

adani

Ports and
Logistics

APSEZL/EnvCell/2019-20/048

Date: 26.11.2019

To

Additional Principal Chief Conservator of Forests (C),
Ministry of Environment, Forest and Climate Change,
Regional Office (WZ), E-5, Kendriya
Paryavaran Bhawan, Arera Colony,
Link Road No. - 3, Bhopal - 462 016.
E-mail: rowz.bpl-mef@nic.in

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

Dear Sir,

Please refer to the above cited reference for the said subject matter. In connection to the same, it is to state that copy of the compliance report for the Environmental and CRZ Clearance for the period of April - 2019 to September - 2019 has been submitted through mail communication dated 26.11.2019 and acknowledge of the same with CD (Soft Copy of Compliance Report) is attached here for your records.

Thank you,

Yours Faithfully,

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

Avinash Rai
Chief Executive Officer
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) Zonal Officer, Regional Office, CPCB - Western Region, Parivesh Bhawan, Opp. VMC Ward Office No. 10, Subhanpura, Vadodara - 390 023
- 3) Member Secretary, GPCB - Head Office, Paryavaran Bhawan, Sector 10 A, Gandhi Nagar - 382 010
- 4) Deputy Secretary, Forests & Environment Department, Block - 14, 8th floor, Sachivalaya, Gandhi Nagar - 382 010
- 5) Regional Officer, Regional Office GPCB (Kutch-East), Gandhidham, 370201

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Received
Deewanjan
20/11/19

कार्यालय/OFFICE
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forests & Climate Change.
राष्ट्रीय कार्यालय (पश्चिम क्षेत्र)/Regional Office (Western Zone)
भोपाल (म.प्र.)/BHOPAL-462016

Environmental Clearance Compliance Report



Waterfront Development Project,
Mundra, Dist. Kutch, Gujarat

Adani Ports and SEZ Limited

For the period of
April-20 19 to September-20 19

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

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**Adani Ports and Special Economic
Zone Limited, Mundra.**

**From : Apr'19
To : Sep'19**

Status of the conditions stipulated in Environment and CRZ Clearance

Compliance Report of Environmental and CRZ Clearance

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

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

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

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

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

1. Dredging Quantity: 210 Mm³. Overall dredging to the tune of 123 Mm³ is completed till date
2. Back-up area, back-up facilities like railway line, rail slidings, rail truck loading, open paved areas, associated buildings, utilities, amenities, etc. and connectivity to rail and road corridor for each port were approved and majority of them are constructed and in operation. Remaining facilities will be developed based on future requirements.
3. Seawater intake channel and outfall channel for power plants, desalination plants (47 MLD is operational out of 300 MLD) and other industrial requirements approved and is already in operation.

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Note:

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

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

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

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
Specific Conditions		
i	No existing mangroves shall be destroyed during construction / operation of the Project.	<p>Complied.</p> <p>Project is being developed as per permissions granted.</p> <p>Conservation of mangroves:</p> <ul style="list-style-type: none"> • In and around APSEZ, approx. 1800 ha. mangrove area was identified by NIO in an EIA report prepared in the year 1998. • Out of this 1800 ha area, 1254 ha area was further demarcated as potential mangrove conservation by NIO in the year 2008 (as part of the EIA report of WFDP). • It may be noted that the entire area of 1254 ha is not covered with mangroves. • Entire area is being conserved and there is no disturbance to the mangroves in this area. Measures such as restricted entry and regular surveillance have resulted in overall growth of mangroves within this area. • As per MoEF&CC directive, APSEZ entrusted NCSCM to demarcate mangroves in and around APSEZ area. As per their study, presently, mangrove cover in and around APSEZ is over 2340 ha. The analysis of the comparison between 2011 and 2016-17 has shown an overall growth of 246 ha. • NCSCM final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around has been submitted to the concerned authorities i.e. MoEF&CC, New Delhi and GCZMA, Gandhinagar vide our letter dated 04.06.2018 and details of the same were submitted along with half yearly EC compliance report of period Apr'18 to Sep'18. • Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and same has been approved vide MOM published by GCZMA
ii	There shall be no filling up of the creek and reclamation of the creeks.	<p>Complied.</p> <p>Conservation of creeks:</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<ul style="list-style-type: none"> • The prominent creek system (main creeks and small branches of creeks) in and around APSEZ are: (1) Kotdi (2) Baradimata (3) Navinal (4) Bocha (5) Mundra (Oldest port (Juna Bandar) leading to Bhukhi river). • All above creek mouths are open allowing free flow of water in to the creeks and surrounding areas and there is no filling or reclamation of any creek area. • This aspect is also confirmed from the recent study of NCSCM, which highlights the bathymetry data of the entire coast around APSEZ. • From the bathymetry data it can be concluded that there are sufficient depths at the creek mouths and all creek mouths are open allowing flushing of water. • APSEZ has so far constructed 19 culverts having total length of approx. 1100 m with total cost of INR 20 Crores. Three RCC Bridges have also been constructed over Kotdi creek with total length of 230 m and cost of INR 10 Crores. Photographs showing the same were submitted along with half yearly compliance report for the period Apr'17 to Sep'17.
iii	The Project proponent shall comply with all the Orders/directions of the Honorable High Court of Gujarat and Supreme Court in the matter.	<p>Complied.</p> <p>There are three ongoing matters pending (Two pending at High Court and other pending at Supreme Court). Updated status of litigation is attached as Annexure – 1.</p>
iv	Adequate safety measures for the offshore structure and ship navigation shall be taken in view of the High Current in the area.	<p>Complied.</p> <p>The hydrodynamic study for the waterfront area has been carried out by HR Wallingford, a maritime design expert. As per the recommendations in their report, the following safety measures are implemented.</p> <ol style="list-style-type: none"> 1. The alignment of the berth has been kept in line with the current flow in order to reduce the effect of current on vessels moored alongside. 2. The breasting dolphins have been designed in such a configuration so as to provide appropriate lead to the vessels mooring ropes. 3. The berth being in line with the current flow will facilitate Pilotage operation and provide better maneuverability of vessels.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<p>4. The strength of the berth structure has been calculated to absorb the energy transferred to fenders while berthing of tanker vessels at the terminal.</p> <p>5. Navigational buoys and lead lights marking the channel and clearing distance off the breakwater are installed.</p> <p>6. The strength of the fenders at the berth and the SWL of the bollards / winches are sufficient to absorb the forces of vessels alongside keeping in mind the monsoon weather conditions.</p> <p>7. Sufficient depths are maintained at all times to ensure 10%UKC at the time of berthing / un-berthing.</p> <p>8. The capstans / winches / bollards are of adequate strength with respect to the vessels being handled.</p> <p>9. The berth has been designed at an appropriate distance from the existing berths at MMPT-1 in order to safely allow berthing / un-berthing of vessels at MMPT-1 with vessels berthed at the South Port tanker terminal.</p> <p>10. Berths have been planned close to the breakwater as there is a reduced strength of current along the coastline.</p>
v	<p>The shore line changes in the area shall be monitored periodically and the report submitted every 6 months to Regional Office Bhopal.</p>	<p>Complied.</p> <p>Shore line change aspect has been studied in detail as part of following two studies;</p> <ul style="list-style-type: none"> • 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. <p>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</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<p>South port and at West port due to approved reclamation activities.</p> <p>Based on the study outcome, it is recommended to map the coastal morphology (shoreline change) at least once in three years. The said recommendation will be implemented and the next shoreline change assessment will be carried out during 2020-21.</p> <p>Please refer Annexure – B (Compliance of MoEF&CC Order dated 18th Sep, 2015) for further details regarding the mentioned studies.</p>
vi	The recommendations of the risk assessment shall be implemented; any change in the design of the project shall come before the committee for seeking necessary approval.	<p>Complied.</p> <p>Risk Assessment was carried out at the time of preparation of the EIA report for the Liquid Berths and LNG terminal. However, it may be noted that liquid berths are not yet developed. Hence recommendations of Risk Assessment will be implemented once the liquid berths & pipelines are developed by APSEZ.</p> <p>The LNG terminal is being constructed by GSPC LNG Ltd. and a separate Environment and CRZ clearance is obtained by them. Please refer general condition no ix below for details regarding the same.</p> <p>LPG is proposed to be handled from the existing multipurpose terminal and storage tanks are being constructed in the back up area. A detailed risk assessment study as per MoEF&CC letter no. F. No. 10-47/2008-IA-III dated 31st May, 2016 is carried out by iFluids Engineering for handling as well as storage activities. Recommendations of the risk assessment have been implemented as part of the construction activity and details of the same were submitted along with last half yearly compliance report for the period Oct'18 to Mar'19. Reports of the same were submitted to MoEF & CC along with half yearly compliance report for the period Apr'17 to Sep'17.</p> <p>There are no other activities which attract requirement of Risk Assessment.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019				
vii	Mangrove plantation of 200 ha to be done in consultation with GEER / GEC of Forest Department, a detailed plan shall be submitted within six months from the date of receipt of this letter.	<p>Complied.</p> <p>APSEZ has consulted Gujarat Institute of Desert Ecology (GUIDE) as they are one of the authorized agencies of Dept. of Forest & Env., Govt. of Gujarat for carrying out mangrove afforestation. GUIDE has completed mangrove plantation in an area of 200 ha at Jakhau, Gujarat during the year 2012-13. Copy of the mangrove plantation completion certificate was submitted along with last EC compliance report for the period Apr'18 to Sep'18. Total expenditure for the said work was INR 40 lakh.</p> <p>It may be noted that to enhance the marine biodiversity, till date APSEZ has carried out mangrove afforestation in more than 2850 ha. area across the coast of Gujarat. Total expenditure for the same till date is INR 832 lakh. Please refer Annexure – 2 for green belt development and mangrove afforestation efforts done by APSEZ.</p>				
viii	It shall be ensured that during construction and post construction of the proposed jetty the movement of fishermen vessel of the local communities are not interfered with.	<p>Complied.</p> <p>During project proposal, APSEZ proposed to provide four (4) dedicated accesses at Juna Bandar, Luni, Bavdi Bandar and Zarpara for the fishermen to approach the sea for fishing activity. However, during construction as well as operation, through fishermen consultative process, so far APSEZ has provided seven (7) access roads instead of four (4). Total length of all the approach roads is approx. 23 Kms and expenditure involved is Rs. 637 Lacs. There is no hindrance to the movement of fisherman boats.</p> <p>Further, 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. Following activities have been carried out during the period FY 2018-19.</p> <table><tr><th>Area</th><th>Activity</th></tr><tr><td>Sustainable Livelihood – Fisher folk</td><td><ul style="list-style-type: none">Average 70 KL of water was supplied to 983 households at 4 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana.Adani Foundation constructed four Balwadis for kids between the age group of 2.5 years to 5 years at different settlements under Vidya Deep Yojana. 125 children are benefiting from this scheme.</td></tr></table>	Area	Activity	Sustainable Livelihood – Fisher folk	<ul style="list-style-type: none">Average 70 KL of water was supplied to 983 households at 4 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana.Adani Foundation constructed four Balwadis for kids between the age group of 2.5 years to 5 years at different settlements under Vidya Deep Yojana. 125 children are benefiting from this scheme.
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019																																																	
			<ul style="list-style-type: none">• 115 students are getting benefit of vehicle transportation support from different Bandar.• 100% girls & 80% boys providing scholarship support to motivate and encourage fishermen boys and girls for higher education. Book support 49 Fisherman Students of Higher Secondary Standard (9to12) has been benefitted.• Mangrove Plantation, moss cleaning, etc.: 4300 Man-days.• Biodiversity Project:-Project started with two spices of mangroves which has good survival rate & Plantation at site—70 % Survival Total 4Hector Plantation.• Sea Weed Culture: Sea Weed Culture is going on. Seed bank preparation is going on under guidance of VRTI.																																																
		Please refer Annexure – 3 for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2019-20 is to the tune of INR 2043 lakh. Out of which, Approx. INR 745 lakh are spent during this compliance period Apr’19 to Sep’19.																																																	
ix	Relocation of the fishermen community if any shall be done strictly in accordance with the norms prescribed by the State Government.	Not Applicable The project was conceptualized in such a way that there are no fishermen settlements in the project proposal. Hence there is no relocation of fishermen communities required.																																																	
x	Marine ecology monitoring shall be done regularly during construction of breakwater and dredging /disposal operation.	Complied. Constructions as well as dredging operations are ongoing activities. Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Apr’19 to Sep’19 is mentioned below. Total Sampling Locations & frequency: 09 Nos. (Frequency: Once a month) <table><tr><th rowspan="2">Parameter</th><th rowspan="2">Unit</th><th colspan="2">Surface</th><th colspan="2">Bottom</th></tr><tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr><tr><td>pH</td><td>--</td><td>8.37</td><td>8.07</td><td>8.24</td><td>8.03</td></tr><tr><td>TSS</td><td>mg/L</td><td>382</td><td>182</td><td>364</td><td>218</td></tr><tr><td>BOD (3 Days @ 27 °C)</td><td>mg/L</td><td>12.8</td><td>3.0</td><td>5.0</td><td>2.0</td></tr><tr><td>DO</td><td>mg/L</td><td>6.8</td><td>6.0</td><td>6.8</td><td>5.6</td></tr><tr><td>Salinity</td><td>ppt</td><td>35.7</td><td>33.9</td><td>36.0</td><td>3.0</td></tr><tr><td>TDS</td><td>mg/L</td><td>36734</td><td>34327</td><td>37434</td><td>34218</td></tr></table>				Parameter	Unit	Surface		Bottom		Max	Min	Max	Min	pH	--	8.37	8.07	8.24	8.03	TSS	mg/L	382	182	364	218	BOD (3 Days @ 27 °C)	mg/L	12.8	3.0	5.0	2.0	DO	mg/L	6.8	6.0	6.8	5.6	Salinity	ppt	35.7	33.9	36.0	3.0	TDS	mg/L	36734	34327	37434	34218
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	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<p>Please refer Annexure – 4 for detailed analysis reports and accreditation certificate. Approx. INR 11.23 Lakh is spent for all environmental monitoring activities during the FY 2019-20 (Till Sep'19). Marine monitoring for west port area has been carried out by M/s. Adani Power Limited. Monitoring reports are also enclosed as Annexure – 4.</p> <p>Summary of ecological parameters is given below: Plankton Diversity: A total of five stations were distributed throughout the sampling effort. Samples were collected during September 2017. A maximum 24 genera of Amphidinium, Amphora, Bacteriastrium, Cerataulina, Ceratium, Chaetoceros, Coscinodiscus, Cyndrotheca, Ditylum, Fragilaria, Gunardia, Hemialus, Lauderia, Melosira, Navicula, Odontella, Pleurosigma, Pseudonitzschia, Rhizosolenia, Scrippsiella, Skeletonema, Surirella, Thalassionema and Thalassiosira identified from station 3 during the period of investigation and a minimum 18 genera of phytoplankton Cerataulina, Chaetoceros, Coscinodiscus, Cyndrotheca, Ditylum, Dinophysis, Fragilaria, Leptocylindrus, Melosira, Meuneria, Navicula, Odontella, Pleurosigma, Protoperidinium, Rhizosolenia, Skeletonema, Thalassionema and Thalassiosira identified from station 2 & 4. The phytoplankton abundance in the study region was ranged from 10000 to 41952 cells L-1. Highest phytoplankton abundance was observed at the ST-3 Surface water. However, lowest phytoplankton abundance was observed at the ST-5 Surface water. The maximum number of groups (24) found at ST-3.</p> <p>Benthic Diversity: Benthic invertebrates in the present study area were distributed on the surface of bed forms i.e. sandy and Silty clay in nature. The abundance and diversity, species composition of benthic invertebrates were recorded which is the indicators of changing environmental conditions. A total 5 sub tidal stations and 3 intertidal transect were distributed throughout the sampling effort. Samples were collected during December 2017. <u>Sub tidal:</u> A maximum 4 group of Bivalvia, Polychaeta, Amphipoda, and Sipuncula identified from station 1 & 5 during the period of investigation and a minimum 2 Polychaeta and Amphipoda Benthic fauna recorded from station 2. In the sub tidal region macro benthos abundance</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019																																								
		was higher at ST-1 (575 no. m-2), whereas lowest abundance was recorded at ST-2 (100 no. m-2). Benthic group count was ranged from 2 to 4, with maximum groups at ST-1&5. High biomass was recorded at ST-5 (8.63mg. m-2) as compared to other stations.																																								
xi	Regular Monitoring of air quality shall be done in the settlement areas around the Project site and appropriate safeguard measures shall be taken.	<p>Complied.</p> <p>Ambient Air Quality and Noise monitoring are being carried out by NABL accredited and MoEF&CC authorized agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Apr'19 to Sep'19 is mentioned below.</p> <p>Air sampling locations & frequency: 10 nos. (twice a week) & Noise sampling locations & frequency: 7 nos. (once in a month)</p> <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit^{\$}</th></tr><tr><td>PM₁₀</td><td>µg/m³</td><td>98.3</td><td>44.0</td><td>100</td></tr><tr><td>PM_{2.5}</td><td>µg/m³</td><td>58.4</td><td>16.5</td><td>60</td></tr><tr><td>SO₂</td><td>µg/m³</td><td>28.6</td><td>5.7</td><td>80</td></tr><tr><td>NO₂</td><td>µg/m³</td><td>45.4</td><td>10.4</td><td>80</td></tr><tr><th>Noise</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr><tr><td>Day Time</td><td>dB(A)</td><td>74.4</td><td>47.7</td><td>75</td></tr><tr><td>Night Time</td><td>dB(A)</td><td>69.8</td><td>46.6</td><td>70</td></tr></table> <p>^{\$} as per NAAQ standards, 2009 Values recorded confirms to the stipulated standards.</p> <p>Please refer Annexure – 4 for detailed analysis reports Approx. INR 11.23 Lakh is spent for all environmental monitoring activities during the FY 2019-20 (Till Sep'19). Ambient air quality monitoring in surrounding villages is being carried out by M/s. Adani Power Limited, Mundra and monitoring reports of the same are also enclosed in Annexure – 4.</p> <p>Following safeguard measures are taken for abatement of dust emissions.</p> <ul style="list-style-type: none">• Regular sprinkling on road and other open area• Regular cleaning of roads	Parameter	Unit	Max	Min	Perm. Limit ^{\$}	PM ₁₀	µg/m ³	98.3	44.0	100	PM _{2.5}	µg/m ³	58.4	16.5	60	SO ₂	µg/m ³	28.6	5.7	80	NO ₂	µg/m ³	45.4	10.4	80	Noise	Unit	Max	Min	Perm. Limit	Day Time	dB(A)	74.4	47.7	75	Night Time	dB(A)	69.8	46.6	70
Parameter	Unit	Max	Min	Perm. Limit ^{\$}																																						
PM ₁₀	µg/m ³	98.3	44.0	100																																						
PM _{2.5}	µg/m ³	58.4	16.5	60																																						
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NO ₂	µg/m ³	45.4	10.4	80																																						
Noise	Unit	Max	Min	Perm. Limit																																						
Day Time	dB(A)	74.4	47.7	75																																						
Night Time	dB(A)	69.8	46.6	70																																						

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019																																																														
		<ul style="list-style-type: none">• Dry fog Dust Suppression System (DSS) in hopper, transfer towers and conveyor belts• Use of water mist canon• Closed type conveyor belts• Regular sprinkling on coal heaps• Covering other types of dry bulk cargo heaps• Installation of wind breaking wall• Development of greenbelt along the periphery of the storage yards/back up area• Mechanized handling system for coal and other dry bulk cargo• Wagon loading and truck loading through closed silo																																																														
xii	Sewage arising in the Port area shall be disposed off after adequate treatment to conform to the standards stipulated by Gujarat State Pollution Control Board and shall be utilized / recycled for Gardening, Plantation and Irrigation.	<p>Complied.</p> <p>Entire quantity of sewage generated is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes.</p> <table><tr><th>Location</th><th>Capacity</th><th>Quantity of Treated water (Avg. Apr'19 to Sep'19)</th><th>Type of ETP / STP</th></tr><tr><td>LT</td><td>265 KLD</td><td>82 KLD</td><td>Activated Sludge</td></tr><tr><td>West port</td><td>55 KLD</td><td>5.5 KLD</td><td>FAB</td></tr></table> <p>Third party analysis of the treated water is being carried out once in a month at Liquid Terminal (LT) & twice in a month at West Port by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Summary of the same for duration from Apr'19 to Sep'19 is mentioned below.</p> <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit^{\$}</th></tr><tr><td colspan="5">Industrial Effluent / Sewage</td></tr><tr><td>pH</td><td>--</td><td>7.9</td><td>6.76</td><td>6.5 to 8.5</td></tr><tr><td>TSS</td><td>mg/L</td><td>84</td><td>42</td><td>100</td></tr><tr><td>TDS</td><td>mg/L</td><td>2096</td><td>1903</td><td>2100</td></tr><tr><td>COD</td><td>mg/L</td><td>98</td><td>78</td><td>100</td></tr><tr><td>BOD (3 Days @27°C)</td><td>mg/L</td><td>30</td><td>18</td><td>30</td></tr><tr><td>Ammonical Nitrogen</td><td>mg/L</td><td>14.8</td><td>6.8</td><td>50</td></tr><tr><td colspan="5">Domestic Sewage</td></tr><tr><td>pH</td><td>--</td><td>8.25</td><td>6.96</td><td>6.5 – 8.5</td></tr></table>	Location	Capacity	Quantity of Treated water (Avg. Apr'19 to Sep'19)	Type of ETP / STP	LT	265 KLD	82 KLD	Activated Sludge	West port	55 KLD	5.5 KLD	FAB	Parameter	Unit	Max	Min	Perm. Limit ^{\$}	Industrial Effluent / Sewage					pH	--	7.9	6.76	6.5 to 8.5	TSS	mg/L	84	42	100	TDS	mg/L	2096	1903	2100	COD	mg/L	98	78	100	BOD (3 Days @27°C)	mg/L	30	18	30	Ammonical Nitrogen	mg/L	14.8	6.8	50	Domestic Sewage					pH	--	8.25	6.96	6.5 – 8.5
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Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019				
		TSS	mg/L	28	12	100
		BOD (3 Days @ 27 °C)	mg/L	19	5	30
		Residual Chlorine	ppm	0.8	0.3	Min 0.5
		Fecal Coliform	Nos.	400	58	<1000
		<p style="text-align: right;">§ as per CC&A granted by GPCB</p> <p>Values recorded confirms to the stipulated standards.</p> <p>Please refer Annexure – 4 for detailed analysis reports. Approx. INR 11.23 Lakh is spent for all environmental monitoring activities during the FY 2019-20 (Till Sep'19).</p>				
xiii	Adequate Plantation shall be carried out along the roads of the Port premises and a green belt shall be developed.	<p>Complied.</p> <p>APSEZ has developed its own “Dept. of Horticulture” which is taking measures/ steps for terrestrial greening as well as mangrove plantation.</p> <p>The species such as <i>Ficus Infectoria</i>, <i>Ficus religiosa</i>, <i>Terminalia arjuna</i>, <i>Cocos nucifera</i>, <i>Washingtonia fillifera</i>, <i>Casurina spp.</i>, <i>Azadirachta Indica</i>, <i>Eucalyptus spp.</i>, <i>Jatropha curacus</i>, <i>Ficus bengalensis</i>, <i>Subabool spp.</i>, <i>Casia fistula</i>, <i>Date Palm</i> and <i>Delonix regia</i> are grown within APSEZ area.</p> <p>Within the port areas approx. 175 hectare of greenbelt having 4,35,830 trees with the density of 2490 trees per hectare is developed till date. So, far APSEZ has developed more than 467 ha. area as greenbelt with plantation of more than 8.7 Lacs saplings within the APSEZ area.</p> <p>Please refer Annexure – 2 for further details regarding greenbelt development, mangrove afforestation and updated green belt development plan. Total expenditures of the horticulture dept. during the FY 2019-20 (Till Sep'19) are INR 547 lakh.</p>				
xiv	There shall be no withdrawal of Ground Water in CRZ area for this Project.	<p>Complied.</p> <p>APSEZ does not draw any ground water for the water requirement. Present source of water for various project activities is desalination plant of APSEZ and/or Narmada water through Gujarat Water Infrastructure Limited. Average water consumption for entire APSEZ area is 4.6 MLD during the compliance period Apr'19 to Sep'19.</p>				
xv	Specific arrangements for rain water harvesting shall	Complied.				

