radheshyam.Singh@adani.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

We are awaiting for your best Techno commercial offer in line with trailing mail.

Regards
Chiragsing Rajput

-----Original Message-----
From: Chiragsing Rajput
Sent: Monday, February 5, 2024 12:26 PM
To: edcprojects@ncscm.org
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>; Purvaja Ramachandran <purvaja@ncscm.res.in>; Robin Rs <robin.ocean1@gmail.com>; Deepak S <deepak.s.ocean@gmail.com>
Subject: RE: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir / Madam,

Please find attached RFQ for conducting Monitoring of Mangrove Distribution in creeks in and around Adani Ports and Special Economic Zone Limited (APSEZ), Mundra site between 2021 to 2023.

So kindly provide us your best Techno-commercial proposal for the same at earliest.

Thanks & Regards,
Chiragsing Rajput
Environment Cell | Adani Ports & Special Economic Zone Ltd.
Mob +91 9687678443 | Ext. 59523 | chiragsing.rajput@adani.com | www.adani.com Adani Corporate House, 3rd Floor, North Wing, Shantigram, Ahmedabad - 382421, Gujarat, India.

-----Original Message-----
From: Radheshyam Singh <Radheshyam.Singh@adani.com>
Sent: Wednesday, December 20, 2023 7:03 PM
To: edcprojects@ncscm.org; purvaja@ncscm.res.in; mahapatra.sac@gmail.com
Cc: Ashvin Kumar Patni <AshvinKumar.Patni@adani.com>; Dhanesh Tank <Dhanesh.Tank@adani.com>; Chiragsing Rajput <Chiragsing.Rajput@adani.com>; Bhagwat Swaroop Sharma <Bhagwat.Sharma1@adani.com>; Piyush Bhanji Sanghani <Piyush.sanghani@adani.com>

Subject: Request for Proposal-Monitoring of Mangrove Distribution in creeks in and around APSEZ Mundra Site

Dear Sir/Madam,

Please provide us Techno-commercial proposal for conducting Monitoring of Mangrove Distribution in creeks in and around Adani Ports and Special Economic Zone Limited (APSEZ), Mundra site for the duration of Mar-2021 to Mar-2023.

ANNEXURE – 4

CSR HEALTH IMPACT ASSESSMENT

CSR Impact Assessment Report

Prepared For

adani | Ports and Logistics

Adani Ports & SEZ Ltd

Prepared By

SoulAce
Path to Sustainability

SOULACE CONSULTING PVT LTD

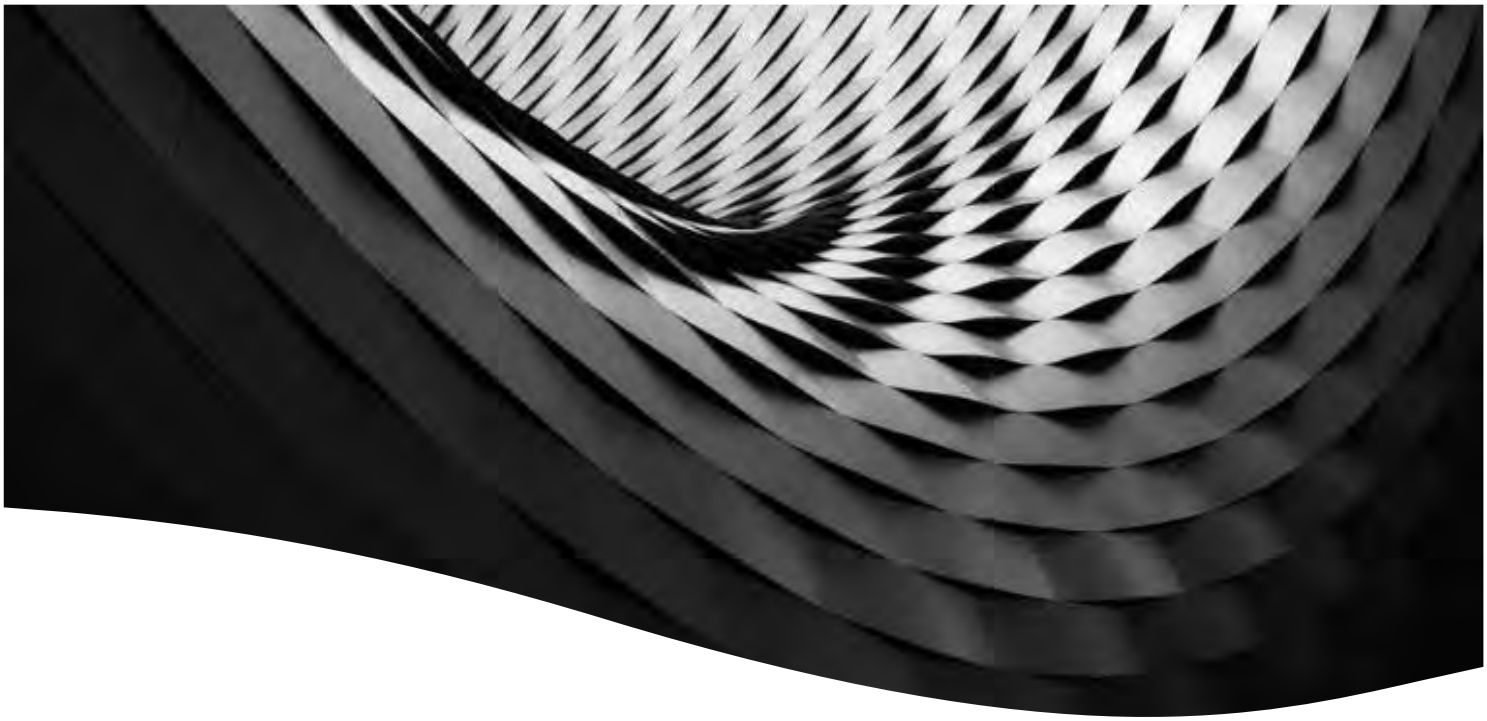
ISO 27001:2013 Certified

DELHI NCR | MUMBAI | KOLKATA

Website: www.soulace.in; Email: enquiry@soulace.in

ANNEXURE – 5

ASSESSMENT OF WATER CONSERVATION PROGRAMS



Outcome Assessment of Water Conservation Programs

Report

2nd November 2022

Adani Ports and Special Economic Zone (APSEZ)

Thinkthrough Consulting

ANNEXURE – 6

PHOTOGRAPHS OF GARLAND DRAIN AND DUMP POND

ANNEXURE – 6

PHOTOGRAPHS OF CLEANING OF GARLAND DRAINS

PHOTOGRAPHS OF CLEANING OF COMMON SUMP

ANNEXURE – 7

PHOTOGRAPHS OF SPILL PLANT AND SIDE WALL AT GSU

ANNEXURE – 7

PHOTOGRAPHS OF HYDRAULIC OPERATED SPILL PLATE WITH SIDE WALL TO PREVENT COAL SPILL

ANNEXURE – 8

PHOTOGRAPHS OF FILTERS AT JETTY OUTLET

ANNEXURE – 8

FILTERS AT JETTY OUTLET

ANNEXURE – 9

PHOTOGRAPHS OF HOUSEKEEPING AWARENESS

ANNEXURE – 9

Photographs of Awareness Training Programme for Proper House Keeping

ANNEXURE – 10

PHOTOGRAPHS OF WIND SCREEN AND ONGOING REFURBISHING WORK

ANNEXURE – 10

Photographs of Installed Wind Screen and Ongoing Refurbishing work

Installed Wind Screen

Ongoing Refurbishing work of Wind Screen

Annexure – 10

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 2302 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 95.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 60 nos. of industries (processing & non-processing) are present within the SEZ (46 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

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
	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

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
			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 of the same were submitted during the last compliance period Apr'23 to Sep'23. During compliance period FY 2023-24 total recorded rain fall was **844 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.