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
	be made in the Project design and the rain water so harvested shall be optimally utilized. Details in this regard shall be furnished to this Ministry's Regional Office at Bhopal within 3 months.	<p>Groundwater recharge cannot be done at the project site since the entire project is in the intertidal / sub tidal areas. Rain water within project area is managed through storm water drainage.</p> <p>We have installed Rain water recharge bore well (4 Nos.) within our township to recharge ground water. Details of the same is attached as Annexure – 5. Due to the same approx. 5.6 ML of rain water has been harvested during last monsoon.</p> <p>We have also connected roof top rain water duct of operational building (Tug berth building within MPT) with u/g water tank for utilization of collected rain water for gardening / horticulture purpose. Details of the same were submitted along with last EC Compliance report for the period Oct'18 to Mar'19.</p> <p>However, APSEZ has carried out rainwater harvesting activities in the nearby villages for benefit of the locals. Following measures are taken for the same during the year 2011 – 13 and the same have benefited to the local farmers.</p> <ol style="list-style-type: none"> 1. Pond deepening activities at villages 2. 18 check dams were constructed under the 'Sardar Patel Sahbhagi Jalsanchay Yojna' <p>Total cost of these efforts was approx. INR 320 lakh. Under Sujlam Suflam project Adani Foundation has successfully completed pond deepening work in Mundra & Abdasa Taluka in record time. 26 pond deepening in Mundra and 7 pond deepening in Abdasa accomplished with all parameters calculated. In Mundra taluka 51723 cum excavation work has been done which increase storage capacity of 51 ML. In Naliya taluka 14550 cum excavation work has been done which increase storage capacity of 15 ML. Total 66 ML storage capacity will be increased.</p> <p><u>Participatory Ground Water Management:</u></p> <p>Adani foundation has started participatory ground water management project. The objective of the project was to reduce the salinity ingress in and around the coastal regions of Mundra, Kutchh and mitigate the ill-effects of this manmade problem to improve the livelihoods of the</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<p>rural people. The Project will help to get water table high, also it will help in agricultural activities.</p> <p>As a part of pre monsoon activities with ACT (Arid Communities and Technologies – NGO) under this program, we have carried out following work. But, due to negligible rainfall we are not able to find out outcome of this project.</p> <ul style="list-style-type: none"> i. Borana – Artificial bore well recharge (work completed) ii. Mangara – Artificial bore well recharge (work completed) iii. Dhrub – Pond deepening work (work completed) iv. Mota Kapaya – abandoned bore well recharge (work completed) <p>With the objective of to preserve the rain water to reduce the impact of salinity and recharge the ground water (the main source of water) to facilitate the Agricultural activities as well as for drinking water.</p> <p>Under UTHHAN MODEL VILLAGE PROJECT, Salinity ingress issue is well taken with pond deepening, recharge bore well technique and roof top rain water harvesting. Total ground water recharged due to this project 1878 ML.</p> <p>Please refer Annexure – 3 for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2019-20 is to the tune of INR 2043 lakh. Out of which, Approx. INR 745 lakh are spent during this compliance period Apr'19 to Sep'19.</p>
xvi	Land Reclamation shall be carried out only to the extent that it is essential for this Project.	<p>Complied.</p> <p>Out of approved reclamation area of 1138 ha for west port, 695 ha area is reclaimed and out of approved reclamation area of 700 ha for south port, 665 ha area is reclaimed. Details of the same were submitted along with last compliance report submission for the period Apr'17 to Sep'17 and there is no further change.</p>
xvi i	No Product other than those permissible in the Coastal Regulation Zone Notification, 1991 shall be stored in the Coastal Regulation Zone area.	<p>Complied.</p> <p>No products other than those permissible in the CRZ Notification 1991 are stored in the CRZ area.</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019																																				
General Conditions																																						
i	Construction of Proposed structures, if any in the Coastal Regulation Zone area shall be undertaken meticulously confirming to the existing Central/local rules and regulations including Coastal Regulation Zone Notification 1991 and its amendments. All the construction designs/ drawings relating to the proposed construction activities must have approvals of the concerned State Government Departments/ Agencies.	<p>Complied.</p> <p>All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification.</p> <p>Further, the requisite permissions from Gujarat Maritime Board (GMB), for carrying out construction activities are taken from time to time. Details of the same are mentioned below:</p> <ul style="list-style-type: none">• Permission for starting construction work for South port vide letter no GMB/N/PVT/711/870 dated 26.02.2009• Permission for starting construction work for West port vide letter no GMB/N/PVT/711/871 dated 26.02.2009 <p>The copies of these letters were submitted as part of the compliance report submission for the period Apr'16 to Sep'16.</p> <p>The project has been developed as per Consent to Establish (CtE) and Consent to Operate (CtO) granted by SPCB. The present in-force CtO are mentioned below.</p> <table><tr><th>Permission</th><th>Project</th><th>Ref. No. / Order No.</th><th>Valid till</th></tr><tr><td>CtO – Renewal</td><td>Mundra Port Terminal</td><td>AWH-83561</td><td>20.11.2021</td></tr><tr><td>CtO – Renewal</td><td>West Port – WFDP</td><td>AWH-79241</td><td>23.06.2021</td></tr><tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>WH-88317</td><td>20.11.2021</td></tr><tr><td>CtE – Fresh</td><td>LPG Terminal</td><td>CTE – 88079</td><td>04.07.2022</td></tr><tr><td>CtO – Amendment</td><td>West Port – WFDP</td><td>AWH-91678</td><td>01.02.2022</td></tr><tr><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/GPCB ID: 53331/468197</td><td>04.07.2022</td></tr><tr><td>CtO - Amendment</td><td>Mundra Port Terminal</td><td>GPCB/CCA-Kutch -39(5)/ ID-17739/473575</td><td>20.11.2021</td></tr><tr><td>CtE – Amendment</td><td>LPG Terminal</td><td>PC/CCA-KUTCH-1437/PCB ID-53331/473995</td><td>03.10.2025</td></tr></table>	Permission	Project	Ref. No. / Order No.	Valid till	CtO – Renewal	Mundra Port Terminal	AWH-83561	20.11.2021	CtO – Renewal	West Port – WFDP	AWH-79241	23.06.2021	CtO - Amendment	Mundra Port Terminal	WH-88317	20.11.2021	CtE – Fresh	LPG Terminal	CTE – 88079	04.07.2022	CtO – Amendment	West Port – WFDP	AWH-91678	01.02.2022	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/GPCB ID: 53331/468197	04.07.2022	CtO - Amendment	Mundra Port Terminal	GPCB/CCA-Kutch -39(5)/ ID-17739/473575	20.11.2021	CtE – Amendment	LPG Terminal	PC/CCA-KUTCH-1437/PCB ID-53331/473995	03.10.2025
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	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019			
		CtO - Amendment	Mundra Port Terminal	H-98086	20.11.2021
		Updated details of CtE / CtO were submitted along with last half yearly EC Compliance report for the period Apr'19 to Sep'19. And there is no further change.			
ii	Adequate provision for infrastructure facilities such as water supply, fuel, sanitation etc. shall be ensured for construction workers during the construction phase of the project so as to avoid felling of trees/mangroves and pollution of water and the surroundings.	<p>Not applicable</p> <p>Most of the construction labours reside in the nearby villages where all basic facilities are easily available. There are no housing requirements for labours inside the project area.</p>			
iii	The project authorities must make necessary arrangements for disposal of solid wastes and for the treatment of effluents by providing a proper wastewater treatment plant outside the CRZ area. The quality of treated effluents, solid waste, and noise level etc. must conform to the standards laid down by the competent authorities including the Central/ State Pollution Control Board and the Union Ministry of Environment and Forests under the Environment (Protection) Act, 1986, whichever are more stringent.	<p>Complied.</p> <p>Monitoring of environmental attributes viz. Air, Water, Noise, Soil, etc. is being carried out on regular basis by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratory Pvt. Ltd. Approx. INR 11.23 Lakh is spent for all environmental monitoring activities during the FY 2019-20 (Till Sep'19).</p> <p>Please refer Specific Conditions no. x, xi & xii for further details regarding environmental monitoring.</p> <p>Liquid Effluent & Sewage – It is being treated at decentralized treatment plants and treated water confirming the stipulated norms is being utilized for horticulture purposes within APSEZ. Please refer specific condition no xii above for details regarding the same.</p> <p>Waste Management – APSEZ has adopted 5R concept for environmentally sound management of different types of solid & liquid wastes. Please refer below details about management of each type of waste.</p> <p>Municipal Solid Waste: A well-established system for segregation of dry & wet waste is in place. All wet waste (Organic waste) is being segregated & utilized for compost</p>			

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
		<p>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 plant (M/s. Sanghi Industries Ltd., Kutch and/or M/s. Ambuja Cement Ltd., Kodinar) for Co-processing as RDF (Refused Derived Fuel).</p> <p><u>Hazardous Waste:</u></p> <ul style="list-style-type: none"> • E – Waste & Used Batteries are being sold to GPCB registered recyclers namely M/s. e-Processing House. • Solid Hazardous Waste is being disposed through co-processing through common facility i.e. M/s. Saurashtra Enviro Projects Pvt. Ltd., Bhachau and/or cement industries of Sanghi Industries Ltd., Kutch and/or Ambuja Cement Ltd., Kodinar. Used/Waste Oil is being sold to GPCB authorized recyclers / re-processors namely M/s. Western India Petrochem Industry, Bhavnagar. • Downgrade chemicals generated from cleaning of storage tanks / pipelines are being sold to authorized solvent recovery facilities namely M/s. Acquire Chemicals, Ankleshwar however during the compliance period, there was no disposal of downgrade chemicals. • Slop Oil received from vessels is treated to separate water and oil particles in Oil Water Separator system. Separated oil from the same is being sold to authorized recycler / reprocessor namely M/s. Western India Petrochem Industry, Bhavnagar and water is sent to ETP for further treatment. However during the compliance period, there was no disposal of Slope Oil. <p>Details of permissions / agreements of hazardous waste authorized vendors were submitted along with last EC Compliance Report for the period Apr'18 to Sep'18.</p> <p>The following table summarizes the waste management practice (for Apr'19 to Sep'19) for different types of wastes</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019		
		at APSEZ:		
		Type of Waste	Quantity in MT	Disposal method
		Hazardous Waste		
		Pig Waste	6.88	Co-processing at cement industries
		Tank Bottom Sludge	46.26	
		Oily Cotton waste	62.11	
		ETP Sludge	4.41	
		Used / Spent Oil	35.41	Sell to registered recycler
		Discarded Containers	3.57	
		E-Waste	2.07	
		Bio Medical Waste	1.38	To approved CBWTF Site
		Municipal Solid Waste		
		Recyclables	67.82	After recovery sent for recycling
		Refuse Derived Fuel	174.72	Co-processing at Cement Industries
		Wet Waste (Food waste + Organic waste)	441.59	Converted to Manure for Horticulture use / Biogas for cooking purpose
iv	The Proponent shall obtain the requisite consents for discharge of effluents and emissions under the Water (Prevention and Control of pollution) Act, 1974 and the Air (Prevention and Control of pollution) Act, 1981 from the Gujarat Pollution Control Board before commissioning of the Project and copy of each of these shall be sent to this Ministry.	Complied. All construction activities are carried out confirming to the existing rules and regulation and as per the CRZ notification. Please refer General condition no. i for permission granted from state pollution control board regarding the same.		
v	The sand dunes, corals, and mangroves, if any, on the site shall not be disturbed in any way.	Complied There are no sand dunes and corals at the project site. 1254 ha area identified as potential mangrove conservation is being conserved and there is no disturbance to the mangroves in this area. Please refer specific condition no i above for details regarding the same.		
vi	A copy of the clearance letter will be marked to the concerned Panchayat / Local NGO, if any from whom any suggestions	Complied. Copy of the clearance letter was marked to the concerned panchayats. A typical proof of the same submitted to Mundra village Panchayat on 21.03.2009 was submitted as		

Status of the conditions stipulated in Environment and CRZ Clearance


Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019																					
	/representations has been received while processing the proposal.	a part of compliance report submission for the period Apr'16 to Sep'16.																					
vii	The funds earmarked for environment protection measures shall be maintained in a separate account and there shall be no diversion of these funds for any other purpose. A year wise expenditure on environmental safeguards shall be reported to this Ministry's Regional Office at Bhopal and the State Pollution Control Board.	<p>Complied.</p> <p>Separate budget for the Environment protection measures is earmarked every year. All environment and horticulture activities are considered at corporate level and budget allocation is done accordingly. All the expenses are recorded in advanced accounting system of the organization.</p> <p>Budget for environmental management measures (including horticulture) for the FY 2019-20 is to the tune of INR 1042 lakh. Out of which, Approx. INR 727 lakh are spent during this compliance period i.e. Apr'19 to Sep'19. Detailed breakup of the expenditures for the past 3 years is attached as Annexure – 6.</p> <p>Details regarding the past six compliance report submissions are mentioned below:</p> <table border="1"> <thead> <tr> <th>Sr. no.</th><th>Compliance period</th><th>Date of submission</th></tr> </thead> <tbody> <tr> <td>1</td><td>Apr'16 to Sep'16</td><td>01.12.2016</td></tr> <tr> <td>2</td><td>Oct'16 to Mar'17</td><td>30.05.2017</td></tr> <tr> <td>3</td><td>Apr'17 to Sep'17</td><td>01.12.2017</td></tr> <tr> <td>4</td><td>Oct'17 to Mar'18</td><td>29.05.2018</td></tr> <tr> <td>5</td><td>Apr'18 to Sep'18</td><td>30.11.2018</td></tr> <tr> <td>6</td><td>Oct'18 to Apr'19</td><td>31.05.2019</td></tr> </tbody> </table>	Sr. no.	Compliance period	Date of submission	1	Apr'16 to Sep'16	01.12.2016	2	Oct'16 to Mar'17	30.05.2017	3	Apr'17 to Sep'17	01.12.2017	4	Oct'17 to Mar'18	29.05.2018	5	Apr'18 to Sep'18	30.11.2018	6	Oct'18 to Apr'19	31.05.2019
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viii	Full support shall be extended to the Officers of this Ministry's Regional Office at Bhopal and the Officers of the Central and State Pollution Control Boards by the Project Proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and	<p>Complied</p> <p>APSEZ is always extending full support to the regulatory authorities during their visit to the project site. All necessary documents are submitted as per the request of the visiting authorities.</p>																					

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
	other environmental Protection activities.	
ix	In case of deviation or alteration in the Project including the implementing agency, a fresh reference shall be made to this Ministry for modification in the clearance conditions or imposition of new ones for ensuring environmental protection.	<p>Complied.</p> <p>LNG terminal was initially approved under the Waterfront Development Project. However the same is now being developed by GSPC LNG Ltd. for which, separate EC and CRZ clearance has already been obtained from MoEF&CC by them. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.</p> <p>LPG terminal was initially approved under the Waterfront Development Project of Adani Ports and SEZ Limited and the same has been developed by M/s. Mundra LPG Terminal Pvt. Ltd., which is 100% subsidiary of APSEZ. Details of the same were submitted along with half yearly compliance report for the period Oct'17 to Mar'18.</p>
x	The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of this Ministry.	Point noted and agreed.
xi	This Ministry or any other competent authority may stipulate any other additional conditions subsequently, if deemed necessary, for environmental protection which shall be complied with.	<p>Complied</p> <p>As part of the directions given by MoEF&CC vide order dated 18th Sep, 2015, following studies were proposed.</p> <ul style="list-style-type: none"> 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. <p>Please refer Annexure – B for further details regarding the mentioned studies.</p>
xii	The project proponent shall advertise at least in	Complied.

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
	two local newspapers widely circulated in the region around the Project, one of which shall be in the vernacular language of the locality concerned informing that the Project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forest at http://www.envforin.in . The advertisement shall be made within 7 days from the date of issue of the clearance letter and a copy of the same shall be forwarded to the Regional Office of this Ministry at Bhopal.	The original copy of the EC and CRZ clearance was obtained on 10.03.2009 and advertisement (containing informing that the EC and CRZ clearance is accorded to the proposed project and a copy of clearance letter is available with the SPCB and may also be seen at the website of MoEF&CC) was given in The Indian Express newspaper dated 18.03.2009. Copy of the same was submitted along with compliance report submission for the period Apr'16 to Sep'16.
xiii	The Project proponent shall inform the Regional Office at Bhopal as well as the Ministry the date of financial closure and final approval of the Project by the concerned authorities and the date of start of land development work.	Complied. APSEZ had informed the Regional Office of MoEF&CC at Bhopal as well as MoEF&CC, New Delhi regarding the date of financial closure and the date of start of land development work vide letter sent in August, 2009.
xiv	Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within period of 30 days as prescribed under section 11 of the National	Point noted and agreed. This EC and CRZ clearance was challenged in National Environment Appellate Authority. In this matter, Order has also been passed in favour of APSEZ. Copy of the same was submitted along with compliance report submission for the period Oct'16 to Mar'17.

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition as per clearance letter	Compliance Status as on 30-09-2019
	Environment Appellate Act, 1997.	



Adani Ports and Special Economic
Zone Limited, Mundra.

From : Apr'19
To : Sep'19

Status of the conditions stipulated in Environment and CRZ Clearance

ANNEXURE – A

CRZ Recommendation Compliance Report of WFDP

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

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

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2019
Specific Conditions		
1	The provisions of the CRZ notification of 1991 and subsequent amendments issued from time to time shall be strictly adhered to by the MPSEZL. No activity in contradiction to the provisions of the CRZ Notification shall be carried out by the MPSEZL.	<p>Complied.</p> <p>All construction and operation activities are being carried out in line with the CRZ recommendation and permissions granted.</p>
2	All necessary permissions from different Government Departments/ agencies shall be obtained by the MPSEZL before commencing any activities.	<p>Complied.</p> <p>Necessary permissions from competent authority have been obtained before commencing any the activities.</p> <p>Please refer condition no. i & iv of General Conditions of the EC & CRZ Clearance above.</p>
3	All major creeks shall be protected and no reclamation shall be done in these creeks and entire development along the creek shall be done after carrying out detailed engineering with an objective of environmental protection including protection of all major creeks to ensure adequate free flow of water and drainage of rain water during rainy seasons.	<p>Complied.</p> <p>All major creeks within the APSEZ area are protected.</p> <p>Please refer specific condition no iii of the EC and CRZ clearance for details regarding this point.</p>
4	The project proponent shall conserve the 1254 ha. of area as committed and proposed in their master plan and shall carry out plantation of various mangrove species in the said area.	<p>Complied.</p> <p>Mangrove conservation area of 1254 Ha is conserved as proposed in the master plan.</p> <p>Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.</p>
5	Massive mangroves plantation activity in at least 300 ha. area shall be carried out within a time frame of 5 years as committed by the project proponent. This would be in	<p>Complied.</p> <p>Mangrove plantation is already completed during the year 2012-13. Please refer specific condition no. vii of the EC and CRZ clearance for further details.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2019
	addition to the earlier commitment for 1200 ha. of mangroves plantation.	
6	No effluent or sewage shall be discharged in to the CRZ area and it shall be treated to conform to the norms prescribed by the Gujarat Pollution Control Board and would be discharged to the point suggested by the NIO in consultation with the GPCB.	<p>Complied.</p> <p>No effluent or sewage is discharged in to the CRZ area.</p> <p>Please refer specific condition no xii of the EC and CRZ clearance for details regarding this point.</p>
7	All the recommendations and suggestions given by NIO in their Environment Impact Assessment report for conservation / protection and betterment of environment shall be implemented strictly by MPSEZL.	<p>Complied.</p> <p>Compliance report of environmental management plan and mitigation measures proposed as part of the EIA report is attached as Annexure – 7.</p>
8	The construction and operational activities as well as dredging and reclamation activities shall be carried out in such a way that there is no negative impact on mangroves and other coastal /marine habitat except the proposed approx. 63 ha of area for which the compensation (300 ha.) is proposed.	<p>Complied.</p> <p>All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals.</p> <p>1254 ha area identified as mangrove conservation area is being conserved by APSEZ.</p> <p>Please refer specific condition no i of the EC and CRZ clearance for details regarding this point.</p>
9	The construction activities and dredging shall be carried out under the supervision/monitoring of the NIO or any such institute of repute.	<p>Complied.</p> <p>Construction activities are carried out as per EIA study carried out by NIO with all mitigative measures as suggested. Requisite permissions are taken from competent authorities such as GMB and GPCB. Site visits are being carried out by govt. officers from time to time to ensure compliance of the conditions stipulated in respective permissions. No capital dredging activities are carried out during the Apr'19 to Sep'19 period.</p> <p>Please refer condition no. i, iv & viii of General Conditions of the EC & CRZ Clearance above.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2019
10	The dredge material generated during capital dredging shall be used only for reclamation and that to be generated during maintenance dredging shall be disposed of at the place identified by NIO/CWPRS/WAPCOS through appropriate modeling and it shall be ensured that it does not create any negative impacts.	<p>Complied.</p> <p>Entire quantity of dredged material is used for reclamation activities only; no disposal is carried out in the sea. No capital dredging activities are carried out during the Apr'19 to Sep'19 period.</p>
11	Necessary measures including the shore protection activities shall be undertaken to ensure that there are no erosion in surrounding area due to the proposed activities.	<p>Complied.</p> <p>All dredging and reclamation activities are carried out as per EC and CRZ Clearance and no erosion is observed.</p> <p>For further details regarding the shoreline change study for the Mundra region, please refer specific condition no v of the EC and CRZ clearance.</p>
12	The alignment of the jetties/berths and other structures shall be done after conducting the detailed modeling to ensure that there are no erosion and accretion in the region due to proposed activities.	<p>Complied.</p> <p>Detailed hydrodynamic modeling was carried out by NIO during preparation of the EIA report. All construction activities are being carried out as per the outcome/recommendations of the modeling report.</p> <p>However, a detailed shoreline change assessment study is also carried out. Please refer specific condition no v of the EC and CRZ clearance for further details.</p>
13	The MPSEZL shall contribute financially for any common study or project that may be proposed by this department for environment management / conservation / improvement for the Gulf of Kutchh.	<p>Complied.</p> <p>There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer general condition no xi of the EC and CRZ clearance.</p>
14	The construction debris and /or any other type of waste shall not be disposed of into the sea, creek or in the CRZ areas. The construction is over and shall be disposed off in low lying areas in consultation with NIO,	<p>Complied.</p> <p>All construction and operation activities as well as dredging and reclamation activities are being carried out as per the EIA report prepared by NIO. The construction debris, if any, is being used for area</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2019
	NEERI or any such institute of repute.	development outside CRZ area. For details about management of other types of wastes, please refer general condition no. iii of the EC and CRZ clearance.
15	The construction camps shall be located outside the CRZ area and the construction labour shall be provided with the necessary amenities, including sanitation, water supply and fuel and it shall be ensured that the environmental conditions are not deteriorated by the construction labors.	<p>Compiled.</p> <p>Construction work of proposed LPG terminal is going on.</p> <p>Please refer general condition no ii of the EC and CRZ clearance for further details.</p>
16	The MPSEZL shall regularly update their Local Oil Spill Contingency and Disaster Management Plan in consonance with the National Oil Spill and Disaster Contingency Plan and shall submit the same to this Department after having it vetted through the Indian Coast Guard.	<p>Compiled.</p> <p>Disaster Management Plan is updated regularly and the updated DMP was submitted as a part of compliance report for the period Apr'16 to Sep'16.</p> <p>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. Plan is being updated regularly and updated plan was submitted along with last half yearly EC Compliance report for the period Oct'18 to Mar'19 and there is no further change.</p>
17	The MPSEZL shall participate and contribute for the Vessel Traffic Management System to be developed for the Gulf of Kutchh being developed.	<p>Complied.</p> <p>A VTS service for Gulf of Kutch is operated by Directorate General of Lighthouses and Lightships (DGLL), Govt. of India.</p> <p>APSEZ is practicing well defined traffic control procedure. Marine Control of APSEZ provides traffic update to vessels in Mundra Port Limit on VHF Channel- 77. Arrival and departure information in Gulf of Kutch is provided to VTS information cell through an agent or directly by sending an e-mail to vtsmanagergulfofkutch@yahoo.com and vtsgok@yahoo.com.</p>
18	The MPSEZL shall bear the cost of external agency that may be appointed by this Department for	<p>Being complied.</p> <p>There are two studies prescribed by MoEF&CC. For further details regarding the same, please refer</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Specific Conditions	Compliance Status as on 30-09-2019
	supervision/monitoring of proposed activities and the environmental impacts of the proposed activities.	general condition no xi of the EC and CRZ clearance.

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Annexure – B

Compliance Status of MoEF & CC Order dated 18.09.2015

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

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
i	The proposal of extension of the validity of environmental clearance granted to the North Port vide letter dated 12.01.2009 will be considered separately at later stage.	Complied After receipt of this order, so far APSEZ has not done any application to MoEF&CC for the proposed North port.
ii	Bocha island, ecologically sensitive geomorphological features and areas in the island and creeks around the island will be declared as conservation zone action plan for its conservation must be prepared. M/s. APSEZ should provide necessary financial assistance for this purpose.	Complied This reply covers condition no ii, iv and v. Based on the MoEF&CC directions, <ol style="list-style-type: none"> 1. APSEZ, vide letter dtd. 19th October 2015 (Copy attached as Annexure 8) had requested GCZMA, for consideration of project for finalization of ToR for NCSCM. 2. Project was considered on 28th GCZMA meeting, scheduled on 22nd April 2016, where ToR was discussed and agreed, upon - Copy of the minutes (Page No. 38 & 39) are enclosed as Annexure 9. 3. APSEZ, vide its letter dtd. 25th April 2016, (Copy enclosed as Annexure 10) submitted the proposal to GCZMA along with Scope of work, as submitted by NCSCM. 4. Service Order was issued to NCSCM vide SO dtd. 29th Aug 2016 (Copy enclosed as Annexure 11). Cost of the study as per the NCSCM proposal was 315.5 Lakh and 90% of payment has already paid to NCSCM. 5. NCSCM has carried out number of site surveys during the period, February 2017 – April 2018 as per the defined scope 6. The study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) Annexure - 12 for their consideration and recommendation if any. 7. A reminder letter has been submitted to GCZMA vide letter dated 4th Jan 2019. Annexure – 13. As informed by concerned officials, at present GCZMA committee has been dissolved, hence project will be considered after reformation of GCZMA committee.
iv	A comprehensive and integrated study and protection of creeks/ mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary, will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area e.g. the reported case of disappearance of mangroves near navinal	<ol style="list-style-type: none"> 1. APSEZ, vide letter dtd. 19th October 2015 (Copy attached as Annexure 8) had requested GCZMA, for consideration of project for finalization of ToR for NCSCM. 2. Project was considered on 28th GCZMA meeting, scheduled on 22nd April 2016, where ToR was discussed and agreed, upon - Copy of the minutes (Page No. 38 & 39) are enclosed as Annexure 9. 3. APSEZ, vide its letter dtd. 25th April 2016, (Copy enclosed as Annexure 10) submitted the proposal to GCZMA along with Scope of work, as submitted by NCSCM. 4. Service Order was issued to NCSCM vide SO dtd. 29th Aug 2016 (Copy enclosed as Annexure 11). Cost of the study as per the NCSCM proposal was 315.5 Lakh and 90% of payment has already paid to NCSCM. 5. NCSCM has carried out number of site surveys during the period, February 2017 – April 2018 as per the defined scope 6. The study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) Annexure - 12 for their consideration and recommendation if any. 7. A reminder letter has been submitted to GCZMA vide letter dated 4th Jan 2019. Annexure – 13. As informed by concerned officials, at present GCZMA committee has been dissolved, hence project will be considered after reformation of GCZMA committee. <p>The site survey carried out by NCSCM includes:</p>

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status
	creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of bocha island up to baradimata and others.	<ol style="list-style-type: none"> 1. Bathymetry survey of creeks 2. Topography survey of intertidal areas 3. Mangrove survey (health and area demarcation) 4. Sampling of soil and water for analysis of physico-chemical and biological parameters 5. Tide and currents data collection (including residence time of tidal water) 6. Focus Group Discussions with the community in the close vicinity of the project area
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.	<p>In addition to the site surveys, NCSCM has procured satellite images for analysis of mangrove cover.</p> <p>The data collected (through site surveys and analysis of satellite maps) was used as input for mathematical modelling. The modelling studies were carried out to understand the impacts of the development activities. Based on the outcome of the modelling studies the necessary conservation plan for protection of creeks and mangrove areas is prepared.</p> <p>Based on the final study report, outcome is summarized in to following points :</p> <ol style="list-style-type: none"> 1. There is no obstruction to any water stream (creeks / branches of creeks / rivers) 2. Presently, mangrove cover in and around APSEZ is over 2340 ha. There is substantial growth in mangrove cover to the tune of 246 ha (comparison between 2011 and 2016-17) 3. Mundra has undergone substantial development during this tenure. Hence it can be interpreted that the infrastructure development has not left any adverse impacts on ecology. <p>The NCSCM study report was submitted to GCZMA (with a copy to MoEF&CC vide letter dated 04.06.2018) for their consideration and recommendation if any.. Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and same has been approved vide MOM published by GCZMA</p> <p>For demarcation of HTL and CRZ areas, NCSCM is under process of finalizing CZMP for this area. Once the maps are finalized, NCSCM will issue the final maps for the project area</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
		of APSEZ. The said maps will then be submitted to GCZMA and MoEF&CC by APSEZ.
iii	The violations of specific condition of all the ECs and CRZ clearances, if any, will be examined and proceeded with the provisions of EP Act, 1986 independently.	<p>Complied</p> <p>Regional Officer, MoEF&CC, Bhopal visited APSEZ on 21-22 December'16 for monitoring the implementation of environmental safeguards.</p> <p>APSEZ was also visited by RO, MoEF&CC Bhopal on 3rd May, 2018 for compliance verification. APSEZ provided all requisite information and documents required by the Regional Officer. During the said compliance verification visit, and as per the compliance certificate by Ro-MOEF&CC vide dated, 07th June 2018, there was no major non-compliance observed.</p> <p>Regional Office MoEF&CC, Bhopal, officer had visited the site on 3rd & 4th Sep, 2019 in compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 w.r.t. compliance verification of MoEF&CC order dated 18th Sep, 2015. APSEZ had provided all requisite information and documents required by the Officer.</p> <p>It may also be noted that GPCB, Regional Office does regular site visit for various components. During the compliance period (Apr'19 – Sep'19) site visit was carried out by SPCB officials on 27.08.2019. During this visit, no major non-compliance was observed. The details of the same are attached as Annexure – 14.</p>
vi	There will be no development in the area restricted by the High court of Gujarat. APSEZ shall abide by the outcome of the PIL 12 of 2011 and other relevant cases.	<p>Complied</p> <p>The order passed by Hon' ble high court in context of PIL 12 of 2011 vide dated 10th Nov 2011. Subject PIL has been disposed off by Hon'ble High Court vide their order dated 17.04.2015 and now there is no restriction on development in the subject area. The order reads as <i>"In view of the aforesaid discussion, we do not find any merit in this writ petition. This writ petition fails and is accordingly dismissed. No order as to cost."</i> Copy of the order was submitted along with last EC Compliance report for the period Apr'18 to Sep'18.</p> <p>Considering the above status and in line to submission of compliance of all the directions under this order, this condition is closed.</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
vii	APSEZ will submit specific action plan to protect the livelihood of fishermen along with budget.	<p>Complied.</p> <p>Adani Foundation (AF) is the CSR arm of the Adani Group actively working for upliftment of the communities in the surroundings of various project sites of Adani Group. AF has prepared a specific action plan to protect livelihood of fishermen at Mundra.</p> <p>Various initiatives, as stated below are discussed in detail in the report namely "Silent Transformation of Fisher folk at Mundra". Said report also includes the information related to the planned expenses to the tune of approx. 13.5 Cr. INR for various initiatives for the next five years (2016 – 2021) (Budget details provided in Page No. 68 of report). Copy of the same is already submitted to MoEF&CC vide our letter dated 10.09.2016.</p> <p>Till, Sep 2019, approx. 7.049 Cr. INR has already been invested. Further, details regarding the expenditure incurred against the commitment are attached as Annexure – 15.</p> <p>APSEZ is carrying out various initiatives specific to the Fisherfolk community which includes:</p> <ul style="list-style-type: none"> • Vidya Deep Yojana Developing school preparedness programme and empowering balwadis at fisherfolk settlement Under this scheme, 4 balwadis at different settlement has been constructed This programme include nutrition food, hygiene, awareness of health, cleanliness, discipline, regularity and development of basic age appropriate conception • Vidya Sahay Yojana – Scholarship Support All basic education supportive facilities have been created to promote education in fisher folk community. • Adani Vidya Mandir Childred of the family with the income of salary less than 1.5 lac/annum are admitted School focusses on nutrition food, uniform and other services to the children for free. • Fisherman Approach in SEZ After due consultative process, APSEZ has provided 7 fishermen access roads for to approach to the sea for fishing activity. • Machhimar Arogya Yojana The Fisher folk communities are disposed to several water and air abided diseased due to exposure to unhygienic working conditions. Frequently Special Health care Camps are organized at Vasahat. Our Mobile health care unit van regularly visit fisher folk settlements

Status of the conditions stipulated in Environment and CRZ Clearance


Sr. No.	Condition	Compliance Status				
		<ul style="list-style-type: none">● Machhimar Kaushalya Vardhan Yojana Based on need assessment a number of trades were introduced through the Adani Skill Development Centre in Mundra, where in fisher folk youth could join and get a number of technical and non-technical training● Machhimar Sadhan Sahay Yojana Fishing material support was provided by AF at Mundra as per the requests of Pagadiya fishermen. According to their needs, fishing nets, ropes, buoys, ice boxes, crates, weighing scales, anchors, solar lights etc., were provided● Machhimar Awas Yojana Shelters, equipped with basic facilities of a toilet and pure drinking water have been constructed for living while fishing and to provide a healthy and hygienic residence.● Machhimar Shudhh Jal Yojana This scheme of providing potable water has helped in reducing the drudgery of women and contributed largely towards general wellbeing● Sughad Yojana Toilets for men and women are constructed at all three Vasahats. Infrastructure was accompanied with continuous awareness campaign on hygiene sanitation and use of toilets in particular.● Machhimar Akshay kiran Yojana Solar street lights at each settlement have been installed. For fish landing shed and school extension room have been fitted with solar invertor allowing late evening video shows for awareness and fish sorting work at ease.● Machhimar Suraksha Yojana Distance Alarm Transmission System – DATS’ project was introduced in order to promote safety of the fishermen. Forced to be at sea to earn their livelihood puts the lives of many fishermen at risk● Machhimar Ajivika Uparjan Yojana Mangrove plantation in the area as means of alternate income generating activity for the fisher folk community during the non-fishing months. During the non-fishing months, the fishermen under usual circumstances were benefited by other alternate economic activity to sustain them.● Bandar Svachhata Yojana Waste bins have been provided for proper collection and segregation of waste. <p>Further, 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. Brief information about activities in the main five persuasions is mentioned below.</p> <table><tr><th>Area</th><th>Activity</th></tr><tr><td>Community Health</td><td>● 11 Rural Clinic-8 from Mundra & 3 from Anjar block treated; 10889 patients.</td></tr></table>	Area	Activity	Community Health	● 11 Rural Clinic-8 from Mundra & 3 from Anjar block treated; 10889 patients.
Area	Activity					
Community Health	● 11 Rural Clinic-8 from Mundra & 3 from Anjar block treated; 10889 patients.					

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status																																				
		<ul style="list-style-type: none">31 villages covered through Mobile healthcare unit 7902 patients benefited during six month.19 General Health Camp conducted - 12 General & 7 under Utthan project; 2873 patients treated.498 Needy patient benefited through Medical support Total amount of support is Rs.4,02,201/-.Sr. Citizen Project 8672 Card holders of 68 villages get benefit under this project. 4713 sr. citizen patients benefited during six month 30000 limit for three year per patients.First Medical College of Kutch district based on PPP model. It started from 2009. Affiliate with "Krantiguru Shyamji Krishna Verma Kutch University"750 bed– Largest Multi Specialty Hospital in kutch.Adani foundation, Adani Hospital and GAIMS have Jointly Celebrated "Arogya Saptah "8th to 14th August 2019 in Respect of 73th Independence of our country. – Approximately 4500 people will be direct beneficiaries of the program. <table><tr><th>Day</th><th>Date</th><th>Event Name</th><th>Beneficiaries</th></tr><tr><td>1</td><td>07/08/2019</td><td>Health check up at Orphan age, Bhuj</td><td>101</td></tr><tr><td>2</td><td>08/08/2019</td><td>Blood Donation Camp, Nakhatrana</td><td>55</td></tr><tr><td>3</td><td>09/08/2019</td><td>Pregnant Women health check up, Madhapar</td><td>50</td></tr><tr><td>4</td><td>10/08/2019</td><td>Surgical Mega Camp, Khavda</td><td>223</td></tr><tr><td>5</td><td>11/08/2019</td><td>General Health Camp, Palara Jail</td><td>139</td></tr><tr><td>6</td><td>12/08/2019</td><td>Ayushman Health Card Enrolment, Gorevali</td><td>52</td></tr><tr><td>7</td><td>13/08/2019</td><td>Awareness on women health, mukt jivan college, Bhuj</td><td>250</td></tr><tr><td>8</td><td>14/08/2019</td><td>Blood Donor Appreciation</td><td>36</td></tr></table>	Day	Date	Event Name	Beneficiaries	1	07/08/2019	Health check up at Orphan age, Bhuj	101	2	08/08/2019	Blood Donation Camp, Nakhatrana	55	3	09/08/2019	Pregnant Women health check up, Madhapar	50	4	10/08/2019	Surgical Mega Camp, Khavda	223	5	11/08/2019	General Health Camp, Palara Jail	139	6	12/08/2019	Ayushman Health Card Enrolment, Gorevali	52	7	13/08/2019	Awareness on women health, mukt jivan college, Bhuj	250	8	14/08/2019	Blood Donor Appreciation	36
Day	Date	Event Name	Beneficiaries																																			
1	07/08/2019	Health check up at Orphan age, Bhuj	101																																			
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	Sustainable Livelihood – Fisher folk	<ul style="list-style-type: none">Average 70 KL of water was supplied to 983 households at 4 fisherman vasahat on a daily basis under Machhimar Shudhh Jal Yojana.Adani Foundation constructed four Balwadis for kids between the age group of 2.5 years to 5 years at different settlements under Vidya Deep Yojana. 125 children are benefiting from this scheme.115 students are getting benefit of vehicle transportation support from different Bandar.100%girls & 80%boys providing scholarship support to motivate and encourage fishermen boys and girls for higher education. Book support 49 Fisherman Students of Higher Secondary Standard (9to12) has been benefitted.Mangrove Plantation, moss cleaning, etc.: 4300 Man-days.Biodiversity Project:-Project started with two spices of mangroves which has good survival rate & Plantation at site– 70% Survival Total 4Hector Plantation.Sea Weed Culture: Sea Weed Culture is going on. Seed bank preparation is going on under guidance of VRTI.																																				
	Education	<ul style="list-style-type: none">Adani foundation adopted 17 government school located at Mundra Taluka under the project 'UTTHAN' a drive of quality education.One teacher–One school + Sports teacher + IT teacher'IT on Wheel 'Van with 35 laptops and computer instructor make students more tech savvy and spreading the digital and technology knowledge amongst the younger generation.																																				

Status of the conditions stipulated in Environment and CRZ Clearance

Sr. No.	Condition	Compliance Status																																
			<ul style="list-style-type: none">With the intervene of our Sports teacher in all Utthan Schools successfully enrolled 500 + students in Khel Mahakumbh.Utthan Sahayak +1222 students from High school & Higher secondary of 6 villages celebrate Fifth International Yoga Day.Adani Vidya Mandir: provide “cost-free” education to meritorious students coming from challenging economic background, who have priceless treasures but have been under achievers due to situation. In year 20 19-20 450 students are studying.250 institutes and 15,329 beneficiaries have made inspirational visit of Adani Port, Power abd Wilmar during this six months under Project UDAAN.																															
		Rural Infrastructure	WORK COMPLETED <ul style="list-style-type: none">Water Conservation Works:<ul style="list-style-type: none">✓ Pond deepening work in Baroi, Luni & Zarpara villages✓ Mota Bhadiya Check Dam desilting work✓ Lakhpata Godhatal dam desilting work✓ Mota Bhadiya artificial bore well recharge -2 no'sProtection Compound wall at Navinal VillageGarden development – Hanuman Temple BaroiFixing of Street Light<ul style="list-style-type: none">✓ 30 LED Street light Bhopawandh✓ 20 LED Street light Mundra✓ 50 LED Street Light at BhoraraConstruction of Prayer Shed at AVMBGarden Development work at-Bhujpur Village.Construction of R.O. Plant Room at Primary School sadau VillageDrainage maintenance.Renovation of ITI at Mundra work in Progress. WORK INPROGRESS <ul style="list-style-type: none">Renovation of Bavadi at Bavadi BandarDevelopmentofCommunityTrainingHallatMundra&GoyarsamaFisherman Room at Navinal & Zarpara Vasahat																															
		Skill Development	<ul style="list-style-type: none">Soft skill training – 437 Nos.Technical Training – 206 Nos. <table><tr><td></td><td>Digital Literacy</td><td>Self Employe d Tailor</td><td>Beauty Therapis t</td><td>Spoken English</td><td>Junior Operator Crane</td><td>Excel Training</td><td>RTG Crain Operator</td></tr><tr><td>Male</td><td>189</td><td>0</td><td>0</td><td>45</td><td>60</td><td>11</td><td>24</td></tr><tr><td>Female</td><td>156</td><td>22</td><td>100</td><td>36</td><td>0</td><td>0</td><td>0</td></tr></table>									Digital Literacy	Self Employe d Tailor	Beauty Therapis t	Spoken English	Junior Operator Crane	Excel Training	RTG Crain Operator	Male	189	0	0	45	60	11	24	Female	156	22	100	36	0	0	0
			Digital Literacy	Self Employe d Tailor	Beauty Therapis t	Spoken English	Junior Operator Crane	Excel Training	RTG Crain Operator																									
Male	189	0	0	45	60	11	24																											
Female	156	22	100	36	0	0	0																											
Please refer Annexure – 3 for full details of CSR activities carried out by Adani Foundation in the Mundra region. Budget for CSR Activity for the FY 2019-20 is to the tune of INR 2043 lakh. Out of which, Approx. INR 745 lakh are spent during this compliance period Apr’19 to Sep’19.																																		
viii	APSEZ will voluntarily return the grazing land, if any, in their possession.	Point noted. All lands are acquired through proper procedure prescribed by State Government. However APSEZ has agreed for voluntarily																																

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
		giving 400 acres of land back to Zarpara village for the purpose of Gauchar. 400 acres of land has been identified in the presence and confirmation of Gram Panchayat. Necessary procedure has been initiated by APSEZ vide its letter dated 09 th Aug 2012 (copy enclosed as Annexure 16) with concerned revenue authority with respect to surrender of 400 acre gauchar land at village Zarpara. Same has been taken up by revenue department for necessary procedure of transfer and is under process.
ix x.	<p>A regional strategic impact assessment report with a special focus on Mundra region will also be prepared. The cost towards these studies will also be borne by PP.</p> <p>In the subject matter of thermal power plant, the proposed regional strategic Impact assessment analysis will take in to account salinity aspect along with its potential environmental impact to suggest future corrective actions as well as the guiding tool on extension and addition of the capacities.</p>	<p>Complied</p> <p>This reply covers direction no ix and x.</p> <ol style="list-style-type: none"> 1. APSEZ vide its letter dtd. 24th Feb 2014 (copy enclosed as Annexure 17) has submitted draft ToR for preparation of CIA report to GCZMA for their approval. 2. GCZMA vide its letter dtd. 19th Dec 2014 (copy enclosed as Annexure 18), has approved ToR for CIA. 3. Based on the ToR finalized by GCZMA (as per the instructions of MoEF&CC) for carrying out regional impact assessment study, APSEZ awarded the work to NABET accredited consultant M/s. Cholamandalam MS Risk Services Ltd. to carry out the studies, vide SO dtd 10th Feb 2016 (copy enclosed as Annexure 19) as stated in these directions. 4. Primary baseline environmental monitoring data collection during March – June 2016 and published secondary data on various environmental attributes have been considered for the study. 5. The study has been concluded and the final report was submitted to GCZMA and MoEF&CC for their consideration vide our letter dated 30.04.2018, Annexure - 20. 6. Reminder letter has been submitted to GCZMA for their comments and consideration vide letter dated 4th Jan 2019 Annexure - 21. GCZMA committee has been dissolved, hence project will be considered after reformation of GCZMA committee. <p>Total cost of the study is approx. INR 1.3 cr. which is financed by APSEZ. 90% of the payment has already been made.</p> <p>The stated study was carried out in following 3 phases</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
		<ul style="list-style-type: none"> • Baseline data collection and review of the past EIA reports and clearances issued to APSEZ. • Mathematical modelling and other technical studies for identification of potential impacts (for the year 2030) of the approved and existing project activities. • Development of macro level EMP for the phase wise implementation of actionable points. <p>As part of the study, following modelling exercises / technical studies have been carried out to study the impacts on all environmental attributes:</p> <ul style="list-style-type: none"> • Ambient air quality • Marine (Hydrodynamic, Thermal & Salinity dispersion, Sediment transport) • Noise level • Traffic assessment • Oil spill contingency plan • Water resource and salinity ingress • Land Use / Land Cover • Socioeconomic, Regional infrastructure • Waste management • Ecology, Bio diversity and Fisheries • Shoreline change assessment <p>Preparation of these reports require extensive use of modelling software and study of the available information / research reports to assess the impacts on individual attribute of environment. Based on the modelling outcomes and findings of the technical studies, a macro level environment management plan is prepared.</p> <p>Inline to the present stage of the project, APSEZ is already complying, as per Environment Management Plan and further recommendations, applicable to APSEZ as mentioned in the EMP, wrt Traffic Management Plan, Ground water quality management, Salinity ingress programme, Air and Noise quality Management, Surface and Marine water quality management, Ecology and Biodiversity Management, Solid & Hazardous waste management, Socio-economic Management and Shoreline Management, will be implemented in phase wise manner as per the progress of development within the boundary limits of APSEZ.</p> <p>The final CIA study report was submitted to GCZMA and MoEF&CC for their consideration vide our letter dated</p>

	Adani Ports and Special Economic Zone Limited, Mundra.	From : Apr'19 To : Sep'19
Status of the conditions stipulated in Environment and CRZ Clearance		

Sr. No.	Condition	Compliance Status
		30.04.2018. Details of the same were submitted along with half yearly EC Compliance report for the period Apr'18 to Sep'18. Presentation on the findings of the report was made to GCZMA committee on 4th October 2019 and after detailed discussion, authority has decided to constitute committee of members, to verify the report in detail.

Annexure – 1

COMPLIANCE OF LEGAL MATTERS

1. Case No: CA 9124 of 2011

Case Name: Kheti Vikas Seva Trust Vs UoI & Others

Name of the Court: Gujarat High Court

Orders/directions of the Court, if any and its relevance with the proposed project:

The writ petition has been dismissed by the Gujarat High Court on 17th April 2015.

The Hon'ble Supreme Court of India on 18.3.2016 dismissed the appeal against the said order dated 17th April, 2015 of the Gujarat High Court.

However, an application filed by the petitioner alleging non-compliance of an order of the Gujarat HC dated 12th July 2011 prohibiting the cutting of mangroves and other forests during the pendency of the petition without permission of the state forest and environment department in relation to the writ petition is still pending

2. Case No: SLP 28788 of 2016

Case Name: Pravinsinh Bhurabhai Chauhan Vs State of Gujarat & Others

Name of the Court: Supreme Court

Orders/directions of the Court, if any and its relevance with the proposed project:

In view of the affidavits filed by MOEF, and Govt of Gujarat the High Court dismissed the petition on 18.2.2015.

The petitioner filed a special leave to appeal before the Supreme Court of India, challenging the order dated 18.2.2015 of Gujarat High Court and the same is pending.

Sunita Narayan committee was appointed to study the area. Report was prepared by committee and submitted to Hon'ble Supreme Court.

Matter pending at Supreme court.