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
			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 4140 ha. area across the coast of Gujarat till date. Total expenditure for the same till date is INR 1592.8 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 overall growth of 246 ha. The cost for said study was

<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>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>INR 3.15 Cr.

Last 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.
<table>
<tr><th>Sr. No.</th><th>Recommendations</th><th>Compliance</th></tr>
</table>
</td></tr>
</table>

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.	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 10.94%. • 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

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		
									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. • According to GUIDE Mangrove monitoring study report November 2023 (report was submitted during the last compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%)

<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 colspan="3">Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021.
• Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%).
• The cost of the said study was INR 23.60 Lacs incurred by APSEZ.

Summary of Mangrove mapping and monitoring (from 2011 to 2021):
<table>
<tr><th rowspan="2">Mangrove mapping Year</th><th rowspan="2">Mangrove cover total Area (Ha.)</th><th colspan="2">Mangrove cover area Increased</th></tr>
<tr><th>Hac.</th><th>%</th></tr>
<tr><td>2011</td><td>2094</td><td>-</td><td>-</td></tr>
</table></td></tr>
</table>

<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 colspan="3">Compliance</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>2011 to 2016-17</td><td>2340</td><td>246</td><td>11.75%</td></tr>
<tr><td>2017 to 2019 till March</td><td>2596</td><td>256</td><td>10.94%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>127</td><td>4.89</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>--</td></tr>
</table>

To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><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.</td></tr>
</table>

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		
									• 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 Rs. 80000 during the FY 2023-24. The report of algal removal is attached as **Annexure – 11**.
							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 29 Villages. Project is covering total 16000 Cattels

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		
									/ 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. • **Grass Land development:** 213 acres of gauchar land has been cleaned and allocated for Grass land development with strong Community Contribution and Mobilization. • 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.

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
							• APSEZ has celebrated the International Day for the Conservation of the Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The report of day celebration was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23. • Since PhD scholars and students frequently visit this area for study. we plan to establish it as a Center of Excellence, serving as a hub to create awareness among students and facilitating research activities for scientist. • Refer CSR report attached as **Annexure – 2**.

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
							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 was paid by APSEZ. GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted during the last EC compliance report submission Apr'23 to Sep'23 According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradi Mata, Navinal, Bocha and Khari creeks and also

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							in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019. According to GUIDE Mangrove monitoring study report November 2023 (Report was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi Mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total

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							mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023. 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, These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem.

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1.4	Development activities along the coast might cause certain changes in hydro-dynamic characteristics along the shoreline. Shoreline of any area also can be influenced by storm surges and other natural processes.		Detailed hydro-dynamic modelling and 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 ±	It is recommended to map the coastal morphology (Shoreline) at least once in three years	APSEZ	Continual Process	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 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.

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			0.5 m/year. which reconfirms that the waterfront development activities of APSEZ would pose insignificant impact on the Mundra shoreline.				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 was INR 17.39 Lacs. The said study is under progress. Shoreline change study was carried out by M/s. Gujarat Institute of Desert Ecology, Bhuj in 2022 as a part of the Environmental Management Plan (EMP) compliance with the CIA study. The cost of said study was INR 17.39 Lacs. 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 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.

<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></td><td></td><td></td><td>The details of the rate of shoreline changes (Short interval time) recorded from 2015 to 2022 are summarized in below table.
<table>
<tr><th>Period</th><th>Name of the block</th><th>Average Shoreline Change(M/Year)</th><th>Shoreline</th></tr>
<tr><td></td><td></td><td></td><td>Maximum Accretion</td></tr>
<tr><td rowspan="2">2015-2022</td><td>West Port</td><td>-11.43</td><td>39.86</td></tr>
<tr><td>Eastern side</td><td>-26.60</td><td>191.32</td></tr>
</table>
The Shoreline Change Assessment Study report of GUIDE was submitted along with six monthly compliance report for the period Oct'22 to Mar'23.

Shoreline change study was carried out by M/s. Chola MS, Chennai (NABET accredited consultant) also as a part of Waterfront Development Project – Expansion EIA study. The summary of the said study are 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</td></tr>
</table>

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							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.
2	**Regional Traffic Management Plan**						
2.1	The projected traffic data	Level-1	As per the master plan of APSEZ,	Additional road as per master plan will be built	APSEZ	As and When Required	Presently, ~ 51.7 % of the total SEZ is developed. Based on technical studies,

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	as per the EIA Report of Multi-Product Special Economic Zone, the peak vehicular traffic from the port and SEZ operations (including supporting facilities and colony) could be in the order of 18,300 and 10,400 vehicles per day respectively. There could		eight artillery roads will be connected to either state highway or national highway for evacuating the goods from APSEZ. None of these roads are passing through settlements, thereby avoiding traffic Congestions in the respective villages. The carrying capacity of the eight artillery roads connecting	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 is fully developed in future. This will further reduce the traffic volumes on the regional road network.			Existing road/rail/conveyer infrastructure facilities are adequate to evacuate the existing cargo. Further, APSEZ's cargo evacuation through rail / conveyer / pipeline has ~23.87%,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.

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	be a possible increase in traffic congestions on village-highway intersections and road accidents.		APSEZ is estimated to be about 16,000 PCU/hr as against the envisaged peak traffic volume of 4,500 PCU/hr. Out of eight artillery roads considered in APSEZ master plan, seven roads were already developed and functional.				
			APSEZ has been imparting Driver Training	APSEZ can undertake technical feasibility of implementing	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:

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			Programs to all their contractors to enhance awareness on road safety.	Intelligent Transport System (ITS) for the freight carriers associated with their development activities.			✓ 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 ✓ Defensive Driving & Emergency Action Plan ✓ Drivers Responsibilities & Safe driving ✓ Emergency Rescue (Vehicle) Training Approx. 7530 Participants (On roll and contractual manpower) were benefitted from above trainings in compliance period Oct'23 to Mar'24. 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.

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							✓ 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. ✓ 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.

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							✓ 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. ✓ In case on any Vehicle found breakdown in main roads, we arrange the security crane / lifting machines to remove /relocated the vehicle. Which help for smooth passage to other vehicles. ✓ Ensuring Drivers must wear near necessary PPEs, for that we have arranged a PPE's Stall at APMS parking area (issued on chargeable basis). ✓ Night Patrolling and PA announcement by Traffic DSO to manage traffic condition. ✓ Safety briefing via PA system at Security Gate.
3	**Water resources Management and sewage treatment & disposal Plan**						
3.1	For a fully developed APSEZ facility, water demand will be in the order of 4,30,000 m3/day (430 MLD). APSEZ will be sourcing	No-Impact	APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	As per the master plan and permissions granted under EC, APSEZ will be developing progressively 4,50,000 m3/day (450 MLD) of desalination plants to meet the future demand. Hence	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 industries including Adani Power Plant is an avg. of 31.49 MLD. So presently, these sources are adequate to fulfill the current freshwater requirement of entire APSEZ

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	majority of the water from the captive desalination plants, which will be developed in progressive manner.		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.	stress on regional water resources due to these developmental projects will be less significant.			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 as 8500 m3/day (@55 lpcd) and the potable and sanitation	Level-2	Adani Foundation has been contributing to various watershed development projects in the Mundra region to enhance ground	Adani Foundation is planning to implement the various water resource conservation programs in next ten years under various schemes.	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 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 Rainwater Harvesting, Desilting of Check dams, Bore Well

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	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 Narmada water supply system to some extent, but		water resources in the area. Adani Foundation has contributed about Rs. 300 Lakhs so far for the development of 18 check dams.				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. **WORK COMPLETED:** Below tabulated Water Conservation Projects completed during Compliance period: **Water Conservation Projects:** **Swajal Project:** ➢ **Aim:** The Foundation's Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district. ➢ **Water Security Plan:** Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological

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<tr><td></td><td>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 some stress on the ground water resources in future.</td><td></td><td></td><td></td><td></td><td></td><td>condition and water demand, water security plan has been prepared for the Seven villages.

<table>
<tr><th>Block Name</th><th>Water conservation structure</th><th>Total no. of Structure</th><th>Total Capacity Created (CUM)</th></tr>
<tr><td rowspan="5">Mundra</td><td>Check Dam</td><td>23</td><td>6,07,332.80</td></tr>
<tr><td>Pond Deepening</td><td>66</td><td>1,89,121.08</td></tr>
<tr><td>RRWHS</td><td>275</td><td>2750</td></tr>
<tr><td>Recharge Borewell</td><td>209</td><td>-</td></tr>
<tr><td>Percolation Well</td><td>24</td><td>-</td></tr>
</table>

Earlier Completed Activities/Projects:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<tr><td>1</td><td>Check dam Restrengthen ing-Nana Kapaya</td><td>1</td><td>Water Storage Capacity increased by 48000 Cum</td><td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td></tr>
<tr><td>2</td><td>Recharge Borewell</td><td>21</td><td>Reduce Salinity ingress, and preventing water run</td><td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td></tr>
</table>
</td></tr>
</table>

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							<table><tr><td>3</td><td>Pipe Culvert at Checkdamat Bhujpur</td><td>1</td><td>prevent water runoff into seaside.</td><td>35 farmers' 120+Acre Area of Agri land can be Irrigated</td></tr></table> • 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 66 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.

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							• 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 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. Adani foundation has spent approx. INR 8515.06 lakhs from April – 2018 to March– 2024 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	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	APSEZ is permitted to develop decentralized sewage treatment plants of total 62 MLD capacities. Existing sewage treatment facilities will be augmented progressively	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 46 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

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	project is fully developed.		development and sewage is not discharged into either seasonal natural streams or marine environment.	based on the development at APSEZ in future. Similar to existing practices, treated sewage will be utilized for greenbelt development.			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. 2.26 MLD of wastewater (in to ETP, STPs & CETP) is treated and being utilized on land for horticulture purpose within APSEZ premises during Oct'23 to Mar'24. 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	Level-2	APSEZ and other thermal power plants have obtained valid consent to operate and have been	All existing and new industrial establishments will obtain requisite consents from GPCB and adhere to the stipulated emission norms regulations and	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

<table>
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<tr><td></td><td>air emission mass discharge from the study area would increase.</td><td></td><td>operating the facilities as per the emission norms stipulated in respective consent 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</td><td>guidelines issued by authorities from time to time.</td><td></td><td></td><td>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'23 to Mar'24) are as below.

Locations: 18 Nos. (APSEZ – 15 + 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$</th></tr>
<tr><td>PM_{10}</td><td>µg/m³</td><td>40.80</td><td>87.32</td><td>74.45</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>µg/m³</td><td>14.49</td><td>43.22</td><td>30.97</td><td>60</td></tr>
<tr><td>SO_2</td><td>µg/m³</td><td>8.35</td><td>38.91</td><td>22.12</td><td>80</td></tr>
<tr><td>NO_2</td><td>µg/m³</td><td>11.21</td><td>44.25</td><td>26.73</td><td>80</td></tr>
</table>
$ as per NAAQ standards, 2009
Values recorded confirms to the stipulated standards.

Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</td></tr>
</table>

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
			the thermal power plants located within the study area have installed continuous emission and air quality monitoring instruments as per CPCB directive.				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 visits/inspections of member industries within SEZ and last visit was conducted during March, 2024 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	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:

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				Board and district administration to manage regional level emission inventory data that can help to manage regional level air quality management goals.			• 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. • 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 19/04/2024 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.

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							• 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. • Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor. 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	Health Impact	APSEZ has been implementing the following management plan to control emissions as per the applicable regulations and similar	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	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,

<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>PM2.5 concentration in the background air. This could pose some health impacts such as asthma and COPD etc. among the local communities.</td><td></td><td>practices will be adopted in future: Entire bulk material handling facilities are mechanized. Regular water 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,</td><td>Pollution Control Board from time to time.</td><td></td><td></td><td>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 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'23 to Mar'24) 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>16.27</td><td>27.23</td><td>21.61</td></tr>
<tr><td>SO_2</td><td>Ppm</td><td>100</td><td>6.13</td><td>15.49</td><td>8.96</td></tr>
</table>
</td></tr>
</table>

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			covered conveyor belts, regular sprinkling on coal heaps,				NO_x | ppm | 50 | 16.92 | 32.62 | 23.06 Values recorded confirms to the stipulated standards. Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, 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 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	An internal Coal Dust Management Working Group shall be formed by APSEZ to effectively co-ordinate the approach to coal dust management and	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

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			periphery of the storage yards/back up area and mechanized handling system for coal and other dry bulk cargo and Wagon loading and 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	monitoring			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 19/04/2024 and below were the points 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.

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			respective ECs granted. Due to installation of tall stacks as per CPCB guidelines and EC conditions, the relative air pollution impacts due to release of emissions from two power plants is insignificant.				• Discussed about to increase more green belt area inside plant premises of SEZ units. • Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor.
4.3	Ships are one of the significant sources of SO2 and NOX emissions in the study area. Marine diesel	Level-2	A Standard Operating Procedure (SOP) has been developed to	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	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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	engines on the ships often utilize fuel oils that might contain higher sulphur content. As per the international best practices, these marine diesel engines are designed to meet MARPOL regulations with NOX emissions less than 14.4 gram/Kwhr of engine. Due 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.	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 to reduce idling stage ship emissions.			