3. Case No: R/SPECIAL CIVIL APPLICATION NO. 5509 of 2019

Case Name: Jusab Kasam Manjaliya Vs Union of India

Name of the Court: Gujarat High Court

In compliance of the order of the Hon'ble HIGH COURT of Gujarat vide letter dated 22nd Aug. 2019 directed MoEF&CC, RO Bhopal to conduct a site visit of area in and Adani Ports & Special economic Zone Mundra Kutch. Accordingly, MoEF&CC, RO Bhopal communicated the dates of the site visit (i.e., Sep 3 & 4, 2019).

In accordance with the above-cited directions/communications, a site visit to the Adani Ports & Special economic Zone Mundra and subsidence areas pointed earlier by the appellant was undertaken during Sep 3-4, 2019 by Dr. HVC Cherry (Scientist D), Regional Office MOEF&CC Bhopal.

Matter pending at High court.

Annexure – 2

Details of Greenbelt development at APSEZ, Mundra

LOCATION	Total Green Zone Detail Till Up to Sept - 20 19				
	Area (In Ha.)	Trees (Nos.)	Palm (Nos.)	Shrubs (SQM)	Lawn (SQM)
SV COLONY	69.53	32480.00	7298.00	68327.00	95019.00
PORT & NON SEZ	81.37	146692.00	19220.00	75061.78	61937.38
SEZ	116.60	227120.00	20489.00	220583.60	28162.03
MITAP	2.48	8168.00	33.00	3340.00	4036.00
WEST PORT	94.33	206587.00	63331.00	24112.00	22854.15
AGRI PARK	8.94	17244.00	1332.00	5400.00	2121.44
SOUTH PORT	14.45	27530.00	3470.00	3882.00	3327.26
Samudra Township	55.93	53672.00	11834.00	20908.89	47520.07
Productive Farming (Vadala Farm)	23.79	27976.00	0.00	0.00	0.00
TOTAL (APSEZL)	467.40	747469.00	127007.00	421615.27	264977.33
		874476.00			

Details of Mangrove Afforestation done by APSEZ

Sl. no.	Location	Area (ha)	Duration	Species	Implementation agency
1	Mundra Port	24.0	-	Avicennia marina	Dr. Maity, Mangrove consultant of India
2	Mundra Port	25.0	-	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)	298.0	2011 - 2013	Avicennia marina	-
6	Jangi Village (Bhachau, Kutch)	50.0	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)	255.0	2014-15 & 2016-17	Avicennia marina & Bio diversity	GUIDE, Bhuj
9	Dandi Village (Navsari)	800.0	2006 - 2011	Avicennia marina, Rhizophora mucronata, Ceriops tagal	SAVE, Ahmedabad
10	Talaza Village (Bhavnagar)	50.0	2011-12	Avicennia marina	SAVE, Ahmedabad
11	Narmada Village (Bhavnagar)	250.0	2014 - 2015	Avicennia marina	SAVE, Ahmedabad
12	Malpur Village (Bharuch)	200.0	2012-14	Avicennia marina	SAVE, Ahmedabad
13	Kantiyajal Village (Bharuch)	50.0	2014-15	Avicennia marina	SAVE, Ahmedabad
14	Devla Village (Bharuch)	150.0	210-16	Avicennia marina	SAVE, Ahmedabad
15	Village Tala Talav (Khambhat, Anand)	100.0	2015 - 2016	Avicennia marina	SAVE, Ahmedabad
16	Village Tala Talav (Khambhat, Anand)	38.0	2015 - 2016	Avicennia marina	GEC, Gandhinagar
17	Aliya Bet, Village Katpor (Hansot, Bharuch)	62.0	2017-18	Avicennia marina & Rhizophora spp.	GEC, Gandhinagar
Total Mangrove Plantation:		2889.90 Ha			

Annexure – 3

Adani

Foundation

Education
Community
Health
Kutch
Community
Health
CSR
Community
Infrastructure
Development
Sustainable Livelihood
Development

Sustainable Growth
With Goodness



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Swachhagraha

Adani Vidya Mandir
Bhadreshwar

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CSR Nakhtrana

Health
Mundra & Bhuj

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CSR Lakhpat

Sustainable
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CSR Bitta

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Employee
Volunteering
Programme

Adani Skill
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Our
Change makers

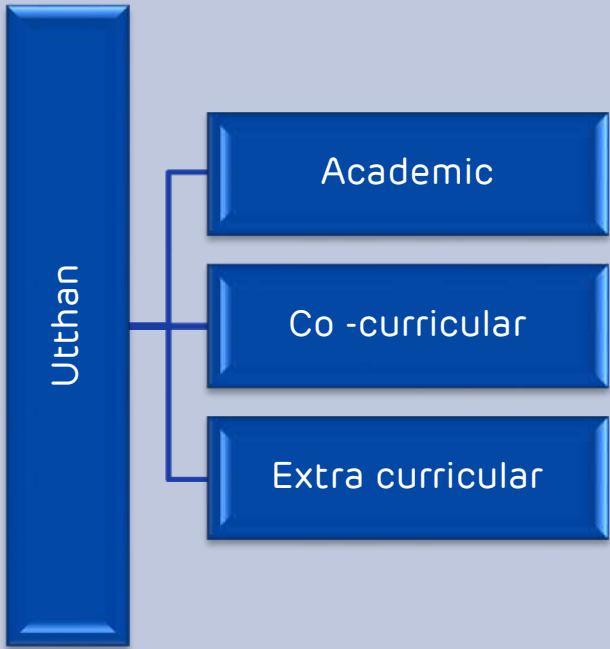
Suposhan

30

52

Awards and
Accolades

Project: Utthan



Majority of Indians are the products of Government schools. These schools are a linchpin of the Indian educational system, accounting for 70% of Pre-Primary and Primary Schools and Secondary Schools. They have a great penetration into the very interiors of our country. We find them in hilly areas, unreachable islands, tribal areas and everywhere.

For the academic year 2018-19, Adani Foundation leveraging their experience, to intervene in Government Schools. These interventions will aim to enhance the quality of primary education in Government schools and result in around 3000 of children benefiting from a meaningful education. 17 Primary Government schools of Mundra taluka of Kutch district have been adopted to take up various initiatives aimed at improving quality in these schools. The project titled is 'UTTHAN'. In this holistic educational project we are focusing on:



Academic

- One teacher – One school + Sports teacher + IT teacher
- 'IT on Wheel' Van with 35 laptops and computer instructor make students more tech savvy and spreading the digital and technology knowledge amongst the younger generation
- To achieve academic excellence of Priya Vidyarthi, Utthan Shikshak implies various alternative method to make their classroom more friendly and interesting.
- English is to be taught to the students from the early classes so that they will be equipped with ample resources during their further studies.
- Training cum Induction Program on various topic like teaching methodology of progressive learner, assessment pattern of slow learner, multiple intelligence etc.



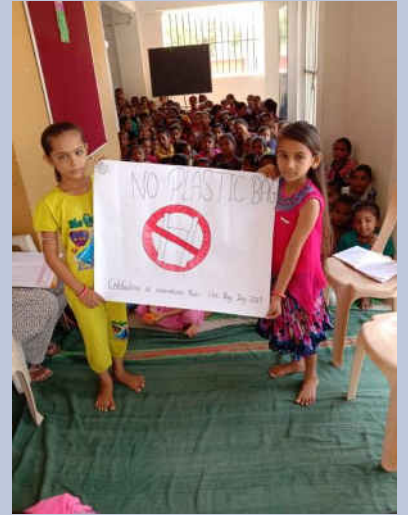
Co - Curricular

- Every Saturday Library activity with the Book issue were planned and executed in a meaningful manner
- Sports are a crucial part of a student's growth and development. Through participation in sports and games, a student gains various skills, experience and confidence. With the intervene of our Sports teacher in all Utthan Schools successfully enrolled 500+ students in Khel Mahakumbh



Extra - Curricular

- Utthan Sahayak + 1222 students from High school & Higher secondary of 6 villages celebrate Fifth International Yoga Day
- On International Plastic Bag Free Day, Awareness were spread through Effective speech, Soft board decoration, Video and Newspaper clipping in all Utthan school.
- Celebration of Gurupurnima in all Utthan Schools during morning special.
- 363 students from 17 schools got an opportunity to visit Adani West port. Main port , Willmar, power & power through project Udaan.
- Tree plantation in all the Utthan School. Adani Foundation align with the circular passed by the Government of Gujarat "Ek baal Ek Jhhad" distributed 100 trees in each school. Students not only planted the trees in fact they adopt each tree with giving their own names.



Adani Vidya Mandir Bhadreshwar



provide "cost-free" education to meritorious students coming from challenging economic background, who have priceless treasures but have been under achievers due to situation. In year 2019-20 450 students are studying.

Activities Covered

- Science Fair – Block level
- Drawing Competition under the P.C.R.A. National level competition
- Assembly on every Saturday.
- International Yoga Day Celebration
- Guru Purnima celebration
- Independence Day Celebration
- Teacher's day Celebration
- Children's Day Celebration
- Educational Tour for each standard
- Festival Celebration
- Awareness Street Play organized at various villages



92% - Result SSC Board Exam

Shala Pravastosav of Std.-1 Students



Parents Teachers Meeting



Healthy Food



Festival Celebration

Various Competitions





With a vision to familiarize, educate and inspire the future generations, Adani Foundation organizes Education Exposure visits to Mundra for High schools and educational institutes in Various parts of Gujrat.

250 institutes and 15,329 beneficiaries have made inspirational visit during this six months



Community Health

Health is the basic need for development of community. Adani Foundation focuses on ensuring good health for better contribution to growth and progress and improving access to quality healthcare service in remote area.

Rural Clinic & Mobile healthcare unit



11 Rural Clinic

8 from mundra 3 from Anjar block treated ;
10889 patients.

31 villages covered through Mobile healthcare unit
7902 patients benefited during six month



19 General Health Camp conducted -
12 General & 7 under Utthan project ;
2873 patients treated



Community Health



206 Dialysis patients

498 Needy patient benefited through Medical support Total amount of support is **Rs.4,02,201/-**



Sr. Citizen project
8672 Card holders of 68 villages get benefit under this project .
4713 sr. citizen patients benefited during six month
30000 limit for three year per patients



Gujarat Adani Institute of Medical Science (GAIMS) - Bhuj

First Medical College of Kutch district based on PPP model. It started from 2009.

Affiliate with "Krantiguru Shyamji Krishna Verma Kutch University"

750 bed – Largest Multi Specialty Hospital in kutch

Adani Foundation Team has initiated coordination with GKGH hospital and established a reception area for the smooth patient coordination and preparation for the social networking Programme.



Health - Bhuj

3075 Beneficiaries of 27 General Health camps.

2629 Golden card enrolled in 18 Health camps in Interior villages & Mahiti Setu as well.

322 death bodies Reached at various locations of Kutchh with dignity and respect.

258 Poor patient supported in GKGH(Rs.2,84,321/-)

4242 People helped through Mahiti Setu for various government schemes

37450 Patinets benefitted though 11 camps towards Mata Madh



Celebration of various days like - World No tobacco day, Kargil Vijay divas, Health week on independence day, 5 years completion ceremony of GKGH, Teachers day,
Page 53 of 296



Awareness for Health & hygiene



Mahiti setu



Support Poor patient



General Health camps



Arogya Saptah (7th – 14th August 2019)



Adani foundation, Adani Hospital and GAIMS have Jointly Celebrated "Arogya Saptah" 8th to 14th August-2019 in Respect of 73th Independence of our country. Celebration included multi specialty camps, Workshops, truckers health check up, surgical camp on foundation day and adolescent fair at different part of district. Collector, DDO, Minister, MLA and other dignitaries from NGOs had remained present. Objective of the program was to avail health benefits at GKGH and also at Adani Hospital Mundra and Approximately 4500 people will be direct beneficiaries of the program.

Day	Date	Event Name	Beneficiaries
1	07/08/2019	Health check up at Orphan age, Bhuj	101
2	08/08/2019	Blood Donation Camp, Nakhatrana	55
3	09/08/2019	Pregnant Women health check up, Madhapar	50
4	10/08/2019	Surgical Mega Camp, Khavda	223
5	11/08/2019	General Health Camp, Palara Jail	139
6	12/08/2019	Ayushman Health Card Enrolment, Gorevali	52
7	13/08/2019	Awareness on women health, mukt jivan college, Bhuj	250
8	14/08/2019	Blood Donor Appreciation	36



Fisherman Education

To strengthen the standard of pri-primary education, Adani Foundation has constructed 4 BALWADI at different fishermen helmet Which focuses on the development of basic age-appropriate learning concepts, discipline, regularity, awareness of health & hygiene, cleanliness and also provides nutritious food. 125 children are benefiting from this scheme



115 students are getting benefit of vehicle transportation support from different Bandar.

Vidya Sahay Yojana



100% girls 80% boys
providing **scholarship support** to motivate and encourage fishermen boys and girls for higher education
Book support : 49 Fisherman Students of Higher Secondary Standard (9 to 12) has been benefitted



SLD Fisherman



65 Teams

13 villages

750 Fisherman youth`

"Adani Premiere League"

Cricket Tournament organized among fishermen community to promote healthy sportsmanship ,and harmonically transparent community relationship

Awareness Program

Facilitation of Government Fishermen Welfare

Vessel Approach Related Message Intimation to Fishermen.



4 Fishermen VAsahat

983 Families

70000 ltr water per day`

potable water provided to the fishermen communities at different vasaht through water tanker



Sea Weed Culture

Sea Weed Culture is going on. Seed bank preparation is going on under guidance of VRTI.



4300 Man-days

Mangrove plantation at Hamira mora site .

Bio diversity Project:-

Project started with two spices of mangroves which has good survival rate & Plantation at site – 70 % Survival
Total 4 Hector Plantation.



- The organization has carried out remarkable activities in the agricultural and animal husbandry sectors. We have initiated Programme for Awareness of Farmers in collaboration with KVK. The outreach is approximate 200 farmers of 7 villages
- The purpose of this project is to initiate village wise integrated agricultural & allied development for sustaining agriculture and socio economic situation of farming community of Mundra block.



Sustainable Livelihood Development

After periodic discussions with Village Development Committee, Gram Panchayat and Gau Seva Samiti of Siracha – Adani Foundation had coordinated for Village Gauchar Development. Total 85 Acre Gauchar Land was approved by GP for Development by decision taken in Gram sabha . Among them 22 Acre land Has been Sowed with Sorghum and Remaining land would be Grow with Wild Grass

Siracha

22 Acre – 88000Kg Sorghum

63 Acre- 63000Kg Wild Grass

Total 85 Acre= 151000KG

Bhadreshwar @ 7 Acre= 28000Kg

Kukadsar @ 15 Acre= 60000Kg

UTTHAN MODEL VILLAGE DEVELOPMENT PROJECT



Implementation Process includes

- Meeting with Village Development Committee
- Meeting with SDM for Gauchar Land Details



Sustainable Livelihood Development

With the Objective of to Preserve the rain Water to reduce the Impact of salinity and Recharge the Ground Water (the Main Source of water) to facilitate the Agricultural activities as well as For Drinking water.

Under **UTHHAN MODEL VILLAGE PROJECT**. Salinity ingress issue is well taken with Pond Deepening, Recharge Borewell technique and Roof Top Rain Water Harvesting.



RRWHS: 54

Bore Recharge - 75

Well Recharge- 31

Pond Deepning- 2

Total Ground Water Recharge

- 1878140 cum



Tissue Culture

UTTHAN MODEL VILLAGE DEVELOPMENT PROJECT



Date is the Amrut Fal of Kutchh and Mainly best quality available in some villages in Mundra Taluka. To maintain quality uniformity Adani Foundation is planning for cultivate 4000 tissue cultured plants of elite varieties to the farmers of project area.

Registration is in progress for Farmer's Producer Company with NABARD – 220 Farmers had registered for the same.



WOMEN EMPOWERMENT

An initiative under the Sustainable Livelihoods Development Program to encourage women, take control of their own lives and increase their confidence whether they are single, married or widowed.

Aaarambh SHG "Suf"
Handicraft Cluster
Seven Women from
Pragpar village are
doing embroidery
and one women from
Mundra is looking
after design part.



Total Sale more than **Rs.3.50** Lacs and
women are getting approximately
Rs.8500 per month.

Women Empowerment

Tejashvi Saheli

3100 School bags for the Students 300 wall hanging for the project of Swachhagraha and 170 Uniform Pair to the Students of Balwadi.



24 Nos of Women got employment

6 women got Job in Britannia Company (Rs.7500/- per month), 9 women got bank sakhi Yojana, 9 women working in various field in SEZ and other companies



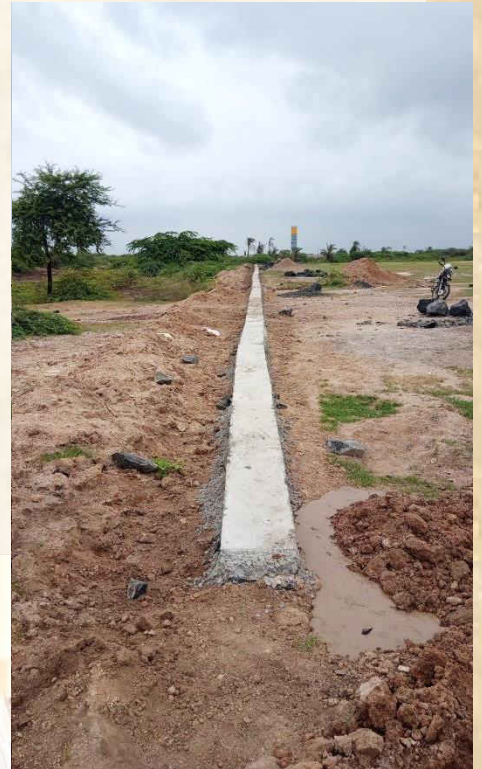
Water Conservation Works



- Pond deepening work in Baroi, Luni & Zarpara villages
- Mota Bhadiya Check Dam desilting work
- Lakhpat Godhatal dam desilting work
- Mota Bhadiya artificial bore well recharge - 2 no's



Protection Compound wall at Navinal Village



Garden Development Hanuman Temple - Baroi



Fixing of street light

30 LED Street light Bhopawandh
20 LED Street light Mundra
50 LED Street Light at Borara



Community Infrastructure Development

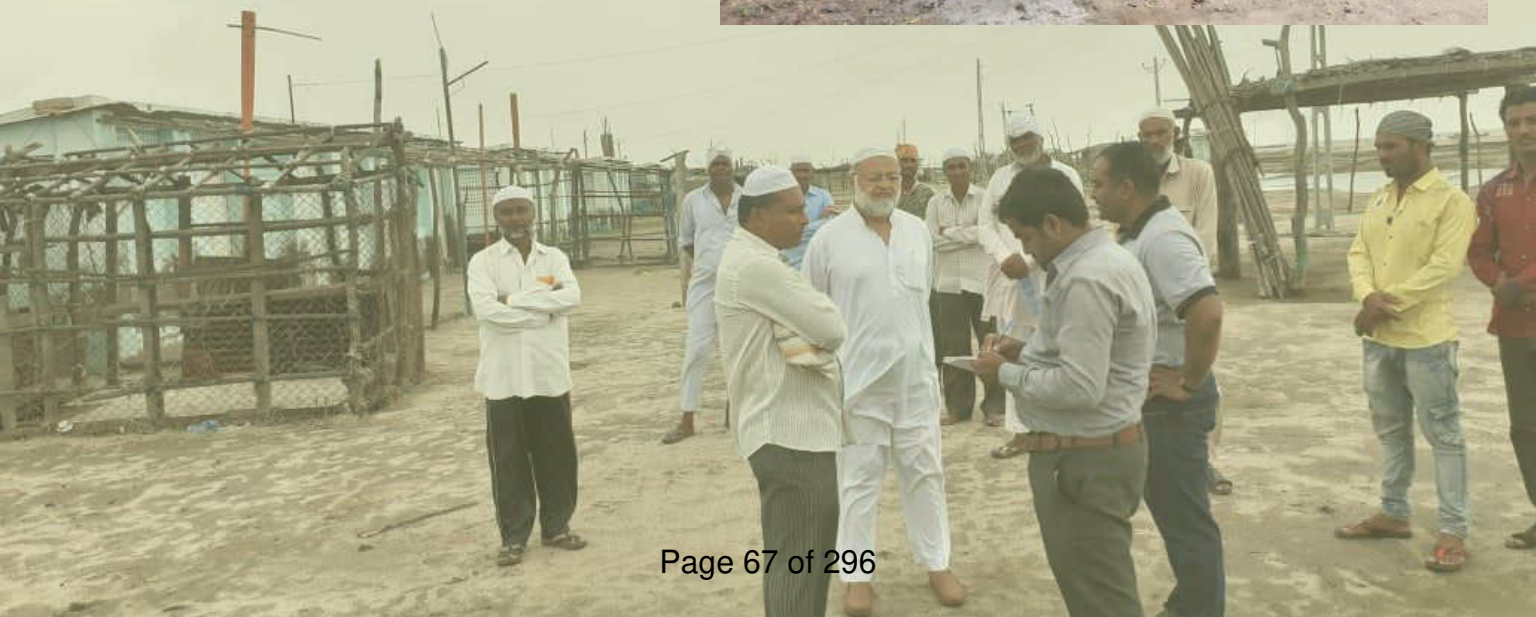
- Construction of Prayer Shed at AVMB
- Garden Development work at- Bhujpur Village.
- Construction of R.O. Plant Room at Primary School sadau Village
- Drainage maintenance.
- Renovation of ITI at Mundra work in Progress.



Work In progress



- Renovation of Bavadi at Bavadi Bandar
- Development of Community Training Hall at Mundra & Goyarsama
- Fisherman Room at Navinal & Zarpara Vasahat



Adani Skill Development Centre

Adani Skill Development Centre is providing various employment-oriented trainings to the young for become self-reliant, responsible and active citizen.

ASDC is tied up with Pradhan Mantri Kaushalya Vardhan Yojana and Deen Dayal Upadhyaya Grameen Kaushalya Yojana.



Total No of trainee 643

Total No of batch. 33

Digital Literacy 345

Beauty Therapist 100

Self Employed Tailor 22

Junior Operator Crane 60

Excel training 11

RTG Crane Operator 24

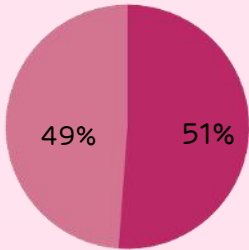
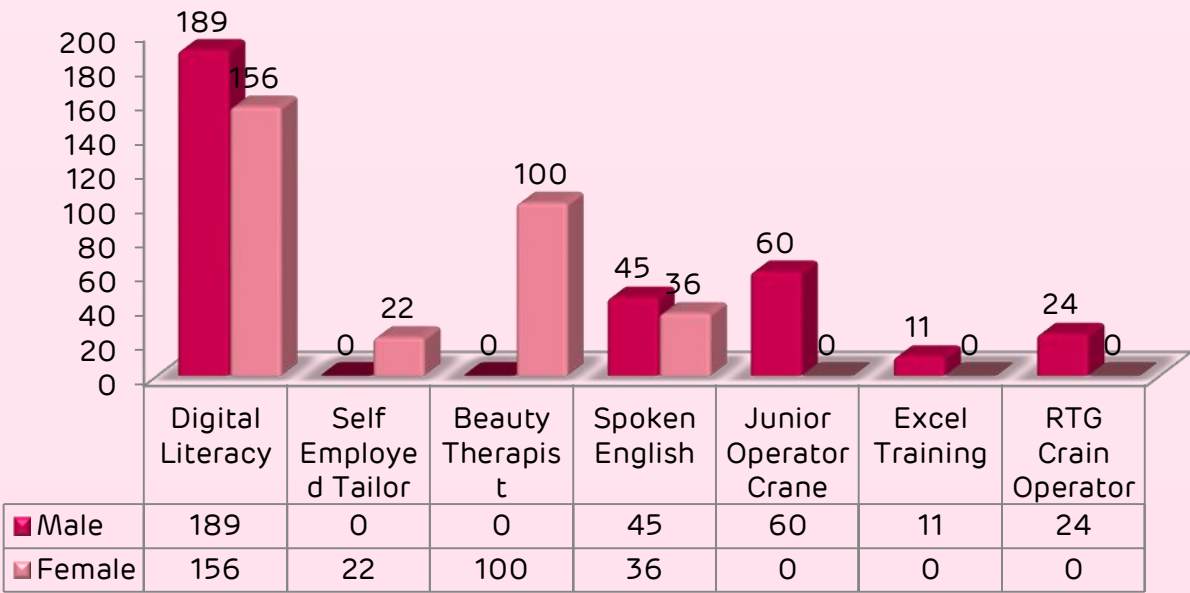


Adani Skill Development Centre



- 42 candidates passed out of 43 people of PMKVY Junior Operator Crane training.
- 21 candidates working in various company with 8000-15000 PM.
- 26 students got job in various company
- 48 women self employed.
- Spoken English class.
- Mobilization activities for SC batch in various village and collage

Completed & Running batch (April to September 2019)



Adani Skill Development Centre

Recognition of Prior Learning (RPL)



RPL recognizes the value of learning acquired a formal setting and provides a government certificate for an individuals skill.