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	lower stack heights of the marine diesel engine, ship emissions often gets dispersed in the local environment and might pose risk of fumigation during the early morning and evening hours due to atmospheric inversion break-up periods.						
	Road vehicle		Not	Due to implementation of Bharat VI fuels (MoEF&CC) in near future the vehicular and	APSEZ		Presently, cargo evacuation through rail / conveyer / pipeline is ~23.87 % of overall cargo evacuation. Vehicles having valid PUC certificate are only being allowed to enter within APSEZ area.

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4.4	emissions will be other major contributors to the air pollution in the region when the facility is fully developed.	Level-2	Applicable	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 Stage VI emission norms are adopted by all their contractors and sub-contractors.	and All Industries	Short Term	APSEZ, has procured 217 nos. of Electrical Vehicle for internal cargo movement and 183 nos. E-ITV's are in operation. As well as procured 10 nos. LMV E-Vehicles for manpower movement and all are in operation. Electrification of Rail Corridor from Dhrub Railway Station to Adipur Railway Station has completed and movement started by electric locomotive. It will leads to reduce the gaseous emission and increase efficiency of transportation by rail.
5	**Noise emissions**						
	Noise emissions are envisaged from port operations,		Due to adoption of various mechanized operations at the waterfront development	APSEZ, all the tenant industries and facilities within APSEZ are required to undertake noise monitoring at their facilities to	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.

<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>5.1</td><td>industrial operations and power plants in the study area. Any increase in noise levels beyond three decibels from the background levels would be perceived as noise nuisance (USEPA)7.</td><td>Level-1</td><td>, the noise emissions from the port cargo handling will be minimal. An adequate greenbelt is being developed by 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</td><td>demonstrate the compliance with the Noise level standards. Continuous noise recording units can be installed by APSEZ at facility boundary to address the 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>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'23 to Mar'24) are as below.

Locations: 15 Nos.
Frequency: Once in a month (24 hourly)
<table>
<tr><th>Noise</th><th>Unit</th><th>Leq Min</th><th>Leq Maxn</th><th>Leq Avr.</th><th>Leq Perm. Limit$</th></tr>
<tr><td>Day Time</td><td>dB(A)</td><td>57.4</td><td>69.9</td><td>64.7</td><td>75</td></tr>
<tr><td>Night Time</td><td>dB(A)</td><td>53.8</td><td>64.8</td><td>60.5</td><td>70</td></tr>
</table>
$ as per GPCB standards

Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, 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</td></tr>
</table>

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			were found to be well within the designated noise standards for Industrial facilities.				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.
				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	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 19/04.2024 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.

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				zones.			• 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. • Discussed about disposal of minor qty. of generated hazardous waste materials at authorized recycler/vendor. 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	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	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	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 940.21 KLD (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 46 operational units only 4 industries within

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	streams, estuaries and marine water bodies.		which necessary permissions to set up decentralized CETPs of various capacities are already obtained. Presently a CETP 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	discharge of treated industrial wastewater to 16 MLD as per the permits. Remaining treated wastewater shall be utilized for horticulture purpose.			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. Presently avg. 2.26 MLD (from CETP, ETP & STPs) of treated water is being utilized on land for horticulture purpose within APSEZ premises during period Oct'23 to Mar'24 and no discharge is made to any other source.

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			meets the stipulated discharge norms for utilization for greenbelt development within the APSEZ areas.				
			Online wastewater quality 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	Efforts shall be made to recycle complete treated wastewater for port operations and industrial operations of APSEZ in future based on a detailed techno-economic feasibility study.	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 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.

<table>
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<tr><td></td><td></td><td></td><td>bodies as on date..</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>Runoff during monsoon from coal storage yards is collected in sedimentation ponds (dump pond) to remove any residual dust particulates for further disposal into sea</td><td>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 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</td><td>APSEZ</td><td>Continual</td><td>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 concerned authorities on regular basis.

The marine water quality monitoring summary for last six months (Oct'23 to Mar'24) is as per below.

Locations: 14 Nos. (APSEZ – 9 + APL – 5)
Frequency: Once in a Month / Half Yearly
<table>
<tr><th>TEST PARAMETERS</th><th>UNIT</th><th colspan="3">Cumulative Surface</th><th colspan="3">Cumulative Bottom</th></tr>
<tr><th></th><th></th><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>7.9</td><td>8.24</td><td>8.09</td><td>7.86</td><td>8.2</td><td>8.04</td></tr>
<tr><td>BOD</td><td>mg/L</td><td>2.2</td><td>5.1</td><td>3.84</td><td>0</td><td>5.2</td><td>4.82</td></tr>
</table>
</td></tr>
</table>

<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>storm water-drains.</td><td></td><td></td><td>
<table>
<tr><td>TSS</td><td>mg/L</td><td>76</td><td>152</td><td>107.45</td><td>78</td><td>128</td><td>107.46</td></tr>
<tr><td>DO</td><td>mg/L</td><td>5.3</td><td>6.5</td><td>5.98</td><td>4.2</td><td>6.25</td><td>5.41</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>35.24</td><td>39</td><td>36.94</td><td>36.15</td><td>40</td><td>37.82</td></tr>
<tr><td>TDS</td><td>mg/L</td><td>35864</td><td>36610</td><td>36225</td><td>34500</td><td>37540</td><td>37077</td></tr>
<tr><td>Temperature</td><td>oC</td><td>24.7</td><td>29.8</td><td>27.38</td><td>24.2</td><td>29.7</td><td>26.92</td></tr>
</table>
MDL – Minimum Detection Limit

Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, which also includes ambient air quality monitoring for overall APSEZ, Mundra.</td></tr>
<tr><td></td><td></td><td></td><td>Detailed marine hydrodynamic modelling studies revealed that the current and proposed dredged soil disposal practices,</td><td>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).</td><td>APSEZ</td><td>Long Term</td><td>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</td></tr>
</table>

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			sea water intake and outfall facilities and desalination plant outfall etc have shown insignificant impact on the marine eco-system. As part of the comprehensive environmental monitoring program, APSEZ has been adopting marine water and sediment quality monitoring on monthly	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 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			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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			basis.	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 published by CGWB), due to induced economic and population growth, use of ground water resources by the local people might increase in Mundra	Level-2	APSEZ is not utilizing ground water for any type of use. APSEZ is meeting the current water demand through Narmada water supply scheme and 47 MLD captive desalination plant at site.	A dedicated desalination plant of capacity 4,50,000 m3/day (450 MLD) will be developed in progressive manner to meet the APSEZ requirements.	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 development and requirement.