Candidates received an accidental insurance coverage for three years at free of cost.

Certified 27 assessor, 19 Trainer and 08 Assessor.

Started first loader-Unloader job role in Port.

Total Candidates registration 550

ASDC Mundra team received award for Best Center - Unique Initiatives



Another milestone reached on 12th Sep 2019, ASDC launched its program for schedule caste in the state of Gujarat. This program will train candidates in various vocational training educational course like Self employed tailor and Beauty & Wellness. Total 135 women/Girls participated in this training. This course is sponsored by Department of Social justice and Empowerment .



Adani Skill Development Centre



Skill Development Training Program for Schedule Cast Beneficiaries

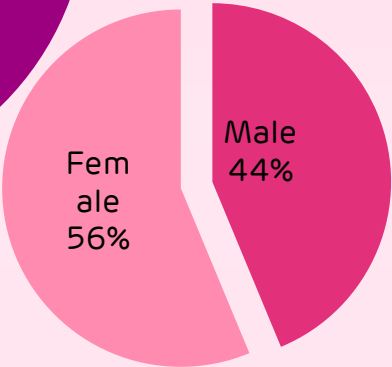
1440 SC beneficiaries from Eight Taluka of Kutchh.

- Hand embroidery
- Self employed stitching
- Mobile Repairing
- Beauty parlor
- Crane operator

Inauguration in presence of Mr Vinod Chavda (MP, Kutchh and Morabi) Mrs Lata Solanki (Pramukh, Nagar Palika,Bhuj) Mr Rohit (District Social Justice and Empowerment), Mr Jatin Trivedi (Head, ASDC)and Mr solanki (Chairman, social justice committee Kutchh) we're present

460 Training Completed at Centre

441 Training completed outreach



Sr No	Job Role (Write Full Name of Job Role)	Female	Male	Total
1	General Duty Assistant	86	38	124
2	Digital Literacy	239	313	552
3	Spoken English	113	40	153
4	Beauty Therapist	38	0	38
5	Tally erp.9	31	3	34
Total		507	394	901



Suposhan



The objective of the Project is to reduce occurrence of malnutrition and anemia.

create awareness about malnutrition and anaemia and related factors amongst all stakeholders and role they may play in curbing the issue.

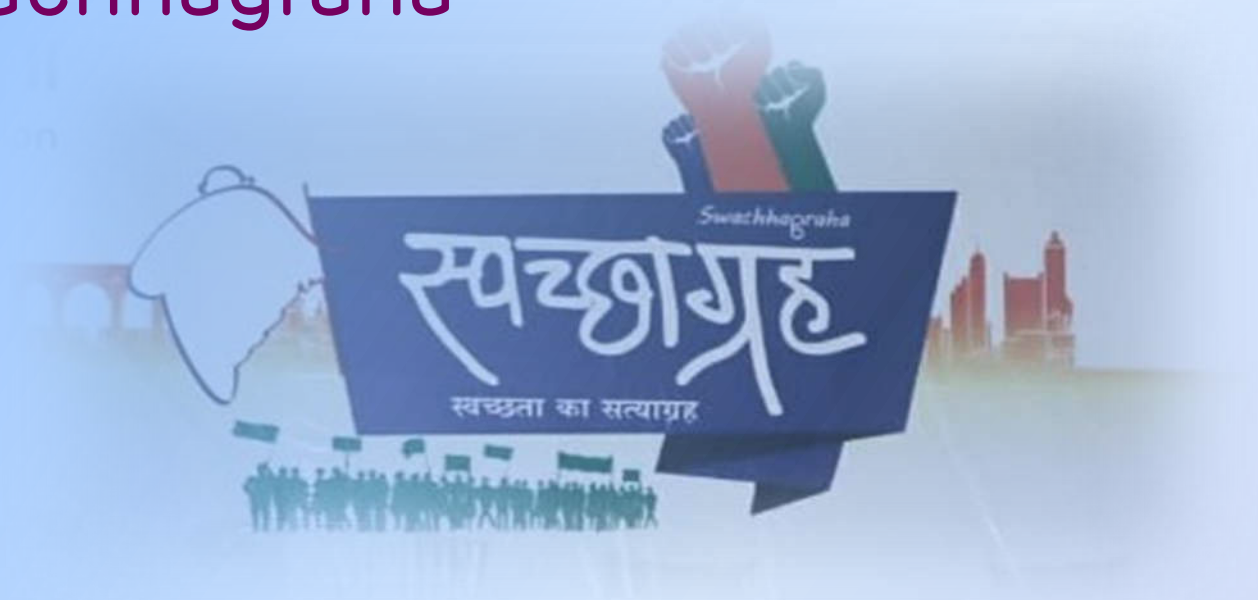
To successful implementation of the project, "Sangini – Village Health Volunteer" plays major role in the Project.

Community Engagement and other Activities

1	No of Sangini	25
2	Total Village Cover	45
3	Total Anganwadi Cover	76
4	SAM to MAM Monitoring Progress	9
5	MAM to Normal Monitoring Progress	20
6	Focus Group Discussion	1111
7	Family Based Counselling	310
8	Village level Events	57
9	Formation of women's groups	15
10	Formation of adolescent's Groups	14
11	No of SAM children referred to CMTC	15
12	No of SAM children provided with EDF	10
13	Total HB screening - RPA	1086
14	Total HB screening - Adolescent girls	1161
15	Total Anthropometric screening	6268
16	Total Family Cover	9038
17	"NATIONAL NUTRITION month Celebration"	1551
18	"WORLD BREASTFEEDING WEEK"celebration	500
19	SuPoshan Melawa	140
20	World menstrual Hygiene Day celebration	220



Swachhagraha



Adani Foundation has launched project "Swachhagraha" Swachhata ka Satyagraha in the year 2015, to support the 'Swachh Bharat Abhiyan'. Falling in line with our Honorable Prime Minister's call for a Clean India, we launched this mass movement towards making our Nation litter free.



Swachhagraha at Kutchh

4 City / town

266 Schools

266 Prerak trained

5000+ Dal members

Swachhagraha



Swachhagraha Wall



Toilet Etiquettes

Safai Ke Sitare



Personal Hygiene



Large Scale community events



Swachhagraha Oath



Activities of Swachhagraha

Adani Kandla Bulk Terminal Port Limited is joint venture of Adani Ports and SEZ Limited as well as Kandla Port. We are going to implement drainage pipeline for Tuna and Wandi with participation of Kandla Port in current year. Survey is done and work will be started soon..



- In Rampar and Tuna Village We are providing Fodder in summer season. Also guiding farmers for modern farming techniques for Organic Farming and sustainable Agriculture
- Praveshotsav Kit is distributed in 8 schools covering 180 Students in Tuna and Surrounding seven villages.. Our efforts were appreciated by community.
- Adani Foundation is bridging the gap between Government Schemes and Beneficiaries. In this Six Months we could able to support 5 widows and 4 differently abled to avail benefits of Government. Tree Plantation and 4 health camp was organized in Tuna and Rampar Village.



CSR Nakhatrana

As a Part of Integrated Development of any Rural area – Education is the most powerful weapon. Keeping in mind, Utthan Education Project will be start after November at 8 Schools of Nakhatrana.

During Primary Information collection, we received warm welcome from Principals and Government Officials. .

Adani Foundation has initiated UTTHAN programme in Government schools. The programme converges the four pillars of education seamlessly: Students, Teachers, Guardians and Infrastructure.

The Project Relates to Adani Green energy Limited – Mainly Windmills project. First phase is completed.

Adani Foundation is also planning to implement Uthhan Model Village Concept and Bio Diversity – Peacock Conservation will be planned in next Budget.

From Current year We are implementing UTHHAN EDUCATION PROJECT in Eight Schools of Nakhatrana



CSR Lakhpāt

Successfully
completion of
Public Hearing
without any
hindrances

Most of the population of Lakhpāt Depends upon Livestock for their livelihood. Fodder is the prime requirement of them. Adani Foundation had distributed Jovar seeds after considerable rain to 260 Farmers to motivate them for sustainable Livestock development.

SLD Projects

Total 260 Acre = 2000000Kg

Kapurashi @ 130 Acre= 520000Kg

Koriyavi @ 105Acre=480000Kg

Maundhvaity @25 Acre= 100000Kg

Education Support

Music Kit – 4

Sports Kit - 4

Carpet – 4

Provided to Govt. Schools of
Kapurashi, Koriyani and Mundhvay

Linkages with Govt. Scheme

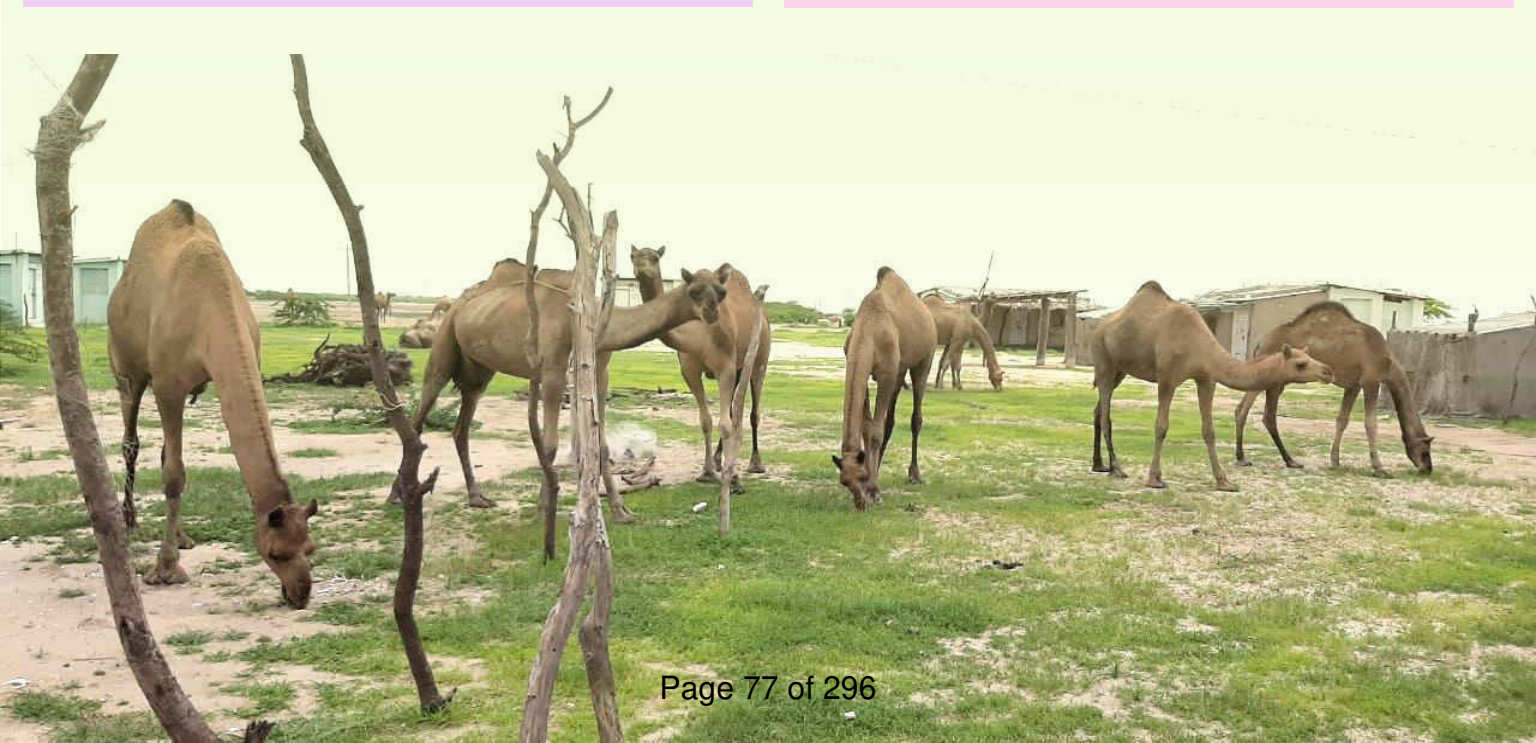
Wheelchair support – 2

Tri cycle support - 3

Divyang Form – 2

Health

Every Friday Specialist Doctor
from GKGH are regularly serving
at CHC Dayapar. More than 250
beneficiaries per month



CSR Bitta

Under Adani Solar Limited – 40 MW Solar Panel Power Unit is Situated at Bitta Village in Abdasa Taluka. We are providing Fodder Support and Health Camp Facilities at Bitta. Our Suposhan Project is running successfully at Bitta..

Adani Foundation has taken Eco Friendly initiative for whole village. Village street lights, School and GP is provided Solar Panel to save electricity. The unit was conceptualized and implemented by Solar Team.

Under “Sujlam Suflam Jal Abhiyan” Two Pond Deepening was carried out and got appreciation letter from District Magistrate.

As Abdasa is water scared region and very less rain in past years , as per humble request of villagers Adani Foundation has provided 1,13,750 Kg Fodder to Bitta, Dhrufi and Moti Dhrufi village.

Praveshotsav Kit is distributed in 8 schools covering 47 Students in Bitta and Surrounding seven villages.. Our efforts were appreciated by community.



Employee volunteering

- Medical Camp – **23**
- Senior Citizen Home – **17**
- Blood Donation Camp – **1174**
- Plastic Free campaign – **251**
- Bio Diversity – **4**
- Joy of Giving – **13**
- Yoga Day - **538**
- Total – **2020**



Adani Group is deeply involved in all round social and economic development of the areas in and around Mundra. Adani EVP is context driven and employees have taken part in teaching, Medical Camps, giving impetus to national Swachhata Mission and blood donation. The journey continues





Suf Handicraft : Conserving "VIRASAT" of Decades

Parvati Ben's earliest memory of stitching delicate handicrafts is from when she was as little as 5-years-old. Since then, she has followed this art with an immense dedication that shows through her intricate and precise handiwork.

Parvati is a resident of Pragpar-2 village. She lives in a house with 5 other people and is the sole breadwinner. Even so, Parvati is a humble, loving and welcoming individual.

Parvati Ben had been practising her intricate Suf handicraft all along, making scarves, table cloths, garments and more for her fellow villagers and the occasional visitors. Her artwork had consistently been worth more than what she sold it for- her only desire being that her art finds an expression, a space in the world, however small it may be.

One day, Adani Foundation discovered this diligent, rigorous woman. Parvati Ben now works on projects brought to her by Adani Foundation and is hence able to sustain her entire family on her own. She has risen to be an aspirational figure, looked upon as a role model by her fellow village women. Parvati Ben is playing a major role in now setting up a federation for the village women across Mundra district to practise their handicraft work and earn a livelihood.

But more than all the titles and positions, what Parvati Ben deems sacred is the sheer recognition of her art. All she ever wanted was to be known as an artist and now she is the voice of this very own art, inspiring dozens of women like her to become independent.



**Healthy children
become
happy children**

Under the initiative of Balwadi at Vasahat (doorstep Early age Education for less Fisher folk), special awareness camps are organized for kids in school in order to imbibe health seeking behavior in the next generation. Various awareness activities based on healthy living are taught to them such as hand-washing steps and healthy eating habits so that they actively participate in adopting methods for personal hygiene in their daily routine.

Yamina is one of the student of Balwadi. She is five years old. Earlier she used to come to Balwadi without taking bath or hair combing. But after regular awareness camps for mother and students now she is coming well dressed and clean – due to maintaining personnel hygiene she remains healthy too..



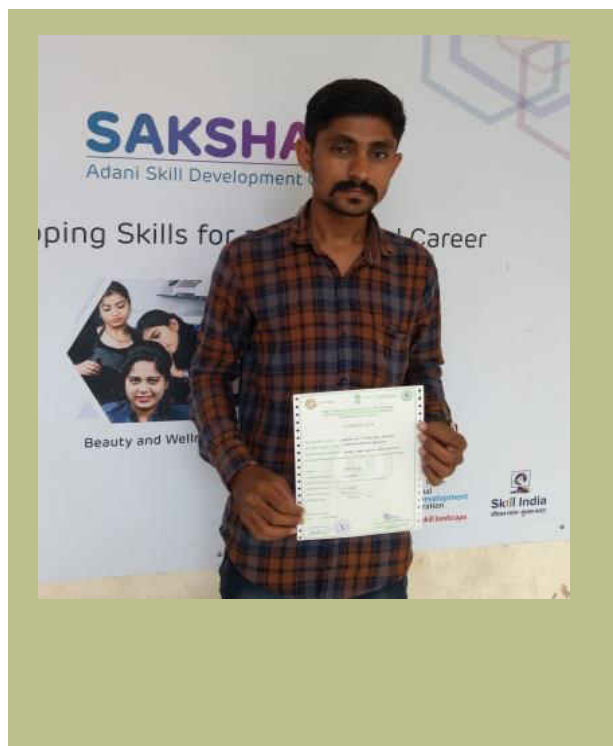
Every Dark Cloud has Silver Lining

Ms. Ramila Maheswari belongs to village Dhrub. Her father's occupation is farming. She has completed graduation and was searching job but lacking in computer operation skill.

Ramila says one of my friends suggested me to join digital literacy training at Adani Skill Development Centre, Mundra. I visited the center with my friend and joined class. I sincerely attended all classes of the course and learnt basics of computer operation viz; Typing, Paint, MS Office (word, Excel, power point), shortcut Keys and using internet for web browsing like; Gmail, Paytm, amazon, net banking etc.

She is saying with smiling on face that

"Today, I am working with firm "YASH ENTERPRISE" in Nana Kapaya, Mundra as a customer care executive and earning Rs. 7000 per month. I am really thankful to Adani Skill development Center to make 'SAKSHAM'.



Pathways towards bright future !!

Kripalsinh Jadeja comes from Hatadi, Mundra with a family of 5 people, four elder brothers and parents. His father is a farmer and mother help him in farming. The brother is working as truck driver. The economic condition of the family was very poor.

Kripalsinh has completed 12th and was searching job. The team of ASDC Mundra had mobilized in the area where he stays and through which he got to know that Adani Skill Development Centre (ASDC) is providing training for checker-cum-RTG crane operator and this was his dream job.

He performed well during the training and understood how this training would help him to grow in future in the field he desires. He was regular to the classes and always eager to know the process well and he performed well during all the activities.

Kripalsinh says he gained back his confidence after starting the training and was motivated by the trainer to participate in all activities and grab any opportunity where he can showcase his skills.

He says that he got more support by getting additional training of soft skills, public speaking, professional manners and facing interviews with confidence.

While undergoing the ASDC training Kripalsinh never imagined that this additional knowledge and skill up gradation would bring him a bright future.



My Emotional Support

Adani Foundations' Senior Citizen Health Card is like a cure to our emotional, physical and psychological problem; in the times when we are completely lonely and handicap at age."....Says both of them while weeping.

Every human being has specific periods of the life wherein the childhood is for fun and the adulthood is spent for the family; remains old age to take care of health

Adani Foundation is holded hands of the senior citizens of Mundra Rajendrasinh and his wife stay alone. Their son and daughters stay separately. They earn their living by grazing cattle. he is having severe arthritis and respiratory disorder. The source of income is very meager and that to dependent on rain. He had to borrow money from family friends or at times take on interest for taking basic treatment. His wife Shantaba also has blood sugar and hence she also requires medical assistance at times. The couple took Adani Foundations' Senior Citizen Health Card in 2015 by which they are able to save good amount, which was their medical expense every month



**Can any other
relationship be as
beautiful?"**

When you grow old, loneliness is sometimes more painful than physical sickness. During routine visits of Dr Mukesh Parmar – Medical Officer of Medical Mobile Unit in the community as a health volunteer, he met Rahomat Ba (grandmother in Gujarati) who initially appeared as an introvert. She lives in Gundala Village. According to her neighbors, she confined herself within the four walls after her husband's demise. Despite living with her children, she is often seen sitting alone in the corridor of her house, as the family members are apparently busy with their own lives. Financially strained, she refrained from visiting a doctor due to fear of their exorbitant fee.

Mukesh bhai was determined to not only get her to our mobile hospital, but also cultivate a health seeking behavior in her. He would keep on standing outside her house till the time she didn't agree to listen to my request. Do you know something? Ba is his best friend today. They not only share our secrets with each other, but also counsel each other as a mother and a son. Can any other relationship be as beautiful?"



Good Human Beings are Gods Incarnate

While many people talk about water crisis and drought in Kutchh, Rambhai Gadhavi of Zarpara has practically found and tried a solution to it and that is water conservation. Born into a poor farmer's family, he faced water problems in childhood and used to wake up at wee hours to fetch water, which inspired him to find ways of water conservation. Under Guidance and Support of Adani Foundation He practiced non-irrigation agricultural methods as solutions to water crisis which causes drought, thereby leading to Indian farmer suicides every year.

He did Bore well recharge and Farm Bunding to increase capacity of ground water through rain and to prevent run off. Not only that, he gave guidance to other farmers to accept water conservation practices.

Rambhai and his wife Veerbai's enthusiasm is remarkable in micro irrigation, fodder cultivation and Recharge activities. They are real change makers of "Sustainable Agriculture Projects" of Adani Foundation

Every drop that matters!



Kutchh district is a dry temperate zone and rainfall is negligible. Water requirement is met through the reservoirs in which the water decreases during summer months when crop is standing in the field. Whatever irrigation was provided resulted in soil erosion leading to loss of huge quantity of soil every year thereby increasing the farmer's problem in producing good quality crop. Therefore, usage of water and land is to be done sensibly by the farmer. Muljibhai The farmer of Navinal Village attended awareness programme of micro irrigation and organic farming organized by the Adani Foundation and showed interest in adopting the same. He was given every suitable help in subsidy and was persuaded into adopting drip irrigation for field crops.

Not only this, with support of DRDA and Adani Foundation he had adopted Bio gas which is utilized for cooking and organic fertilizer as well.

With the help of drip system, the Muljibhai was able to diversify towards different Horticulture crops like Pomegranate, Jamfal, chikoo etc. in addition to traditionally grown crops like Cotton and Caster.

As a result, he is able to get 40-45% higher yield as compared to flood irrigated crops. Diversification has helped in improving returns from the same area.



Giving Back to the Society

Sharad Sharma is Plant head of Adani Wilmar Limited since six years. During Review meetings he came to know about activities of Adani Foundation. He asked Adani Foundation to start health camps near Wilmar Workforce settlements.

Before three years, when Adani Foundation organized first health camp under dignity of workforce – he came during inauguration. He discussed various issues of workforce during camp and being generous and sensitive – he took a decision to do some concrete work for the workforce.

He started visit of labour vasahat once in a month for interacting with them regarding various issues i.e. deaddiction, sanitation, health issues and education of children. Due to his support, We could able to start “Joy of Giving Week” twice in a year.

Not only this, his wife has also extended great support for Education and Joy of giving Week. In spite of being always occupied Sharad ji is volunteering as a proud adanian.

Adani Foundation is feeling proud to have employee volunteer like Shard Sharma – one of the HEROS AT WORK.

જુવન જુવવાના દરવાજા ખૂલે

મુજના એક ૨૨ વર્ષના યુવાનની કથા બેકારીના રોદણા રોનારા યુવાનોને પ્રેરણા આપે છે. બાળપણમાં જ, લગભગ બે વર્ષની વયે જ જેને થેલિસિમિયા મેજર હોવાની ખબર પડી હતી, તેવા નખત્રાણા તાલુકાના નાનકડા ગામ દેસલપર(ગુંતલી)ના રાજુ કરસન ચાવડાની સારવાર તો તેનાં માતાપિતા પોતાના ક્ષમતા મુજબ કરાવતાં હતાં પરંતુ દસ વર્ષના રાજુને લઈને માતાપિતા ચોટીલા દર્શન કરવા ગયાં તો ત્યાં ગમખવાર અકસ્માતનો ભોગ બન્યાં ને



માતાપિતાને કાળે છીનવી લીધાં અને રાજુને પગમાં કાયમી ખોડ આવી. અનાથ બનેલા રાજુનો સહારો તેના માસી બન્યાં. બે વર્ષ તેમની સાથે રહ્યા બાદ રાજુ એક ચાની રૅંકડી પર નોકરી કરીને પેટિયું રળવા લાગ્યો, પરંતુ આશરાનો સવાલ તો ઊભો જ હતો. ત્યાંના શેઠે તેને બહેર શૌચાલયમાં નોકરીએ રખાવ્યો. આશરો મળતો હોવાથી રાજુ ત્યાં કામ કરવા તૈયાર થઈ ગયો. રાજુ કહે છે, 'મારો પોતાનો કંઈ વિશેષ ખર્ચ નથી. મને રોજ ટિકિન મળે છે, એટલે જમવાનો ખર્ચ થતો નથી. રોટરી ક્લબની સહાયથી જી.કે. જનરલ હોસ્પિટલમાં દર મહિને મારું લોહી બદલાવાય છે. દવા પણ મને નિ:શુલ્ક મળે છે. આમ મારું જીવન ચાલ્યા કરે છે. કોઈ સામે હાથ લાંબો કર્યા વગર જીવાય તેને ભગવાનના આશીર્વાદ ગણું છું.' કામ નથી મળતું કહીને નિરાશ થનારા યુવાનો માટે રાજુ ખરેખર પ્રેરણાસ્ત્રોત સમો છે. ■

True Warrior : We Salute

This is the story of Raju residing at Desalpar village of Nakhatrana Taluka. He is lesser blessed child of the almighty as he got Thalassemia Major and needs blood transfusion regularly.

Not only this - he lost his parents at the age of 10 in accident. He started work at tea stall for bread n butter for two ends meet. Then he started work at public toilet with the help of Village leaders.

In all this miseries - he says with smile that due to GKGH Hospital he could elongate his life span.

Every Month blood transfusion and free medicine n guidance by thalassemia ward by Rotary saved his life...

We salute this warrior and wish him best wishes.

World Environment Day

World Environment Day was celebrated in Five Talukas by different activities related to conservation of Environment. These Events were organized in coordination with DDO, TDO, SDM and Village Leaders of all Five Talukas. The activities Tree Plantation, Check dam Augmentation work, Inauguration work of Godhatal Dam Deepening work.



555+ Tree
plantation
in Bhuj,
Mundra &
Nakhtrana
Taluka



9000+ cum
Augmentation
and deepening
work of check
dam in Mandvi
& Lakhpatt
Taluka



International Coastal Clean up Day



Mundra Adani foundation MUNDRA has celebrated swachhagraha related International Coastal Clean up Day celebrated with Coast Guard" with theme swachhagraha.. School students, Coast Guard staff and Adani foundation staff had cleaned Mandvi beach and give a message of swachhagraha.. At the end information given about swachhagraha project

Teacher's Day : Guru Vandana

Teachers day celebration in coordination with District Education Office and District Development Office with Adani Foundation - District Level Best teacher Award on this auspicious day.

13 teachers is selected after screening by DEO Office and tofay award will be given in presence of DEO, DPEO and Vasan bhai Ahir Minister Gujarat .



Divine Feelings Towards Mata no Madh



Mata no Madh is a village in Lakhpatt Taluka of Kutch district, Gujarat, India. The village lies surrounded by hills on both banks of a small stream and has a temple dedicated to Ashapura Mata. She is considered patron deity of Kutch. The village is located about 105 km from Bhuj, the headquarters of Kutch district.

People used to go by foot to Mata no madh in Navaratri. Total 8 camps at different locations is inaugurated today in way towards Mata no Madh by Adani Foundation Bhuj and GKGH Hospital.

Total 34537 Patients were benefitted in this Camp

"Ayushman Bharat – Celebrating First Birthday !! "

On the first birth anniversary of "AYUSHMAN ENROLMENT CARD" Adani Foundation Bhuj and Mundra had successfully completed 11 Ayushman card enrollment camps in a single Day.



Skill Development Training Program for Schedule Cast Beneficiaries

we could able to fulfil target of training 1440 SC beneficiaries from Eight Talukas from Kutchhh for different courses.

Mr Vinod Chavda (MP, Kutchhh and Morabi) Mrs Lata Solanki (Pramukh, Nagar Palika,Bhuj) Mr Rohit (District Social Justice and Empowerment), Mr Jatin Trivedi (Head, ASDC)and Mr solanki (Chairman, social justice commitee Kutchhh) we're present.



courses

1. Hand embroidery
2. Self employed stitching
3. Mobile Repairing
4. Beauty parlor
5. Crane operator



Apex India CSR Innovation Award 2019



Adani Foundation Mundra received **"Gold Award"** under Apex India CSR Innovation Award 2019 Today at Goa.

Cheif Guest of the event was Shri Prasad (Union Minister Goa,GOI) and Guest of Honour Mr Suri (Former Governor Goa).

From Adani Foundation Mundra - Mr Vijay Gosai (Coordinator SLD Projects) and Mr. Karsan Gadhvi (Sr PO SLD Projects) received the Award.



Awards and Accolades

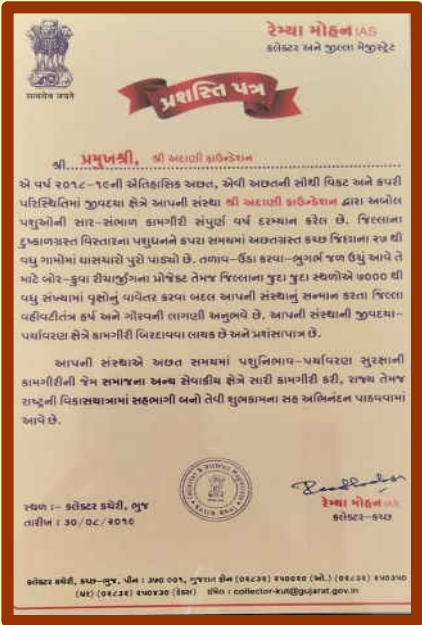


Sharing with Proud that Adani Foundation got felicitation from Mr Vijay Rupani Honrable Cheif Minister Gujarat for

- 1. Water Conservation works
- 2. More than 7000 Tree Plantation in Mundra, Anjar, Lakhpat and Mandvi Taluka

Felicitatation of 3 CSR from Kutchh district for remarkable scarcity related work.

From Adani Foundation - Mr Karsanbhai Gadhai received Award.



Awards and Accolades



Ms. Pankti Shah was invited as a guest of honour for Mission Eco Next "Eco Eureka Training" by ministry of science and technology - Government of India at KSKV Bhuj.

Initiatives of Adani Foundation for Biodiversity and water conservation was shared on this platform.



Ms. Mavajibhai Baraiya was invited as a guest of honor for "Creating Sustainable Farming Villages" by Krushi Research and Development Association by Vagad Visa Oswal Samaj.

Initiatives of Adani Foundation for Fodder Sustainability and water conservation was shared by him.

Beneficiaries

No	Core Area	Beneficiaries	Remarks
1	Utthan (Education)	3000	Uthhan, Labour School, School Enrollment
2	Adani Vidya Mandir	450	School Students
3	UDAAN	15329	250 Institute Visited
4	Adani Skill Dev. Center	1544	Mundra and Bhuj
5	Health Mundra	30336	MHCU, Medical Camps, Senior Citizen
6	Health Bhuj	47526	Health Camps, Mahiti Setu,care
7	SLD Fisherman	5572	Water, Education, Mangroves etc.
8	SLD Agriculture	1232	Drip Irrigation, Bio gas, tissue
9	SLD Women Empowerment	132	Saheli mahila gruh udyog – 12 SHG
10	CID Work	12345	Pond deepening, AKBTPL,
11	Swachhagraha	5266	Mundra, Bhuj, Anjar and Gandhidham
12	Suposhan Mundra	21439	Adolescent, Children and RPA
13	CSR Tuna	745	Health Camp, Cattle feed,
14	CSR NaKhtrana	-	
15	CSR Bitta	2450	Pond Deepening, Fodder, School Praveshotsav
16	CSR Lakhpat	1890	Fodder, School Support, Dam Desilting

Adani Foundation -Mundra
Executive Summary-Budget Utilization up to September 2019

F.Y. 2019-20 (Rs. In Lacs)

Sr. No.	Budget Line Item	CAPEX	OPEX	Budget 2019-20	Expenditure up to Sept.19	% of utilization against FY 2019-20 budget
A	Admin Expense	1.30	70.20	71.50	28.56	39.94%
B.	Education	0.00	57.75	57.75	26.70	46.23%
C.	Community Health	0.60	220.06	220.66	78.91	35.76%
D.	Sustainable Livelihood Development	30.00	387.30	487.80	325.04	66.63%
E	Rural Infrastructure Development	358.93	33.10	321.53	28.53	8.87%
Total AF CSR Budget :		390.83	768.41	1159.24	487.73	42.07%
F.	Utthan - Education	49.97	58.96	108.93	31.86	29.25%
G.	Model Village	132.93	64.33	197.26	61.52	31.19%
Total Project Utthan Budget		182.90	123.29	306.19	93.38	30.50%
H.	Adani Vidya Mandir - Bhadreshwar	33.36	170.99	204.35	71.34	34.91%
Total AVMB Budget		33.36	170.99	204.35	71.34	34.91%
I.	Project Udaan_Mundra	5.00	368.14	373.14	92.41	24.77%
Total Project Udaan Budget		5.00	368.14	373.14	92.41	24.77%
GRAND TOTAL		612.09	1430.83	2042.92	744.86	36.46%



Annexure – 4



POLLUCON

LABORATORIES PVT. LTD.

Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

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"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"

FOR



**ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421**

MONITORING PERIOD:

PREPARED BY:



POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
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TC - 5945

ISO 9001:2015

ISO 14001:2015

OHSAS 18001:2007

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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	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.16	8.12	8.07	8.13	8.12	8.07	8.18	8.14	8.03	8.11	8.13	8.1	IS3025(P11)83Re.02
2	Temperature	oC	30.9	30.5	31.8	31.6	30.0	29.9	30.4	30	29.8	29.1	29.7	29.3	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	224	246	194	213	328	302	336	350	369	374	304	318	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4	BDL*	4.3	BDL*	4.2	BDL*	2.9	BDL*	BDL*	BDL*	3.5	BDL*	IS 3025 (P44)1993Re.03Editi on2.1
5	Dissolved Oxygen	mg/L	6.2	5.5	5.6	5.4	6.2	5.3	6	5.5	6.1	5.8	5.8	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.2	36.5	37	37.5	36.4	36.9	36.8	37.5	34.8	35.2	34.5	34.6	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)5520 D
8	Nitrate as NO ₃	μmol/L	4.53	3.27	3.14	2.9	3.56	3.1	2.56	2.3	2.16	1.94	2	2.13	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.7	0.62	0.54	0.45	0.87	0.64	0.45	0.32	0.32	0.26	0.25	0.28	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.54	1.46	1.60	1.52	1.98	1.60	1.7	1.4	1.56	1.27	1.76	1.89	IS3025(P34)88Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.56	1.39	1.24	1.1	2.1	2.04	1.83	1.63	1.71	1.42	1.34	1.4	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	6.78	5.35	5.28	4.87	6.41	5.34	4.71	4.02	4.04	3.47	4.01	4.3	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	9.3	6.4	5.9	3.6	5.1	3	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37780	37993.0	38452	38894	37941	38310	37216	37312	35940	36213	35040	36102	IS3025(P16)84Re.02
15	COD	mg/L	15.7	7.3	11.9	6.4	15.2	7.5	9.4	BDL*	8.6	BDL*	13	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A	Flora and Fauna														
16	Primary productivity	mgC/L /day	5.73	4.72	5.62	4.61	9.67	5.4	9.9	6.3	8.32	7.42	7.65	6.61	APHA (22 nd Edi) 10200-J
B	Phytoplankton														
17.1	Chlorophyll	mg/m ³	1.97	1.49	2.88	2	2.83	2.29	2.93	2.61	2.83	2.56	1.97	1.49	APHA (22 nd Edi) 10200-H



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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17.2	Phaeophytin	mg/m ³	2.7	3.0	1.2	2.0	2.0	1.9	2.11	1.83	0.95	1.29	2.7	3.0	APHA (22 nd Edi) 10200-H
17.3	Cell Count	No. x 10 ³ /L	172	58	156	70	172	56	148	50	134	42	172	58	APHA (22 nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Cyclotella sp.</i> <i>Biddulphia sp.</i> <i>Coscinodiscus sp.</i> <i>Thallasiosira sp.</i>	<i>Melosira sp.</i> <i>Rhizosolenia sp.</i> <i>Navicula sp.</i> --	<i>Navicula sp.</i> <i>Melosira sp.</i> <i>Thallasiosira sp.</i> <i>Cyclotella sp.</i> ---	<i>Nitzschia sp.</i> <i>Thalassionema sp.</i> <i>Navicula sp.</i> ---	<i>Thallasiosira sp.</i> <i>Rhizosolenia sp.</i> <i>Coscinodiscus sp.</i> <i>Nitzschia sp.</i> --	<i>Nitzschia sp.</i> <i>Coscinodiscus sp.</i> <i>Navicula sp.</i> --	<i>Nitzschia sp.</i> <i>Rhizosolenia sp.</i> <i>Coscinodiscus sp.</i> <i>Skeletonema sp.</i> --	<i>Navicula sp.</i> <i>Rhizosolenia sp.</i> <i>Fragillaria sp.</i> --	<i>Coscinodiscus sp.</i> <i>Thallasiosira sp.</i> <i>Rhizosolenia sp.</i> <i>Pediastrum sp.</i>	<i>Ceratium sp.</i> <i>Fragillaria sp.</i> <i>Synedra sp.</i> --	<i>Navicula sp.</i> <i>Rhizosolenia sp.</i> <i>Coscinodiscus sp.</i> <i>Amphiproteron sp.</i>	<i>Ceratium sp.</i> <i>Cyclotella sp.</i> <i>Biddulphia sp.</i> --	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ /100 m ³	32			36		40		46		42		51	APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Foraminiferans Chaetognathes Polychaetes			Polychaetes Crustaceans Decapods		Polychaetes Gastropods --		Gastropods Ostracods Polychaetes		Amphipods Decapods Polychaetes		Copepods Mysids Gastropods	APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.8			2.9		2.6		2.7		2.1		3.2	APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1750			1800		1840		1900		1850		1780	IS 5402:2002
19.2	Total Coliform	/ml	Absent			Absent		Absent		Absent		Absent		Absent	APHA(22 nd Edi)9221-D
19.3	Ecoli	/ml	Absent			Absent		Absent		Absent		Absent		Absent	IS:1622:1981Edi.2.4 (2003-05)
19.4	Enterococcus	/ml	Absent			Absent		Absent		Absent		Absent		Absent	IS : 15186 :2002
19.5	Salmonella	/ml	Absent			Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-3)
19.6	Shigella	/ml	Absent			Absent		Absent		Absent		Absent		Absent	IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent			Absent		Absent		Absent		Absent		Absent	IS : 5887 (P-5)



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Lab Manager




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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.52	0.7	0.63	0.57	0.5	0.62	FCO:2007
2	Phosphorus as P	µg/g	234	284	343	490	436	412	APHA(22 nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	5.15	5.2	5.1	4.8	5.1	5.32	AAS APHA 3111 B
5.2	Total Chromium as Cr ⁺³	µg/g	192	170	124	102	170	210	AAS 3111B
5.3	Manganese as Mn	µg/g	1320	1390	1168	1048	1031	1068	AAS APHA 3111 B
5.4	Iron as Fe	%	4.95	4.9	4.9	4.64	4.8	5.1	AAS APHA(22 nd Edi)3111 B
5.5	Nickel as Ni	µg/g	22.6	19.6	34	18.2	20.3	27	AAS APHA(22 nd Edi)3111 B
5.6	Copper as Cu	µg/g	28.4	20.4	19.8	15.9	25.1	29	AAS APHA(22 nd Edi)3111 B
5.7	Zinc as Zn	µg/g	216	312	224	183	203	231	AAS APHA(22 nd Edi)3111 B
5.8	Lead as Pb	µg/g	1.83	1.27	3.6	2.8	1.74	1.64	AAS APHA(22 nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Polychaetes Decapods --	Crustaceans Polychaetes --	Crustaceans Polychaetes --	Polychaetes Gastropods --	Polychaetes Bivalves Crustaceans	Polychaetes Crustacean Brachyurans	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans Gastropods --	Gastropods Bryozoans --	Nematodes Foraminiferans --	Foraminiferans -- --	Nematodes --	Nematods --	APHA (22 nd Edi) 10500-C
6.3	Population	no/m2	618	733	704	765	617	735	APHA (22 nd Edi) 10500-C



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Lab Manager




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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.19	8.16	8.10	8.15	8.19	8.14	8.20	8.15	8.02	7.97	8.16	8.13	IS3025(P11)83 Re.02
2	Temperature	oC	30.8	30.5	31.7	31.5	30.4	30.0	30.3	30.1	29.7	29.3	29.8	29.5	IS3025(P9)84R e.02
3	Total Suspended Solids	mg/L	193	210	218	236	315	368	329	350	356	382	394	410	IS3025(P17)84 Re.02
4	BOD (3 Days @ 27 °C)	mg/L	5.1	BDL*	4.6	BDL*	3.4	BDL*	3.0	BDL*	BDL*	BDL*	3.4	BDL*	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	5.9	5.6	6.0	5.9	5.9	5.6	5.9	5.7	6.1	5.9	5.9	5.8	IS3025(P38)89 Re.99
6	Salinity	ppt	36.3	36.5	37.1	37.4	36.4	36.8	36.1	36.5	34.7	35	34.6	35.1	APHA (22 nd Eti) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Eti)5 520D
8	Nitrate as NO ₃	μmol/L	5.61	5.04	3.0	2.84	3.3	3	2.5	2.76	2.11	1.92	2.5	2.42	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.71	0.63	0.55	0.51	0.6	0.51	0.38	0.47	0.26	0.18	1.7	1.83	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.60	1.43	1.70	1.66	1.87	1.62	1.27	1.41	0.9	0.8	2.2	2.2	IS3025(P34)88 Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.47	1.2	1.3	1.14	2.28	2	1.83	1.99	1.57	1.28	1.7	1.83	APHA(22 nd Eti) 4500 C
12	Total Nitrogen	μmol/L	7.93	7.10	5.25	5.01	5.73	5.13	4.15	4.64	3.29	2.86	5.07	5.22	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	11.2	BDL*	6.8	3.2	7.7	4.9	10.4	BDL*	BDL*	BDL*	13.6	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37824	37989	38550	38894	37143	37790	37118	37284	36812	37126	35524	35376	IS3025(P16)84 Re.02
15	COD	mg/L	14.2	6.3	17.8	7.4	10.4	7.0	14.6	6.3	9.6	BDL*	15.2	BDL*	APHA(22 nd Eti) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/ L/day	5.85	4.05	7.76	5.28	9.22	6.3	9	6.52	7.87	6.3	7.42	6	APHA (22 nd Eti) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/ m ³	3.2	2.67	2.83	2.56	2.94	2.34	2.77	2.24	2.45	2.13	2.72	1.65	APHA (22 nd Eti) 10200-H
17.2	Phaeophytin	mg/ m ³	1.1	1.1	1.7	1.3	1.5	1.6	1.8	1.87	1.4	1.64	1.3	1.22	APHA (22 nd Eti) 10200-H
17.3	Cell Count	No. x 10 ³ /L	159	50	141	56	173	60	146	50	123	37	114	41	APHA (22 nd Eti) 10200-H



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17.4	Name of Group Number and name of group species of each group	--	Thallasiosira sp. Fragillaria sp. Biddulphia sp. Rhizosolenia sp.	Nitzschia sp. Pleurosigma sp. Ceratum	Navicula sp. Biddulphia sp. Thallasioema sp. Melosira sp.	Nitzschia sp. Coscinodiscus sp. Synedra sp. Biddulphia sp.	Nitzschia sp. Coscinodiscus sp. Synedra sp. Biddulphia sp.	Navicula sp. Rhizosolenia sp. Nitzschia sp.	Navicula sp. Synedra sp. Pleurosigma sp. Melosira sp.	Nitzschia sp. Fragillaria sp. Biddulphia sp.	Ceratium Thallasioema sp. Nitzschia sp. Melosira sp.	Melosira sp. Fragillaria sp. Navicula sp.	Ceratium sp. Skeletone ma sp. Navicula sp. Rhizosolenia sp.	Melosira sp. Nitzschia sp. Pleurosigma sp.	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ / 100 m ³	48		42		55		39		32		39		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Chaetognathes Polychaetes Gastropods		Polychaetes Crustaceans		Polychaetes Bivalves Crustaceans		Ostracods Nematodes Chaetognathes		Polychaetes Ostracods Bivalves		Foraminiferans Ostracods Decapods		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.71		1.63		1.8		1.5		1.25		1.95		APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1550		1620		1660		1700		1760		1850		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)9 221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Ed i.2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




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Lab Manager (Q)

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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.65	--	--	0.44	0.48	0.5	FCO:2007
2	Phosphorus as P	µg/g	231	--	--	384	403	412	APHA(22 nd Eti) 4500 C
3	Texture	--	Sandy	--	--	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	--	--	BDL*	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	4.96	--	--	4.84	4.7	4.93	AAS APHA 3111 B
5.2	Total Chromium as Cr+3	µg/g	236	--	--	102	168	208	AAS 3111B
5.3	Manganese as Mn	µg/g	1245	--	--	978	993	1014	AAS APHA 3111 B
5.4	Iron as Fe	%	5.2	--	--	4.96	4.83	5.16	AAS APHA(22 nd Eti)3111 B
5.5	Nickel as Ni	µg/g	22.6	--	--	44	30	26	AAS APHA(22 nd Eti)3111 B
5.6	Copper as Cu	µg/g	40.2	--	--	25	22.8	30.2	AAS APHA(22 nd Eti)3111 B
5.7	Zinc as Zn	µg/g	193	--	--	177	169	198	AAS APHA(22 nd Eti)3111 B
5.8	Lead as Pb	µg/g	1.83	--	--	1.5	1.24	1.35	AAS APHA(22 nd Eti)3111 B
5.9	Mercury as Hg	µg/g	BDL*	--	--	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Polychaetes Crustaceans --	--	--	Amphipods Isopods --	amphipods Polychaetes --	Polychaetes Gastropods --	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans --	--	--	Copepods Brozoans --	Forminiterans --	Nematods Ostracodes --	APHA (22 nd Edi) 10500-C
6.3	Population	no/m ²	557	--	--	170	440	471	APHA (22 nd Edi) 10500-C



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Lab Manager




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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.14	8.10	8.13	8.09	8.17	8.11	8.24	8.16	8.05	7.99	8.11	8.09	IS3025(P11)83Re.02
2	Temperature	oC	30.4	30.1	31.8	31.9	30.1	30.0	30.9	30.3	29.9	29.3	29.8	29.5	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	198	223	240	278	310	291	330	304	368	390	302	315	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4.9	BDL*	4.0	BDL*	5.2	BDL*	3.2	BDL*	BDL*	BDL*	4.2	BDL*	IS 3025 (P44)1993Re.03Edition2.1
5	Dissolved Oxygen	mg/L	6.0	5.8	5.9	5.7	6.0	5.8	6	5.7	6.1	5.9	5.8	6.0	IS3025(P38)89Re.99
6	Salinity	ppt	36.4	36.6	37.2	37.5	36	36.5	36.3	36.4	34.8	35.2	34.3	34.8	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)5520D
8	Nitrate as NO ₃	μmol/L	5.29	4.03	3.26	2.9	2.98	2.68	2.64	2.4	2.2	2.0	2.3	2.5	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.75	0.62	0.54	0.46	0.24	0.2	0.21	0.18	0.33	0.21	0.25	0.29	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.48	1.29	1.60	1.54	1.83	1.66	1.46	1.1	1.6	1.3	1.6	1.7	IS3025(P34)88Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.81	1.58	1.26	1.18	1.58	1.32	1.29	1.12	1.83	1.46	1.39	1.52	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	7.52	5.9	5.40	4.9	5.05	4.5	4.31	3.68	4.12	3.51	4.16	4.43	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	10.4	BDL*	11.6	BDL*	8.3	BDL*	BDL*	BDL*	BDL*	BDL*	10.9	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37958	38057	38598	37924	37310	37864	36781	36894	36718	38017	35843	35210	IS3025(P16)84Re.02
15	COD	mg/L	13.4	BDL*	15.6	BDL*	19.2	BDL*	13.6	BDL*	10	BDL*	14	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/L/day	7.65	5.28	6.52	5.4	10.35	8.32	8.88	7.31	7.87	6.75	7.31	5.96	APHA (22 nd Edi) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/m ³	3.25	2.18	2.83	2.4	3.25	2.72	2.88	2.34	2.93	2.72	2.61	2.13	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	1.4	2.7	1.7	2.4	1.4	1.8	2.05	2.6	2.78	1.8	2.32	2.1	APHA (22 nd Edi) 10200-H