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	region. This might increase the TDS and chloride levels in the ground water in future.						
7.2	Due to induced growth in the region, pressure on the available ground water source would increase and this could pose some threat to salinity ingress.	Level-2	Ground water is not drawn by 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.	The Govt. of Gujarat, Narmada, Water Resources, Water Supply & Kalpsar Dept.,(WRD)12 has been implementing various salinity ingress prevention projects	District Administration*	Long Term	APSEZ will co-operate and comply with the directions from concerned regulatory authorities. 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 Rainwater 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

<table>
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<tr><td></td><td></td><td></td><td>Due to the above reasons, the possibility of salinity ingress due to APSEZ development is not envisaged. Mundra and Anjar blocks 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</td><td></td><td></td><td></td><td>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.

<u>WORK COMPLETED:</u>

Below tabulated Water Conservation Projects completed during Compliance period:

<u>Water Conservation Projects:</u>
<u>Swajal Project:</u>
➢ Aim: The Foundation’s Water Conservation program, SWAJAL, is aimed at addressing the alarming depletion of groundwater levels and reduction in water sources in various parts of Kutch district.
➢ Water Security Plan: Due to arid climatic characters of the Kutch region, it is essential to plan for water security drinking and livelihood purposes. Considering weather condition, rainfall characters, geohydrological condition and water demand, water security plan has been prepared forl the Seven villages.

<table>
<tr><th>Block Name</th><th>Water conservation structure</th><th>Total no. of Structure</th><th>Total Capacity Created (CUM)</th></tr>
<tr><td>Mundra</td><td>Check Dam</td><td>23</td><td>6,07,332.80</td></tr>
<tr><td></td><td>Pond Deepening</td><td>66</td><td>1,89,121.08</td></tr>
</table>
</td></tr>
</table>

<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>Anjar blocks. This aspect confirms that the overall salinity ingress from the shore into the land due to existing APSEZ facilities and power plant outfalls are less significant.</td><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>RRWHS</td><td>275</td><td>2750</td></tr>
<tr><td></td><td>Recharge Borewell</td><td>209</td><td>-</td></tr>
<tr><td></td><td>Percolation Well</td><td>24</td><td>-</td></tr>
</table>
Earlier Completed Activities/Projects:
<table>
<tr><th>Sr. No.</th><th>Project</th><th>Unit</th><th>Outcome</th><th>Impact</th></tr>
<tr><td>1</td><td>Check dam Restrengthen ing-Nana Kapaya</td><td>1</td><td>Water Storage Capacity increased by 48000 Cum</td><td>60 + farmer's 120+Acre Area of Agri land can be Irrigated</td></tr>
<tr><td>2</td><td>Recharge Borewell</td><td>21</td><td>Reduce Salinity ingress, and preventing water run</td><td>150+ farmer's 260+ Acre Area of Agri land for Irrigated</td></tr>
<tr><td>3</td><td>Pipe Culvert at Checkdam at Bhujpur</td><td>1</td><td>prevent water runoff into seaside.</td><td>35 farmers' 120+Acre Area of Agri land can be Irrigated</td></tr>
</table>
</td></tr>
</table>

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							• 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. With the objective of to preserve the rainwater to

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							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 monitoring as per the	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'23 to Mar'24) are as below. Nos. of Location: 09

<table>
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<tr><td></td><td></td><td></td><td></td><td>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>
<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>7.11</td><td>8.32</td><td>7.77</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>0.99</td><td>21.11</td><td>5.86</td></tr>
<tr><td>Oil & Grease</td><td>mg/L</td><td>BDL(MDL:5.0)</td><td>BDL(MDL:5.0)</td><td>BDL(MDL:5.0)</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>BDL(MDL:0.01)</td><td>0.11</td><td>0.01</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>BDL(MDL:0.02)</td><td>0.10</td><td>0.01</td></tr>
<tr><td>Total Chromium as Cr</td><td>mg/L</td><td>BDL(MDL:0.05)</td><td>BDL(MDL:0.01)</td><td>BDL(MDL:0.01)</td></tr>
<tr><td>Cadmium as Cd</td><td>mg/L</td><td>BDL(MDL:0.003)</td><td>0.14</td><td>0.02</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>BDL(MDL:0.05)</td><td>0.14</td><td>0.02</td></tr>
<tr><td>Copper as Cu</td><td>mg/L</td><td>BDL(MDL:0.05)</td><td>BDL(MDL:0.05)</td><td>BDL(MDL:0.05)</td></tr>
<tr><td>Iron as Fe</td><td>mg/L</td><td>BDL(MDL:0.1)</td><td>1.78</td><td>0.43</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</td><td>meter</td><td>1.90</td><td>2.20</td><td>2.07</td></tr>
</table>
</td></tr>
</table>

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							from Ground Level | | | | | BDL – Below Detection Limit MDL – Minimum Detection Limit Approx. INR 13.37 Lakhs is spent by APSEZ for environmental monitoring activities during the FY 2023-24, 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.	Solid waste will be generated from industrial	Level-2	APSEZ has been adopting Zero waste Initiatives	APSEZ will continue to adopt Zero Waste Initiative and wastes will	APSEZ	Continual	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

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1	activities of APSEZ and other 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 the entire waste generated from existing operations is segregated and disposed to recycling vendors, thereby APSEZ has achieved zero landfill status as on date.	be segregated at source and disposed to 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.		Process	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, 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 principle as per Waste Management Plan.

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	and material recycling strategies 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	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	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	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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	APSEZ will be in the order of 100 TPD (36,500 TPA).		Initiatives, no landfill facilities will be installed at APSEZ.	adopted and implemented as per Municipal 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	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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			to landfill sites.				
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	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	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	APSEZ/State Forest Department*	Long Term	Stage – 1 Forest clearance granted for diversion of 1576.81 Ha Forest land. APSEZ has applied for getting EC & CRZ clearance for SEZ / Industrial Park in 1576.81 Ha Forest land. ToR accorded by MoEF&CC on 30.11.2021 and draft EIA is being carried out through NABET accredited consultant.

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	in the study area.		diversion. It is also noted that 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	overall ecological footprint in the district will be increased. 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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			will not be any change in 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	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. Last 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

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<tr><td></td><td></td><td></td><td>coast of Gujarat state in 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>growth of mangroves in a progressive direction.

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 10.94%.</td></tr>
</table></td></tr>
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									• 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. • According to GUIDE Mangrove monitoring study report November 2023 (The report was submitted during the last compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi

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									mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. • Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). • The cost of the said study was INR 23.60 Lacs incurred by APSEZ.

<table>
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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>
Summary of Mangrove mapping and monitoring (from 2011 to 2021):
<table>
<tr><th rowspan="2">Mangrove mapping Year</th><th rowspan="2">Mangrove cover total Area (Ha.)</th><th colspan="2">Mangrove cover area Increased</th></tr>
<tr><th>Hac.</th><th>%</th></tr>
<tr><td>2011</td><td>2094</td><td>-</td><td>-</td></tr>
<tr><td>2011 to 2016-17</td><td>2340</td><td>246</td><td>11.75%</td></tr>
<tr><td>2017 to 2019 till March</td><td>2596</td><td>256</td><td>10.94%</td></tr>
<tr><td>2019 to 2021 till March</td><td>2723</td><td>127</td><td>4.89</td></tr>
<tr><td>Total</td><td>2723</td><td>629</td><td>--</td></tr>
</table>
To comply with the GCZMA recommendations regarding mangrove monitoring at every
</td></tr>
</table>

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									2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023.
							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 Rs. 80000 Lacs during the FY 2022-232023-24.