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17.3	Cell Count	No. x 10 ³ /L	162	70	150	60	170	62	148	56	116	50	130	56	APHA (22 nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Biddulphia sp.</i> <i>cymbella sp.</i>	<i>Fragillaria sp.</i> <i>Nitzschia sp.</i> <i>Melosira sp.</i> --	<i>Thallasioema sp.</i> <i>Biddulphia sp.</i> <i>Cyclotella sp.</i> <i>Melosira sp.</i> --	<i>Rhizosolenia sp.</i> <i>Thallasiosira sp.</i> <i>Nitzschia sp.</i> -- --	<i>Rhizosolenia sp.</i> <i>Thallasiosira sp.</i> <i>Cyclotella sp.</i> <i>Biddulphia sp.</i> <i>Navicula sp.</i>	<i>Navicula sp.</i> <i>Nitzschia sp.</i> <i>Coscinodiscus sp.</i> -- --	<i>Melosira sp.</i> <i>Thallasiosira sp.</i> <i>Rhizosolenia sp.</i> <i>Peridinium</i> --	<i>Nitzschia sp.</i> <i>Navicula sp.</i> <i>Cheatecerous sp.</i> -- --	<i>Melosira sp.</i> <i>Closterium sp.</i> <i>Fragillaria sp.</i> <i>Coscinodiscus sp.</i> --	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Synedra sp.</i> --	<i>Melosira sp.</i> <i>Biddulphia sp.</i> <i>Coscinodiscus sp.</i> <i>Cheatecerous sp.</i>	<i>Navicula sp.</i> <i>Biddulphia sp.</i> <i>Amphiprora sp.</i> --	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ /100 m ³	41		51		56		50		39		31		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Foraminiferans Mysids Gastropods		Polychaetes Crustaceans --		Polychaetes Bivalves Crustaceans		Hydrozoa Echinoderms Ostracods		Polychaetes Decapods Ctenophores		Ctenophores Ostracods Gastropods		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.05		2.6		3.1		2.9		1.2		1.8		APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1720		1800		1780		1870		1740		1800		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)922 1-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi.2 .4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



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Lab Manager




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Lab Manager (Q)

RESULTS OF SEDIMENT ANALYSIS [M3 RIGHT SIDE OF BOCHA CREEK - N 22°46'530" E 069°41'690"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.6	0.48	0.64	0.57	0.6	0.59	FCO:2007
2	Phosphorus as P	µg/g	201	258	350	430	457	376	APHA(22 nd Eti) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	4.8	5.15	4.88	4.78	4.58	4.86	AAS APHA 3111 B
5.2	Total Chromium as Cr ⁺³	µg/g	172	206	139	104	157	213	AAS 3111B
5.3	Manganese as Mn	µg/g	1260	1174	1206	1068	1076	1106	AAS APHA 3111 B
5.4	Iron as Fe	%	4.91	5.05	4.75	4.84	4.65	4.98	AAS APHA(22 nd Eti)3111 B
5.5	Nickel as Ni	µg/g	27.3	23.9	27	47.93	25.4	31	AAS APHA(22 nd Eti)3111 B
5.6	Copper as Cu	µg/g	22.4	30.9	20.2	25.52	23.6	26	AAS APHA(22 nd Eti)3111 B
5.7	Zinc as Zn	µg/g	203	256	218	203	249	227	AAS APHA(22 nd Eti)3111 B
5.8	Lead as Pb	µg/g	1.52	1.65	3.2	3.7	1.63	2.14	AAS APHA(22 nd Eti)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Polychaete worms Chaetognaths --	Crustaceans Polychaetes --	Polychaetes Gastropods --	Crustaceans Decapods --	Polychaetes Bivalves --	Crustaceans Bivalves --	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Nematodes Foraminiferans --	Hydrozoans -- --	Nematodes Branchyurans --	Foraminiferans Hydrozoans --	Nematodes Gastropods --	Foraminiferans --	APHA (22 nd Edi) 10500-C
6.3	Population	no/m ²	735	618	765	733	674	557	APHA (22 nd Edi) 10500-C



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Lab Manager





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RESULTS OF MARINE WATER [M4 JUNA BANDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.17	8.13	8.20	8.11	8.16	8.10	8.21	8.17	8.07	8.1	8.13	8.07	IS3025(P11)83R e.02
2	Temperature	oC	30.9	30.7	31.9	31.5	30.2	30.0	30.8	30.1	29.8	30	29.8	29.6	IS3025(P9)84Re .02
3	Total Suspended Solids	mg/L	183	210	236	259	330	354	349	326	394	413	316	334	IS3025(P17)84R e.02
4	BOD (3 Days @ 27 °C)	mg/L	6.2	BDL*	4.4	BDL*	3.5	BDL*	3.8	BDL*	3.0	BDL*	4.0	BDL*	IS 3025 (P44)1993Re.03 Edition2.1
5	Dissolved Oxygen	mg/L	5.9	5.7	6.4	6.0	6.1	5.8	6	5.7	5.9	5.6	5.9	6.0	IS3025(P38)89R e.99
6	Salinity	ppt	36.4	36.7	37.2	37.5	36.3	36.4	35.9	36.9	34.7	35.2	34.2	34.5	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)5 520D
8	Nitrate as NO ₃	µmol/L	4.63	3.57	6.1	5.85	3.85	3.64	3.14	2.96	2.26	1.98	2.13	2.28	IS3025(P34)88
9	Nitrite as NO ₂	µmol/L	0.9	0.75	0.6	0.8	0.74	0.61	0.52	0.36	0.42	0.29	0.3	0.34	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	µmol/L	1.86	1.79	2.80	3.40	1.94	1.80	1.7	1.47	1.5	1.3	1.5	1.6	IS3025(P34)88C la.2.3
11	Phosphates as PO ₄	µmol/L	1.56	1.26	1.82	1.44	2	1.91	1.83	1.52	1.36	1.18	1.64	1.76	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	µmol/L	7.39	6.12	9.50	10.10	6.53	6.05	5.36	4.79	4.17	3.58	3.95	4.21	IS3025(P34)88
13	Petroleum Hydrocarbon	µg/L	15	BDL*	12	BDL*	8	4.0	BDL*	BDL*	BDL*	BDL*	12.8	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37934	38194	38144	38602	37684	38142	36312	36814	36517	36984	35703	35206	IS3025(P16)84R e.02
15	COD	mg/L	21.3	7.6	16	BDL*	12	6.4	10.3	BDL*	11.2	BDL*	13.8	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A	Flora and Fauna														
16	Primary productivity	mgC/L/d ay	5.28	3.78	6.97	4.72	9.9	7.2	8.77	7.4	7.65	6	7.44	5.7	APHA (22 nd Edi) 10200-J
B	Phytoplankton														
17.1	Chlorophyll	mg/m ³	3.15	2.56	3.25	2.99	3.2	2.5	2.83	2.67	2.5	2.08	2.72	2.29	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	1.6	2.1	1.4	1.9	1.3	1.8	2.48	2.26	2.13	1.73	1.91	1.52	APHA (22 nd Edi) 10200-H


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17.3	Cell Count	No. x 10 ³ /L	146	50	173	41	158	72	142	64	120	48	132	48	APHA (22 nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Nitzschia sp.</i> <i>Rhizosolenia sp.</i> <i>Cheatoceous sp.</i> <i>Coscinodiscus sp.</i>	<i>Navicula sp.</i> <i>Rhizosolenia sp.</i> <i>Biddulphia sp.</i> --	<i>Nitzschia sp.</i> <i>Thallasiosira sp.</i> <i>Cheatoceous sp.</i> <i>Fragillaria sp.</i>	<i>Gyrosigma sp.</i> <i>Navicula sp.</i> <i>Coscinodiscus sp.</i> --	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Biddulphia sp.</i> <i>Coscinodiscus sp.</i>	<i>Nitzschia sp.</i> <i>Synedra sp.</i> <i>Rhizosolenia sp.</i> --	<i>Melosira sp.</i> <i>Rhizosolenia sp.</i> <i>Thallasiosira sp.</i> <i>Fragillaria sp.</i>	<i>Navicula sp.</i> <i>Biddulphia sp.</i> <i>Synedra sp.</i> --	<i>Melosira sp.</i> <i>Fragillaria sp.</i> <i>Rhizosolenia sp.</i> <i>Coscinodiscus sp.</i>	<i>Navicula sp.</i> <i>Synedra sp.</i> <i>Pleurosigma sp.</i> --	<i>Thallasiosira sp.</i> <i>Nitzschia sp.</i> <i>Biddulphia sp.</i> <i>Melosira sp.</i>	<i>Navicula sp.</i> <i>Ceratium sp.</i> <i>Pleurosigma sp.</i> --	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ /100 m ³	56		61		65		59		39		30		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Foraminiferans Gastropods		Polychaetes Foraminiferans Decapods		Hydrozoans Polychaetes Gastropods		Crustaceans Bivalves --		Polychaetes Copepods Decapods		Ostracods Gastropods Polychaetes		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	3.1		3.2		3.5		3.2		1.55		1.7		APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1780		1840		1800		1920		1860		1740		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)9 221-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi .2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



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RESULTS OF SEDIMENT ANALYSIS [M4 JUNA BANDAR N 22°47'57" E 069°43'620"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.48	0.66	0.62	0.4	0.62	0.59	FCO:2007
2	Phosphorus as P	µg/g	198	230	336	484	456	373	APHA(22 nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	4.83	5.17	5.14	4.72	4.85	4.92	AAS APHA 3111 B
5.2	Total Chromium as Cr ⁺³	µg/g	131	183	132	166	142	157	AAS 3111B
5.3	Manganese as Mn	µg/g	1214	1420	1218	1041	1118	1068	AAS APHA 3111 B
5.4	Iron as Fe	%	4.9	5.1	4.88	4.8	5.18	4.97	AAS APHA(22 nd Edi)3111 B
5.5	Nickel as Ni	µg/g	53	39.4	34.1	20.48	17.6	29	AAS APHA(22 nd Edi)3111 B
5.6	Copper as Cu	µg/g	29	37.4	24.6	32.4	37.4	43	AAS APHA(22 nd Edi)3111 B
5.7	Zinc as Zn	µg/g	246	344	220	276	212	284	AAS APHA(22 nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.24	1.1	2.14	2.46	1.8	2.1	AAS APHA(22 nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Gastropods Decapods --	Polychaetes Bivalves --	Gastropods Crustaceans Bivalves --	Gastropods Polychaetes --	Polychaetes Crustaceans --	Crustaceans Polychaetes --	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans Bryozoans --	Foraminiferans Nematodes --	Foraminiferans -- --	Hydrozoans Nematodes --	Nematodes --	Nematods Harpacticoids	APHA (22 nd Edi) 10500-C
6.3	Population	no/m ²	706	796	733	676	588	647	APHA (22 nd Edi) 10500-C



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Lab Manager (Q)

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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.13	8.09	8.11	8.03	8.18	8.15	8.22	8.14	8.1	8.14	8.14	8.11	IS3025(P11)83Re.02
2	Temperature	oC	30.3	30.0	31.8	31.6	30.1	30.0	30.7	30.2	29.8	30	29.8	29.6	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	210	234	256	271	319	346	338	359	386	403	316	335	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	3.8	BDL*	3.0	BDL*	3.4	BDL*	BDL*	BDL*	BDL*	BDL*	4.1	BDL*	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.0	5.8	6.1	5.6	6.0	5.9	6.1	5.7	6.1	5.9	5.9	6.0	IS3025(P38)89Re.99
6	Salinity	ppt	36.5	36.8	36.9	36.4	36.3	36.6	36.4	36.7	35.2	35.5	34.2	34.4	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)55 20D
8	Nitrate as NO ₃	μmol/L	4.41	3.57	5.6	3.9	3.57	3.34	2.7	2.28	2.37	2.18	2.31	2.39	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	1.85	1.7	5.1	4.5	0.68	0.42	0.54	0.42	0.41	0.35	0.35	0.5	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.43	1.24	1.70	1.30	2.11	1.98	1.66	1.52	1.32	1.1	2.1	2.26	IS3025(P34)88CI a.2.3
11	Phosphates as PO ₄	μmol/L	1.17	1.1	1.96	1.32	2.98	2.79	1.98	1.74	1.5	1.32	1.64	1.78	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	7.68	6.55	12.40	9.70	6.36	5.74	4.9	4.22	4.1	3.6	4.76	5.09	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	8.2	BDL*	22.0	BDL*	15.0	BDL*	BDL*	BDL*	BDL*	BDL*	13.2	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	38090	38280	38184	37920	37912	38198	36974	37011	36118	36827	35640	35818	IS3025(P16)84Re.02
15	COD	mg/L	17.3	6.4	15.4	BDL*	10.8	BDL*	10.6	BDL*	9.4	BDL*	14.8	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/L /day	6.3	5.62	6	5.4	9.67	6.75	9.78	7.2	7.87	6.52	7.31	5.94	APHA (22 nd Edi) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/m ³	2.5	2.18	2.24	2.08	3.2	2.34	2.4	2.08	2.18	2.02	2.61	2.13	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	1.3	2.0	1.8	1.9	1.0	1.7	1.78	2.14	1.7	1.82	1.64	2.16	APHA (22 nd Edi) 10200-H



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17.3	Cell Count	No. x 10 ³ /L	178	58	150	44	168	58	162	50	1.4	36	118	42	APHA (22 nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Nitzschia sp.</i> <i>Rhizosolenia sp.</i> <i>Biddulphia sp.</i> <i>Thallasiosira sp.</i>	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Fragillaria sp.</i> --	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Nitzschia sp.</i> <i>Coscinodiscus sp.</i> <i>Navicula sp.</i> <i>Coscinodiscus sp.</i> <i>Biddulphia sp.</i>	<i>Nitzschia sp.</i> <i>Coscinodiscus sp.</i> <i>Navicula sp.</i> -- --	<i>Thallasiosira sp.</i> <i>Cheatoceus sp.</i> <i>Fragillaria sp.</i> -- <i>Rhizosolenia sp.</i>	<i>Navicula sp.</i> <i>Thallasiosira sp.</i> <i>Pleurosigma sp.</i> -- --	<i>Navicula sp.</i> <i>Coscinodiscus sp.</i> <i>Thallasiosira sp.</i> <i>Biddulphia sp.</i> --	<i>Biddulphia sp.</i> <i>Navicula sp.</i> <i>Nitzschia sp.</i> -- --	<i>Rhizosolenia sp.</i> <i>Thallasiosira sp.</i> <i>Pleurosigma sp.</i> <i>ceratium sp.</i>	<i>Navicula sp.</i> <i>Fragillaria sp.</i> <i>Biddulphia sp.</i> --	<i>Nitzschia sp.</i> <i>Rhizosolenia sp.</i> <i>Cyclotella sp.</i> <i>Biddulphia sp.</i>	<i>Navicula sp.</i> <i>Nitzschia sp.</i> <i>Cheatoceus sp.</i> --	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ /100 m ³	42		48		51		57		49		41		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Gastropods Nematodes		Polychaetes Gastropods Mysids		Hydrozoans Crustaceans Foraminiferans		Crustaceans Foraminiferans Gastropods		Polychaetes Copepods Decapods		Chaetognaths Mysids Gastropods		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	1.35		1.6		1.8		1.7		1.3		2		APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1800		1760		1720		1840		1800		1740		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)92 21-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.71	0.48	0.56	--	0.65	0.62	FCO:2007
2	Phosphorus as P	µg/g	225	284	324	--	433	370	APHA(22 nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	--	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	--	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	4.92	5.14	4.82	--	4.96	5.1	AAS APHA 3111 B
5.2	Total Chromium as Cr ⁺³	µg/g	138	216	142	--	162	246	AAS 3111B
5.3	Manganese as Mn	µg/g	1172	1498	1210	--	1120	1093	AAS APHA 3111 B
5.4	Iron as Fe	%	5.14	4.96	5.2	--	4.8	5.18	AAS APHA(22 nd Edi)3111 B
5.5	Nickel as Ni	µg/g	18.2	25.6	21.6	--	19.36	31.2	AAS APHA(22 nd Edi)3111 B
5.6	Copper as Cu	µg/g	29.4	30.4	25.4	--	33.4	27.4	AAS APHA(22 nd Edi)3111 B
5.7	Zinc as Zn	µg/g	218	218	230	--	244	208	AAS APHA(22 nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.4	1.85	2.12	--	1.6	2.17	AAS APHA(22 nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	--	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Gastropods Echinoderms	Gastropods Polychaetes	Gastropods Echinoderms	--	Polychaetes amphipods	Brachyurans Polychaetes	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans --	Nematodes Foraminiferans	Nematodes Turbellaria	--	Nematodes --	Nematods Hydroza	APHA (22 nd Edi) 10500-C
6.3	Population	no/m2	676	740	674	--	618	706	APHA (22 nd Edi) 10500-C



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

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.17	8.15	8.25	8.15	8.18	8.12	8.24	8.17	8.07	8.14	8.19	8.15	IS3025(P11)83Re.02
2	Temperature	oC	31.0	30.8	31.7	37.6	30.2	30.0	30.4	30	29.8	30.2	30	30.2	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	244	268	258	296	340	379	350	369	369	405	347	356	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	4	BDL*	5.0	BDL*	3.9	BDL*	3.1	BDL*	4.3	BDL*	3.8	BDL*	IS 3025 (P44)1993Re.03 Edition 2.1
5	Dissolved Oxygen	mg/L	6.4	6.0	6.6	5.8	6.4	5.8	6.1	5.7	5.9	5.7	5.8	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36	36.3	35.9	36.2	36.2	36.7	36.5	37	35	35.3	34.3	34.8	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)552 OD
8	Nitrate as NO ₃	μmol/L	6.4	4.2	4.9	3.1	3.12	2.84	2.7	2.49	2.41	2.32	2.33	2.38	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	1.35	1.56	1.5	1.65	0.83	0.68	0.63	0.38	0.26	0.14	0.39	0.46	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	2.10	1.98	1.80	1.44	2.14	2.00	1.74	1.43	1.37	1.18	2.2	2.31	IS3025(P34)88Cla 2.3
11	Phosphates as PO ₄	μmol/L	1.64	1.4	1.75	1.5	1.99	1.81	1.52	1.36	1.64	1.4	1.57	1.68	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	9.85	7.74	8.20	6.20	6.09	5.52	5.07	4.3	4.04	3.64	4.92	5.15	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	11.0	BDL*	16.0	BDL*	14.3	BDL*	BDL*	BDL*	BDL*	BDL*	12.9	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37103	37814	36812	37610	37214	37984	36972	37321	36816	37058	35728	35824	IS3025(P16)84Re.02
15	COD	mg/L	12.0	BDL*	24	BDL*	16	BDL*	13.2	BDL*	15.6	8.4	12.6	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/L /day	6.63	4.95	6.75	4.16	8.77	6.3	9.33	7.2	8.1	6.52	7	5.71	APHA (22 nd Edi) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/m ³	3.31	2.13	2.99	2.29	2.61	2.39	2.93	2.5	2.67	2.34	2.5	2.08	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	1.3	2.1	1.9	1.9	2.6	1.4	1.7	2.01	1.55	1.91	1.6	1.84	APHA (22 nd Edi) 10200-H
17.3	Cell Count	No. x	184	62	168	72	150	60	136	54	104	50	114	46	APHA (22 nd Edi)


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10 ³ /L															10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus</i> sp.	<i>Synedra</i> sp.	<i>Thalassionema</i> sp.	<i>Navicula</i> sp.	<i>Pleurosigma</i> sp.	<i>Navicula</i> sp.	<i>Nitzschia</i> sp.	<i>Navicula</i> sp.	<i>Synedra</i> sp.	<i>Thalassiosira</i> sp.	<i>Ceratium</i> sp.	<i>Cyclotella</i> sp.	APHA (22 nd Edi) 10200-H
			<i>Rhizosolenia</i> sp.	<i>Navicula</i> sp.	<i>Nitzschia</i> sp.	<i>Thalassionema</i> sp.	<i>Rhizosolenia</i> sp.	<i>Synedra</i> sp.	<i>Coscinodiscus</i> sp.	<i>Nitzschia</i> sp.	<i>Pleurosigma</i> sp.	<i>Thalassiosira</i> sp.	<i>Biddulphia</i> sp.	<i>Fragillaria</i> sp.	
			<i>Navicula</i> sp.	<i>Rhizosolenia</i> sp.	<i>Rhizosolenia</i> sp.	--	<i>Thalassionema</i> sp.	<i>Rhizosolenia</i> sp.	<i>Rhizosolenia</i> sp.	<i>Thalassionema</i> sp.	<i>Nitzschia</i> sp.	--	<i>Skeletonema</i> sp.	<i>Navicula</i> sp.	
			<i>Biddulphia</i> sp.	--	<i>Coscinodiscus</i> sp.	--	<i>Thalassionema</i> sp.	--	<i>Skeletonema</i> sp.	--	<i>Rhizosolenia</i> sp.	--	<i>Coscinodiscus</i> sp.	--	
			--	--	--	--	<i>Coscinodiscus</i> sp.	--	--	--	<i>Rhizosolenia</i> sp.	--	<i>Coscinodiscus</i> sp.	--	
C	Zooplanktons														
18.1	Abundance (Population)	noX10 ³ /100 m ³	42	49	53	48	43	46							APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Copepods Ostracods Polychaetes	Polychaetes Gastropods --	Polychaetes Ctenophores Chaetognathes	Polychaetes Crustaceans Bivalves	Polychaetes Decapods Isopods	Ostracods Gastropods Mysids							APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.6	2.75	2.9	2.1	1.9	2.1							APHA (22 nd Edi) 10200-G
D	Microbiological Parameters														
19.1	Total Bacterial Count	CFU/ml	1850	1840	1780	1800	1750	1820							IS 5402:2002
19.2	Total Coliform	/ml	Absent	Absent	Absent	Absent	Absent	Absent							APHA(22 nd Edi)922 1-D
19.3	Ecoli	/ml	Absent	Absent	Absent	Absent	Absent	Absent							IS:1622:1981Edi.2 .4(2003-05)
19.4	Enterococcus	/ml	Absent	Absent	Absent	Absent	Absent	Absent							IS : 15186 :2002
19.5	Salmonella	/ml	Absent	Absent	Absent	Absent	Absent	Absent							IS : 5887 (P-3)
19.6	Shigella	/ml	Absent	Absent	Absent	Absent	Absent	Absent							IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent	Absent	Absent	Absent	Absent	Absent							IS : 5887 (P-5)