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									The report of algal removal is attached as **Annexure – 11.**
							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 29 Villages. Project is covering total 16000 Cattels / 3008 farmers and hence enhancing cattle productivity. Dry Fodder 731230 Kg Green –2359204 Kg. • Awareness of mangroves importance in surrounding communities & Fodder support - The expenditure for fodder supporting activities was approx. 305.55 Lacs during FY 2023-24, which was incurred by APSEZ. • Grass Land development: 213 acres of gauchar land has been cleaned and

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									allocated for Grass land development with strong Community Contribution and Mobilization. • 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 Mangrove Ecosystem on July 26th 2023 and World Nature Conservation Day on 28th July 2023 to raise awareness of the importance of mangrove ecosystems as "a unique, special and vulnerable ecosystem". The report of day celebration was submitted along with half yearly compliance report for the period of Apr'23 to Sep'23..

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							• 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 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 was 23.60 Lacs (Including Taxes), which was paid by APSEZ. GUIDE has completed the study of Monitoring and Distribution of the Mangroves along the Creeks in and Around APSEZ, Mundra, Kutch, Gujarat for the duration of year March 2019 to March 2021. Copy of the report of Monitoring and Distribution of the Mangroves was submitted during the last EC compliance report submission Apr'23 to Sep'23.

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							According to NCSCM Mangrove monitoring study report March 2021, distribution of mangroves in Kotdi, Baradi Mata, Navinal, Bocha and Khari creeks and also in Bocha island was studied using Google earth images (2017 March and 2019 Sep). The data obtained for 2017 i.e., 2398 ha was compared with data reported for 2016 (Dec) - 2017 (Jan & Feb) i.e., 2340 ha in the Conservation plan submitted earlier. The Google earth showed a marginal difference of + 58 ha (compared to earlier 2016-17 data) which shows 2.4% higher and the difference can be considered as insignificant. Further for both the start year (2017 March) and the end year (Sep.2019) Google earth image was used as a source and therefore, the results will be quite acceptable for assessment. With regard to overall health of mangroves in the creeks in and around APSEZ, it was found that there was an increase of mangrove cover between March 2017 and Sep 2019 to an extent of 256 ha which is about 10.7% increase in mangroves. Hence overall mangrove cover was considered as 2596 Ha in year 2019. Now, according to GUIDE Mangrove monitoring study report November 2023 (The Report was submitted during last EC compliance report submission Apr'23 to Sep'23), the distribution of mangroves in Kotadi, Baradi Mata, Navinal, Bocha and Khari creeks as well as in the Bocha island was studied using LISS IV satellite images for the duration of March 2019 to March 2021.The

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							mangrove cover in the creeks in and around APSEZ showed a positive trend from March 2019 to March 2021, with an overall increase of 52.79 ha (1.9%) compared to the cover during the year 2019. The total mangrove cover during 2019 was 2670 ha which has increased to 2723 ha during the year 2021. Hence, overall increase in mangrove cover area in creek system in and around APSEZ from 2011 (2094 Ha) to 2021 (2723 Ha) is 629 Ha (30%). To comply with the GCZMA recommendations regarding mangrove monitoring at every 2 years, presently APSEZ is in process to carry out the study for Monitoring of Mangrove Distribution of creeks in and around APSEZ area from 2021 to 2023. 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,

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							These plantations are diligently maintained and continually monitored. Notably, these forests have evolved into a thriving habitat for various marine and migratory bird species, enriching the local ecosystem. Mangrove plantation done at Luni Sea coast with school students on "International Day for the Conservation of the Mangrove Ecosystem" on 26th July-2023 and Bhareswar sea coast area with fisher folk community on "World Nature Conservation Day" on 28th July-2023.. Web talk show was organized on the occasion of "International Mangrove days On Multi species Mangrove biodiversity 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 Mandvi Beach.
9.3	Outfall from the thermal power plants desalination and CETP	Level-1	A detailed marine hydro-dynamic and dispersion modelling of the study area indicates	All approved marine outfalls shall be monitored for salinity, temperature and other designated parameters as	APSEZ and Concerned Industry	Continual Process	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

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<tr><td></td><td>would pose certain level of impact on the marine environment.</td><td></td><td>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 respective power plants in the study area have been monitoring the marine water quality status on monthly basis for the stipulated</td><td>per consent to establish issued by GPCB.
Existing marine environmental monitoring program shall be continued.</td><td></td><td></td><td>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>29.8</td><td>30</td><td>24.2</td><td>30</td></tr>
<tr><td>Salinity</td><td>ppt</td><td>40</td><td>36.7</td><td>35.24</td><td>7</td></tr>
</table>

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.</td></tr>
</table>

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			environmental and ecological parameters.				
9.4	**Terrestrial Ecology:** Study area doesn't have any notified national parks or ecological sanctuaries. Since the area falls under dry deciduous shrubs. Due to scanty rains in the area, the overall natural green-cover/vegetation in 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 plantation. APSEZ have undertaken a plantation with about 9.6 Lakh fully grown trees.	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 during the FY 2023-24 within APSEZ is INR 904 lakhs.

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	area is very small.						
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 area could be possible due to induced economic growth in the region. Increase in population will have a additional need for public	Level-1	Dedicated townships are developed within APSEZ area with necessary community infrastructures such as hospital, school, recreational facilities, sewage treatment and waste collection facilities. Adani Foundation has been undertaking various CSR programs under the	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 2302 households and associated infrastructure facilities. Accommodation is made available for all interested employees working within Adani group & SEZ industries. Out of which 95.57% Occupancies are accommodated within the townships and rest are available for employees working within APSEZ. At present 46 nos. of industries (processing & non-processing) are operating within the SEZ. Township facilities are also made by SEZ industries within 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

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	infrastructure in the region.		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 development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.				• 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 • Skill Development Adani foundation has spent approx. INR 8515.06 lakhs from April – 2018 to March – 2024 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 2023-24 infrastructure development activities:</u>**

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							• 377 - AC Roof sheet support to Fisherfolk Vasaha 1700+ Benefited. • 2 Development of Common Gathering flooring work – 4000+ Benefited. • 195 Stall – Vegetable market– 900+ Benefited. • Solar Panel System at Mundra – 600+ Benefited. • Maintenance, Fencing & Material Support - 30+ Benefited.Renovation of Shed at Shekranpir Bhopavandh - 2000+ Benefited. • Renovation Check dam and CC road work at Nani Khakhar – 200+ Benefited. • Renovation of High School at Zaarapa – 2200+ Benefited. • Construction of Pipe Culvert – 400+ Benefited. • Construction of chain-link fencing at Mangra village – 300 people benefited. • Gaushala Shed at Zarapara village – 400 cettle benefited. • Renovation of approach road, Zarpara – benefiting 400 villagers. • Renovation of Civil and Electrical Work at ITI, Mundra - 500 students benefited. • Construction of 21 Borewell Recharge in Nagmati River - 150+ farmer benefited. • Check dam Desilting and restoration at Nana Bhadiya – 100+ farmers benefited. • Renovation of Check dam at Pavadiyara village - 300 people benefited.

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							• Renovation of Balwadi at Juna bandar & Luni bandar. • 185 RRWHS construction is ongoing in various villages - will benefit 1300+ residents. • Supply & installation of Solar panel (3.25 KV) at CGP, Mundra – benefiting 1200 people. • Development of Model Farm in Zarpara, Siracha & Mangra – Benefiting 300 people. • Renovation of approach road at various fisherfolk vasahat. **<u>Last 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.

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							• 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 • 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,

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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>drinking water and sanitation plus recreational – TV Facilities.

Similar community development programs (based on need based assessment) will be continued in future as well with allocation of appropriate budget.</td></tr>
<tr><td>10.2</td><td>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 influx of working men in the region due to rapid economic development. Similar trend might continue in future due to induced</td><td>Level-2</td><td>Adani foundation is taking up several girl child education programs as part of CSR activities to create awareness about girl child protection.</td><td>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 programs in association with district authorities.</td><td>APSEZ, Other development projects and District Administration*</td><td>Long Term</td><td>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. We extend 100% fee support to female candidates and 80% to male candidates."W.
• Student Benefitted Under Uthhan Project:
<table>
<tr><th>Utthan Initiatives</th><th>Benefited</th></tr>
<tr><td>Strengthening government Primary & High schools</td><td>31 Villages, 77 Schools, 12000+ Students, Efforts for Increase Gunotsav result & Board result.</td></tr>
<tr><td>Appointing an Utthan sahayak</td><td>70+ Utthan sahayak works as catalyst. Students: Teacher ration decrease.</td></tr>
<tr><td>Mainstreamed Progressive learner</td><td>Assessment: 6982, Progressive learners: 2541, Mainstreamed: 1278.</td></tr>
<tr><td>Providing required</td><td>Sports Kit, Music Kit, TLM Kit, Science Kit provided in schools.</td></tr>
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<tr><td></td><td>economic growth in the region.</td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>resources and facilities</td><td></td></tr>
<tr><td>Enabling joyful learning spaces</td><td>Smart Class with Navneet software+ Bala painting + Activity base learning.</td></tr>
<tr><td>Adani Students Development Center (ASDC)</td><td>2 Adani Evening Education Center, 5 Adani Competitive Coaching Center, 5 Adani English Coaching Center</td></tr>
<tr><td>Introducing English as a Third Language</td><td>Students: 5000+ Classes 1-4, Curriculum, Every Friday morning assembly in English</td></tr>
<tr><td>Enhancing Reading Habits</td><td>Redding corner, 1000+ Oasis workshop, 162780 Books CICO, 100+ Schools partner from 10+ Country in International school library month (ISLM)</td></tr>
<tr><td>IT on Wheels</td><td>2 dedicative van, 2 IT instructors, 55 laptops, 34 schools, Empowering 4170 students, 200+ High schools' students</td></tr>
<tr><td>Promote sports</td><td>6 Students selected in District level sports school, Inspiring more 100 Students. Khel Maha Kumbh: 2000+</td></tr>
<tr><td>Teachers' & Sahayak Capacity Building</td><td>3500+ Hours Capacity building program + Webinar + Diksha + 10 full days training.</td></tr>
<tr><td>Formation of Eco Club</td><td>Plastic free village workshop: 1250+ Students, Environment Awareness program & Tree plantation in schools.</td></tr>
<tr><td>Day Celebrations & Collaboration with GoG</td><td>Summer Camp: 6000+ Students Diwali Mela: 5500+ Students. 1400+ Parents participated.</td></tr>
<tr><td>Mothers as catalyst in transformation</td><td>Mothers meet: 700+ Mothers Joined: 15000+ this year. (Meetings + Home Visit)</td></tr>
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							<table><tr><td>Strengthening Stakeholders</td><td>Support in Taluka, District & state level various initiative with DIRT, BRC, Strengthening SMC Committee.</td></tr></table> • 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. • Menstrual Hygiene Awareness: To educate and empower rural girls and women about menstrual health, break down negative social views on menstruation, supply to enhance their overall health, education, and empowerment." • Till date 36% women had never used sanitary Napking single time now they started using due to our intervention. This will reduce UTI @ 22%. As our sample survey. 1587 Women and 494 School girls from 18 nos. of villages. • 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

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							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. • During the year various activity like, Covid-19 awareness in village & Slum Area, Menstrual Hygiene Day, Breastfeeding Week, National 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. ✓ 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

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							• Support Awareness & Cover 100 % Vaccination taken by Child & women. • SuPoshan Thanksgiving program was organized. In this webinar DDO, CDPO Mundra and other 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 8515.06 lakhs has been spent on various CSR activities in the Mundra region since April 2018 to till March 2024 including cost of community health and education for woman and girl child.
	Due to economic growth		Adani hospitals, Mundra is setup by	APSEZ will explore other possibilities to augment the primary and	APSEZ	Long Term	Adani hospitals (Multi-specialty), Mundra is having 110 bed facility and same is setup by Adani group near Samudra township.

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10.4	leading to rapid urbanization, which prompts the 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.	Level-2	Adani group near Samudra township with a goal to provide 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.	secondary healthcare facilities in future depending on the growth scenario at APSEZ development.			Primary health center and community health center are in place within the Mundra taluka. 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 • 07 Rural Clinics • 05 villages of Mundra & 02 village Mandvi block has benefited by rural clinic service. • Total Patients Benefitted FY 23-24 : -23327 (direct & indirect) by Mobile van and rural clinic • 2 financially challenged patients has been supported with Dialysis treatment at 124 Times which added day in their Life. • Provided 41,546 medical health services and conducted health awareness camps for 763 High school students. • **<u>Cataract-Free Mundra:</u>** The initiative is a dedicated effort to eradicate cataract-related vision impairments specially focused on Senior citizen through Meticulous planning as below. **Lives Impacted: - 1131** ➢ Comprehensive Eye Screenings at Village level ➢ Cataract Surgeries to GKGH, Bhuj

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							➢ Post-Operative Care and Follow-up ➢ 5 successful Operation **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, ophthalmic, specialty health camp): - 5795 Patients Benefited. • General health camp: - 1618 Patients benefited. • Blood Donation Camp: 1715 people have donated blood. • Conducted health programs for students, engaging 763 participants, and held sessions on Personal Health & Hygiene Awareness, addressing critical health issues and promoting overall well-being. • Women's Health: Provided health services to more than 2610 women benefitted through Menstrual & Mental Health Awareness Drive. • Dialysis Support: During this year, 2 patients were supported for regular dialysis with 124Times which added day in their Life. • Medical Supports: 1007 beneficiary in 35 village. • **International year of Millets – 2023:** To promote millet culture and raise awareness about its benefits in Mundra, we organized a Millet

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							Competition across nine villages. Over 715 women took part in the competition, while 2200 benefited from awareness sessions. Through this initiative, 300 indigenous millet recipes were showcased, highlighting the potential for sustainable and nutritious dishes in our daily diets. • **Ayushman card facilitation:** Ayushman card issued to 5584 for 25 village of 686.50 Cr. health insurance. • Preventive health Campaign the Adani Foundation is focusing on providing preventive healthcare to women and adolescent girls, raising awareness of Physical and Mental health issues, promoting healthy behaviors, implementing Menstrual hygiene initiatives and Millet consumption for healthy body. • **Sample Survey Report 2023-24** o 55% Never heard about Menstrual hygiene. o 60% Are using cloths on regular basis. o 36% Had never used sanitary pads. o 68% Had no information about UTI. o 30% Never used millets in their diet. o 60% Never heard about millets or it's benefits. • 2222 –Economically Challenged patients have been supported for operation, OPD, IPD, Medicines and lab-test.

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							• For Preventive health care General and multispecialty camps Pediatric camp, General Health camps in 7 villages and Super specialist camp which benefitted more than 4690 patients of Mundra & Mandvi 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 with total 18903 cattle benefitted, and 18870 cattle vaccinated. Total 982 cattle owners benefited for Preventive Health Care & Fodder Support Program • 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		APSEZ has been giving				**Current FY 2023-24 fishermen livelihood activities development activities:**

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10.5	development in the region, several employment opportunities can be 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		preferences to people from Gujarat for providing employment opportunities 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	APSEZ is committed to provide support for fishermen livelihood activities and has submitted a detailed 5 years plan to MoEF&CC with a total budget of Rs.13.5 Cr.	APSEZ	Short Term	**Overall Persistent efforts for Fisherman development:** • 598 Education Kit Support • 273 Fisherman Shelter Support • 1,247 Vehicle transportation support of Mundra and Mandvi taluka • 106 Cycle Support to high school going students. • 613 Scholarship Support • 419 Youth Employment • 195 Linkages with Fisheries Scheme • 3,534 Ramatotsav Community Engagement • 56,523 Man days Mangroves Plantation • **Vehicle Transportation Facilities:** 146 Students supported Mundra Taluka and 58 Students supported at Mandvi Taluka during the compliance period. • **Education Kits Support:** Education Kits including notebooks, guides, and bags, to fisherfolk students studying in 9th to 12th standard to enhance their learning experience (57 nos. students benefitted). • **Educational Awareness Sessions:** Through targeted awareness sessions in Fisherfolk Vasahats, we promote the transformative power of education, with a particular focus on

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	by the end of 2030.		Development Centre, Mundra. In these centres, youth can join and get 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.				advancing girl-child education. (487 Students motivated for high school Education). • **Scholarship Support:** Provide scholarship support to 31 deserving students, covering their higher secondary school fees. Emphasizing gender equality, we offer 100% fee support to female candidates and 80% to male candidates. • **Cycle Support:** Overcoming transportation obstacles, our cycle support initiative enables six 9th standard fisherfolk students from Juna Bandar to continue their education with ease. • **Assisting During Emergencies**: Fisherfolk Home were significantly damaged by the Biporjoy Cyclone. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery. (336 Fisherfolk house benefited) • **Fostering Youth Employment:** At APSEZ Mundra, our mission revolves around providing sustainable employment opportunities for the local fishing community. We serve as a bridge between industries and Fisherfolk youth, facilitating job placements to enhance livelihoods. This year, we have successfully engaged 115+ Fisherfolk youth, paving the way for a brighter future. (115+ Fisherfolk youth employed) • **Strengthening Fisherfolk women:** Through comprehensive health and hygiene initiatives, we empower Fisherfolk women. Our programs include family planning resources, menstrual

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							hygiene workshops, nutrition advocacy, and health awareness sessions covering vaccinations, clean water access, and mental health support. (449 Women benefited) • **Potable Water Distribution:** Providing potable water facilities to 9 Fisherfolk Vasahats daily, either through water tankers or by establishing linkages with the nearest Gram Panchayat. This initiative benefits over 5000 Fisherfolk, significantly improving their health and productivity. (5000+ Population benefited). • **Cement Roof Sheet Support:** fisherfolk Home were significantly damaged by the **Bipor Cyclone**. In response to that we provided 2696 cement sheets to 336 fisherfolk households of Juna Bandar, Luni, and Randh Bandar to support their recovery." • **Potable water Distribution:** Providing access of potable Drinking water Facilities to Nine sherfolk vasahat on Daily bases, either By Water tanker or Linkage with Nearest Gram panchayat. • More than 5000 Fisherfolk Population are getting benefit which impact on their health and efficiency. • Water distribution to Luni & Bavadi Bandar Fishfolk Vasahat: 35000 KL water for 936 people. • **Sagar Mitra Card:** Introduced the 'Sagar Mitra Card' to simplify access for Fisherfolk to specific fishing routes within APSEZ. This digital card is

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							connected to a digital punching machine located at designated entry points. Initially, we have implemented this system for Navinal Fisherfolk, and so far, we have issued a total of 57 Sagar Mitra Cards." • 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. • More than 35% of enrolled students in AVMB come from the Fisherfolk community. • **Youth Employment:** Our main objective is to offer sustainable employment opportunities to the local fishing community in APSEZ Mundra. We bridge the gap between industries and Fisherfolk youth by facilitating job placements. Currently, we have successfully engaged a total of 12 Fisherfolk youth in this endeavor. • **Vidya Sahay Yojana – Scholarship Support:** All basic education supportive facilities have been created to promote education in fisher folk community. We are deeply committed to empowering the future of fisherfolk communities through education. To this end, we provide scholarship support to 30 deserving students, covering their actual school fees. In our unwavering commitment to promoting gender equality and advancing girl

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							child education, we extend 100% fee support to female candidates and 80% to male candidates." • During FY2023-24 Approx. INR 122.32 lakh were spent for Fisherfolk Amenities work in different core areas • Till FY 2023-24 , Adani Foundation has done total expenditure of INR 1460.51 lakh for Fisherfolk Amenities work in different core areas. 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

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							submitted earlier in detail in the report namely "Silent Transformation of Fisher folk at Mundra", Till, FY 2023-24 approx. 14.61 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**.

Annexure – 11

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.

Photographs of removal of algal encrustations:

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	2023-24	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	563,000	5,020,638	50.21
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	7,452,390	36,870,769	368.71
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	1,620,000	13,153,780	131.54
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	1,227,000	14,911,122	149.11
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	1,370,000	16,497,975	164.98
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	12,232,390	146,051,424	1,460.51