H. T. Shah

Lab Manager




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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	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.11	8.09	8.22	8.15	8.19	8.12	8.25	8.19	8.04	7.99	8.17	8.2	IS3025(P11)83Re.02
2	Temperature	oC	30.9	30.6	31.7	31.4	30.1	30.0	30.5	30.1	29.8	30	29.9	29.5	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	196	214	252	226	302	324	326	341	370	402	317	326	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	4.9	BDL*	3.6	BDL*	4.6	BDL*	3.7	BDL*	2.8	BDL*	3.9	BDL*	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	5.9	5.7	6.4	6.2	6.0	5.9	6	5.7	6	5.8	5.9	6.1	IS3025(P38)89Re.99
6	Salinity	ppt	36.5	36.8	36.9	37.2	36.2	36.6	36.6	37.3	34.8	35.2	34.1	34.4	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)552 OD
8	Nitrate as NO ₃	μmol/L	4.28	3.52	5.6	3.9	3.36	3.1	2.84	2.57	2.13	1.9	2.1	2.17	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.8	0.74	1.4	1.1	0.92	0.79	0.81	0.64	0.48	0.62	0.29	0.35	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.97	1.65	2.16	1.50	1.76	1.48	1.52	1.31	1.27	1.1	1.53	1.61	IS3025(P34)88Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.76	1.57	1.98	1.75	1.86	1.55	1.7	1.49	1.4	1.31	1.28	1.34	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	7.05	4.40	9.16	6.50	6.04	5.37	5.17	4.52	3.88	3.62	3.92	4.13	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	12.6	BDL*	16.0	BDL*	13.2	BDL*	BDL*	BDL*	BDL*	BDL*	7.4	3.6	PLPL-TPH
14	Total Dissolved Solids	mg/L	38019	38349	37410	37676	37514	37912	36844	37542	36358	36756	35698	35718	IS3025(P16)84Re.02
15	COD	mg/L	14.3	9.6	15.0	BDL*	13.2	BDL*	10.3	BDL*	8.7	BDL*	12.4	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A	Flora and Fauna														
16	Primary productivity	mgC/L /day	6.52	5.0	6	5.0	18.55	7.4	8.66	7.8	7.65	6.9	7.29	6.16	APHA (22 nd Edi) 10200-J
B	Phytoplankton														
17.1	Chlorophyll	mg/m ³	2.62	2.56	2.72	2.24	3.15	2.83	2.67	2.24	3.04	2.56	2.77	2.5	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	2.0	1.9	1.9	2.3	1.5	1.7	2.26	2.69	1.29	1.47	1.78	1.42	APHA (22 nd Edi) 10200-H



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17.3	Cell Count	No. x 10 ³ /L	202	82	176	60	188	50	172	58	124	46	136	54	APHA (22 nd Edi) 10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Rhizosolenia</i> sp. <i>Thalassiosira</i> sp. <i>Coscinodiscus</i> sp. <i>Synedra</i> sp.	<i>Synedra</i> sp. <i>Cyclotella</i> sp. <i>Biddulphia</i> sp. --	<i>Navicula</i> sp. <i>Cyclotella</i> sp. <i>Coscinodiscus</i> sp. <i>Rhizosolenia</i> sp.	<i>Nitzschia</i> sp. <i>Biddulphia</i> sp. <i>Coscinodiscus</i> sp. --	<i>Nitzschia</i> sp. <i>Cyclotella</i> sp. <i>Thalassiosira</i> sp. <i>Rhizosolenia</i> sp.	<i>Navicula</i> sp. <i>Biddulphia</i> sp. <i>Cyclotella</i> sp. --	<i>Navicula</i> sp. <i>Thalassiosira</i> sp. <i>Coscinodiscus</i> sp. <i>Amphipro</i> sp.	<i>Nitzschia</i> sp. <i>Pleurosigma</i> sp. <i>Synedra</i> sp. --	<i>Cyclotella</i> sp. <i>Skeletonema</i> sp. <i>Nitzschia</i> sp. <i>Rhizosolenia</i> sp.	<i>Nitzschia</i> sp. <i>Fragillaria</i> sp. <i>Synedra</i> sp. --	<i>Thalassiosira</i> sp. <i>Amphipro</i> sp. <i>Pleurosigma</i> sp. <i>Cheatecer</i> sp.	<i>Pleurosigma</i> sp. <i>Nitzschia</i> sp. <i>Biddulphia</i> sp. --	APHA (22 nd Edi) 10200-H
C Zooplanktons															
18.1	Abundance (Population)	noX10 ³ /100 m ³	36		50		53		62		45		55		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Ostracods Decapods		Crustaceans Polychaetes Foraminiferans		Polychaetes Crustaceans Bivalves		Polychaetes Bivalves Decapods		Polychaetes Isopods Amphipods		Gastropods Mysids Ostracods		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.4		2.55		2.7		2.65		2.1		3.4		APHA (22 nd Edi) 10200-G
D Microbiological Parameters															
19.1	Total Bacterial Count	CFU/ml	1900		1880		1820		1760		1700		1810		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)922 1-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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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	APRIL 2019	MAY 2019	JUNE 2019	JULY 2019	AUGUST 2019	SEPTEMBER 2019	TEST METHOD
			SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	
1	Organic Matter	%	0.68	0.8	0.72	0.6	0.68	0.61	FCO:2007
2	Phosphorus as P	µg/g	278	312	412	483	432	376	APHA(22 nd Edi) 4500 C
3	Texture	--	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	--
4	Petroleum Hydrocarbon	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	PLPL-TPH
5	Heavy Metals								
5.1	Aluminum as Al	%	5.12	4.86	5.14	4.7	4.75	4.95	AAS APHA 3111 B
5.2	Total Chromium as Cr ⁺³	µg/g	203	244	138	164	142	213	AAS 3111B
5.3	Manganese as Mn	µg/g	1180	1350	1203	1036	1025	1054	AAS APHA 3111 B
5.4	Iron as Fe	%	5.15	5.26	5.1	4.88	5.15	5.2	AAS APHA(22 nd Edi)3111 B
5.5	Nickel as Ni	µg/g	36.8	42.6	29	17.83	21.8	26	AAS APHA(22 nd Edi)3111 B
5.6	Copper as Cu	µg/g	31.4	41.6	26.4	25.4	16.4	37	AAS APHA(22 nd Edi)3111 B
5.7	Zinc as Zn	µg/g	226	239	240	210	254	210	AAS APHA(22 nd Edi)3111 B
5.8	Lead as Pb	µg/g	2.4	1.62	2.29	1.97	1.5	1.93	AAS APHA(22 nd Edi)3111 B
5.9	Mercury as Hg	µg/g	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	AAS APHA- 3112 B
6	Benthic Organisms								
6.1	Macrobenthos	--	Polychaetes Crustaceans --	Polychaetes Echinoderms --	Bivalves Gastropods Polychaetes	Bivalves Gastropods ---	Bivalves Polychaetes --	Polychaetes Decapods --	APHA (22 nd Edi) 10500-C
6.2	MeioBenthos	--	Foraminiferans Nematodes	Foraminiferans Hydrozoans	Gastropods Nematodes	Nematodes Hydrozoans	Nematodes --	Ostracodes Ciliates	APHA (22 nd Edi) 10500-C
6.3	Population	no/m ²	618	540	706	765	674	616	APHA (22 nd Edi) 10500-C



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

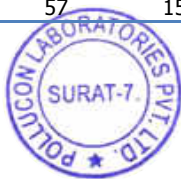
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RESULTS OF MARINE WATER [M11 MPT T1 JETTY N 22°42'278" E 069°43'450"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.13	8.09	8.17	8.09	8.19	8.13	8.24	8.17	8.1	8.03	8.12	8.07	IS3025(P11)83Re.02
2	Temperature	oC	30.5	30.3	31.6	31.4	30.1	29.9	30.2	30	30	30.2	29.9	29.7	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	203	226	272	251	239	258	308	313	384	419	416	432	IS3025(P17)84Re.02
4	BOD (3 Days @ 27 °C)	mg/L	5.2	BDL*	4.0	BDL*	3.7	BDL*	3.2	BDL*	BDL*	BDL*	3.2	BDL*	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	6.0	5.9	6.2	6.0	6.0	5.8	6.0	5.7	6.0	5.8	5.8	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.4	36.7	36.9	37	36.3	36.7	36.7	37	35.4	35.9	34.2	34.6	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)552 OD
8	Nitrate as NO ₃	μmol/L	4.71	3.57	4.95	4.1	2.84	2.69	2.46	2.24	1.7	1.56	1.92	2.12	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.89	0.75	1.18	1.25	0.72	0.56	0.51	0.36	0.48	0.29	0.3	0.46	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.88	1.26	1.90	1.60	1.84	1.71	1.68	1.43	1.33	1.12	1.28	1.36	IS3025(P34)88Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.6	1.39	1.75	1.56	2.36	2.14	1.97	1.7	1.64	1.36	1.58	1.65	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	7.48	5.59	8.00	7.00	5.40	4.96	4.65	4.03	3.51	2.97	3.5	3.94	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	10.3	BDL*	BDL*	BDL*	6.2	BDL*	10.41	BDL*	BDL*	BDL*	10.6	5.2	PLPL-TPH
14	Total Dissolved Solids	mg/L	37918	38910	37916	37514	37580	38287	36902	37124	36252	36817	35314	35284	IS3025(P16)84Re.02
15	COD	mg/L	17.3	6.3	18	BDL*	11	BDL*	9.2	BDL*	8.1	BDL*	15	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/L /day	3.52	5.17	5.85	5.28	9.9	8.32	8.78	7.53	8.1	7.42	7.65	5.96	APHA (22 nd Edi) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/m ³	3.52	2.93	3.31	2.61	3.52	2.77	2.8	2.50	3.31	2.40	2.83	2.56	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	2.2	2.4	2.5	2.9	2.0	2.6	1.75	2.42	1.03	2.01	1.84	1.92	APHA (22 nd Edi) 10200-H
17.3	Cell Count	No. x	153	64	141	57	154	41	136	50	123	44	117	50	APHA (22 nd Edi)



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10 ³ /L															10200-H
17.4	Name of Group Number and name of group species of each group	--	<i>Rhizosolenia</i> sp.	<i>Nitzschia</i> sp.	<i>Rhizosolenia</i> sp.	<i>Nitzschia</i> sp.	<i>Navicula</i> sp.	<i>Nitzschia</i> sp.	<i>Nitzschia</i> sp.	<i>Navicula</i> sp.	<i>peridinium</i> sp.	<i>Nitzschia</i> sp.	<i>Melosira</i> sp.	<i>Cheatecerous</i> sp.	APHA (22 nd Edi) 10200-H
			<i>Coscinodiscus</i> sp.	<i>Biddulphia</i> sp.	<i>Biddulphia</i> sp.	<i>Rhizosolenia</i> sp.	<i>Rhizosolenia</i> sp.	<i>Coscinodiscus</i> sp.	<i>Rhizosolenia</i> sp.	<i>Thalassionema</i> sp.	<i>Synedra</i> sp.	<i>Melosira</i> sp.	<i>Pleurosigma</i> sp.	<i>Rhizosolenia</i> sp.	
			<i>Biddulphia</i> sp.	<i>Synedra</i> sp.	<i>Thalassionema</i> sp.	<i>Coscinodiscus</i> sp.	<i>Coscinodiscus</i> sp.	<i>Cyclotella</i> sp.	<i>Rhizosolenia</i> sp.	<i>Rhizosolenia</i> sp.	<i>Cheatecerous</i> sp.	<i>Nitzschia</i> sp.	<i>Skeletonema</i> sp.	<i>Biddulphia</i> sp.	
			<i>Navicula</i> sp.	--	<i>Navicula</i> sp.	--	<i>Navicula</i> sp.	--	<i>Coscinodiscus</i> sp.	--	<i>Cheatecerous</i> sp.	--	<i>Fragillaria</i> sp.	<i>Fragillaria</i> sp.	--
C	Zooplanktons														
18.1	Abundance (Population)	noX10 ³ / 100 m ³	46		52		49		53		48		56		APHA (22 nd Edi) 10200-G
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Gastropods Mysids		Crustaceans Gastropods Decapods		Polychaetes Crustaceans --		Polychaetes Gastropods Decapods		Ostracodes Hydrozoans Polychaetes		Polychaetes Mysids Gastropods		APHA (22 nd Edi) 10200-G
18.3	Total Biomass	ml/100 m ³	2.1		2.55		2.10		1.9		1.6		2.1		APHA (22 nd Edi) 10200-G
D	Microbiological Parameters														
19.1	Total Bacterial Count	CFU/ml	1780		1750		1790		1850		1750		1880		IS 5402:2002
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)922 1-D
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)



H. T. Shah
Lab Manager




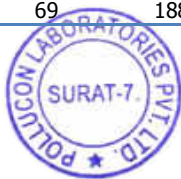

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RESULTS OF MARINE WATER [M12 SPM N 22°40'938" E 069°39'191"]

SR. NO.	TEST PARAMETERS	UNIT	APRIL 2019		MAY 2019		JUNE 2019		JULY 2019		AUGUST 2019		SEPTEMBER 2019		TEST METHOD
			SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	SURFACE	BOTTOM	
1	pH	--	8.17	8.12	8.30	8.21	8.19	8.14	8.24	8.18	8.12	8.07	8.15	8.11	IS3025(P11)83Re.02
2	Temperature	oC	30.6	30.3	31.9	31.5	30.2	30.0	30.3	30	30	30.3	29.9	29.6	IS3025(P9)84Re.02
3	Total Suspended Solids	mg/L	202	231	227	248	317	351	328	349	392	424	370	384	IS3025(P17)84Re.02
4	BOD (3 Days @ 27°C)	mg/L	5.1	BDL*	6.0	BDL*	3.9	BDL*	3.3	BDL*	BDL*	BDL*	3.5	BDL*	IS 3025 (P44)1993Re.03E dition2.1
5	Dissolved Oxygen	mg/L	5.9	5.7	6.2	5.9	5.8	6.0	6.0	5.7	6.1	5.8	6.0	5.9	IS3025(P38)89Re.99
6	Salinity	ppt	36.2	36.5	36.9	37.1	37.1	37.6	37	37.7	35.5	36	34.6	35.1	APHA (22 nd Edi) 2550 B
7	Oil & Grease	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	APHA(22 nd Edi)552 OD
8	Nitrate as NO ₃	μmol/L	2.9	2.32	2.5	2.1	3.14	3	2.98	2.7	1.64	1.32	1.9	2.03	IS3025(P34)88
9	Nitrite as NO ₂	μmol/L	0.95	0.82	1.1	0.9	0.83	0.69	0.74	0.59	0.51	0.29	0.34	0.42	IS3025(P34)88 NEDA
10	Ammonical Nitrogen as NH ₃	μmol/L	1.90	1.72	1.70	1.60	2.10	1.97	1.83	1.64	1.32	1.1	1.56	1.62	IS3025(P34)88Cla.2.3
11	Phosphates as PO ₄	μmol/L	1.28	1.01	1.58	1.34	2.16	2.1	2	1.83	1.56	1.19	1.48	1.57	APHA(22 nd Edi) 4500 C
12	Total Nitrogen	μmol/L	5.74	4.86	5.40	3.90	6.07	5.66	5.55	4.93	3.47	2.71	3.8	4.07	IS3025(P34)88
13	Petroleum Hydrocarbon	μg/L	10.4	BDL*	13.0	BDL*	8.2	BDL*	10.3	BDL*	BDL*	BDL*	12.9	BDL*	PLPL-TPH
14	Total Dissolved Solids	mg/L	37610	37913	37847	38013	38103	38914	36902	37124	35917	36318	35390	36298	IS3025(P16)84Re.02
15	COD	mg/L	17.2	9.8	23	BDL*	16	6.2	10.4	BDL*	9.2	BDL*	15	BDL*	APHA(22 nd Edi) 5520-D Open Reflux
A Flora and Fauna															
16	Primary productivity	mgC/L /day	4.95	3.15	4.72	3.6	8.55	7.42	9.2	6.97	8.3	6.75	7.69	7	APHA (22 nd Edi) 10200-J
B Phytoplankton															
17.1	Chlorophyll	mg/m ³	2.64	2.40	2.48	2.29	2.69	2.24	3.09	2.61	2.77	2.34	2.83	2.4	APHA (22 nd Edi) 10200-H
17.2	Phaeophytin	mg/m ³	2.0	2.1	2.3	2.3	1.9	2.7	1.8	2.06	2.53	2.29	2.48	2.23	APHA (22 nd Edi) 10200-H
17.3	Cell Count	No. x	146	73	134	69	188	76	204	68	196	54	182	68	APHA (22 nd Edi)


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10 ³ /L															10200-H	
17.4	Name of Group Number and name of group species of each group	--	<i>Coscinodiscus sp.</i>	<i>Nitzschia sp.</i>	<i>Coscinodiscus sp.</i>	<i>Navicula sp.</i>	<i>Nitzschia sp.</i>	<i>Navicula sp.</i>	<i>Nitzschia sp.</i>	<i>Navicula sp.</i>	<i>Biddulphia sp.</i>	<i>Nitzschia sp.</i>	<i>Thallasiosira sp.</i>	<i>Nitzschia sp.</i>	APHA (22 nd Edi) 10200-H	
			<i>Fragillaria sp.</i>	<i>Coscinodiscus sp.</i>	<i>Nitzschia sp.</i>	<i>Synedra sp.</i>	<i>Thallasiosira sp.</i>	<i>Thallasiosira sp.</i>	<i>Coscinodiscus sp.</i>	<i>Thallasiosira sp.</i>	<i>Coscinodiscus sp.</i>	<i>Pleurosigma sp.</i>	<i>Fragillaria sp.</i>	<i>Skeletonema sp.</i>		<i>Rhizosolenia sp.</i>
			<i>Biddulphia sp.</i>	<i>Synedra sp.</i>	<i>Thallasiosira sp.</i>	--	--	<i>Pleurosigma sp.</i>	--	<i>Rhizosolenia sp.</i>	--	<i>Synedra sp.</i>	<i>Biddulphia sp.</i>	<i>Coscinodiscus sp.</i>		<i>Biddulphia sp.</i>
			<i>Thallasiosira sp.</i>	--	--	--	<i>Navicula sp.</i>	--	<i>Synedra sp.</i>	--	<i>Synedra sp.</i>	--	<i>Synedra sp.</i>	--		--
C Zooplanktons																
18.1	Abundance (Population)	noX10 ³ /100 m ³	39		43		50		56		46		51		APHA (22 nd Edi) 10200-G	
18.2	Name of Group Number and name of group species of each group	--	Polychaetes Crustaceans Mysids		Polychaetes Gastropods Foraminiferans		Gastropods Crustaceans Mysids		Polychaetes Crustaceans Bivalves		Polychaetes Decapods Ostracodes		Ostracods Mysids Ctenophores		APHA (22 nd Edi) 10200-G	
18.3	Total Biomass	ml/100 m ³	1.6		1.8		1.95		2.0		1.6		2.0		APHA (22 nd Edi) 10200-G	
D Microbiological Parameters																
19.1	Total Bacterial Count	CFU/ml	1750		1860		1810		1790		1700		1780		IS 5402:2002	
19.2	Total Coliform	/ml	Absent		Absent		Absent		Absent		Absent		Absent		APHA(22 nd Edi)922 1-D	
19.3	Ecoli	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS:1622:1981Edi. 2.4(2003-05)	
19.4	Enterococcus	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 15186 :2002	
19.5	Salmonella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-3)	
19.6	Shigella	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 1887 (P-7)	
19.7	Vibrio	/ml	Absent		Absent		Absent		Absent		Absent		Absent		IS : 5887 (P-5)	



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Lab Manager




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RESULTS OF ETP WATER OUTLET

SR. NO.	PARAMETERS	UNIT	RESULTS OF ETP WATER OUTLET						GPCB Limit	TEST METHOD
			05/04/2019	05/07/2019	04/06/2019	03/07/2019	06/08/2019	06/09/2019		
1	Colour	Co-pt	70	50	40	50	40	50	100	IS3025(P4)83Re.02
2	pH	--	7.32	7.90	7.01	7.65	7.08	6.76	6.5 TO 8.5	IS3025(P11)83Re.02
3	Temperature	°C	31.9	32	31.9	31.5	31.3	32	40	IS3025(P9)84Re.02
4	Total Suspended Solids	mg/L	52	84	70	56	42	64	100	IS3025(P17)84Re.02
5	Total Dissolved Solids	mg/L	1903	2041	2096	2084	2060	1976	2100	IS3025(P16)84Re.02
6	COD	mg/L	80	84	98	88	78	92	100	APHA(22 nd Edi) 5520-D Open Reflux
7	BOD (3 Days @ 27 °C)	mg/L	24	28	30	24	18	24	30	IS 3025 (P44)1993Re.03Edition2.1
8	Chloride as Cl	mg/L	572	559	598	584	539	589	600	IS3025(P32)88Re.99
9	Oil & Grease	mg/L	3.8	2.4	2.9	3.4	5.2	3.2	10	APHA(22 nd Edi)5520D
10	Sulphate as SO ₄	mg/L	156	480	502	455	392	412	1000	APHA(22 nd Edi)4500 SO ₄ E
11	Ammonical Nitrogen as NH ₃	mg/L	10.2	6.8	11.1	14.8	10.6	7.4	50	IS3025(P34)88Cla.2.3
12	Phenolic Compound	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	1	IS3025(P43)92Re.03
13	Copper as Cu	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	3	AAS APHA(22 nd Edi)3111 B
14	Lead as Pb	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	0.1	AAS APHA(22 nd Edi)3111 B
15	Sulphide as S	mg/L	1.6	2.4	1.6	1.2	1.4	1.2	2	APHA(22 nd Edi) 4500-S
16	Cadmium as Cd	mg/L	BDL*	BDL*	BDL*	BDL*	BDL*	BDL*	2	AAS APHA(22 nd Edi)3111 B
17	Fluoride as F	mg/L	0.6	0.55	0.70	0.55	0.6	0.75	2	APHA(22 nd Edi) 4500 F D SPANDS

*Below detection limit



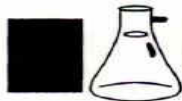
H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON****LABORATORIES PVT. LTD.**Environmental Auditors, Consultants & Analysts.
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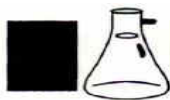
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RESULT OF AMBIENT AIR QUALITY MONITORING**ADANI PORT – T1 TERMINAL NR.MARINE BUILDING**

Sr. No	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO2) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO2) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
1	02/04/2019	81.68	41.24	15.65	35.64	0.50	BDL*	BDL*
2	03/04/2019	94.36	52.77	11.69	21.35	0.81	BDL*	BDL*
3	08/04/2019	77.51	49.27	8.46	18.67	0.47	BDL*	BDL*
4	10/04/2019	80.33	35.64	10.36	37.63	0.62	BDL*	BDL*
5	15/04/2019	96.24	56.36	13.72	31.58	0.68	BDL*	BDL*
6	17/04/2019	75.67	42.68	20.36	41.30	0.79	BDL*	BDL*
7	22/04/2019	86.36	36.50	24.29	39.47	0.30	BDL*	BDL*
8	24/04/2019	78.45	45.36	21.39	34.57	0.63	BDL*	BDL*
9	29/04/2019	92.42	39.26	18.36	30.45	0.98	BDL*	BDL*
10	01/05/2019	78.32	46.35	20.33	31.50	0.66	BDL*	BDL*
11	06/05/2019	83.50	38.31	17.52	39.30	0.55	BDL*	BDL*
12	09/05/2019	94.36	54.38	22.51	45.36	0.71	BDL*	BDL*
13	13/05/2019	98.30	44.53	13.43	22.59	0.89	BDL*	BDL*
14	15/05/2019	84.32	47.87	11.26	40.24	0.34	BDL*	BDL*
15	20/05/2019	79.58	37.53	24.43	36.41	0.65	BDL*	BDL*
16	22/05/2019	87.58	43.59	21.19	32.42	0.72	BDL*	BDL*
17	27/05/2019	95.43	52.73	16.53	38.61	0.54	BDL*	BDL*
18	29/05/2019	80.65	40.25	19.62	43.56	0.82	BDL*	BDL*
19	03/06/2019	74.31	42.60	11.60	34.34	0.26	BDL*	BDL*
20	05/06/2019	88.69	37.53	20.33	40.25	0.72	BDL*	BDL*
21	10/06/2019	71.63	40.29	17.44	27.64	0.56	BDL*	BDL*
22	17/06/2019	92.48	36.29	21.53	30.24	0.50	BDL*	BDL*
23	19/06/2019	76.31	39.55	18.25	28.58	0.58	BDL*	BDL*
24	24/06/2019	96.38	45.36	23.49	39.46	0.55	BDL*	BDL*
25	26/06/2019	82.56	50.55	19.54	37.56	0.64	BDL*	BDL*
26	01/07/2019	94.38	55.53	20.31	44.29	0.85	BDL*	BDL*
27	03/07/2019	85.38	45.36	23.69	37.59	0.48	BDL*	BDL*
28	08/07/2019	68.71	38.48	16.32	33.66	0.65	BDL*	BDL*
29	10/07/2019	77.55	47.34	21.25	39.27	0.73	BDL*	BDL*
30	15/07/2019	69.62	35.47	12.72	36.05	0.29	BDL*	BDL*

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H. T. Shah**Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

**RESULT OF AMBIENT AIR QUALITY MONITORING**

ADANI PORT – T1 TERMINAL NR. (MARINE BUILDING)								
Sr.N o.	Date of Sampling	Particulate Matter (PM ₁₀) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM _{2.5}) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO ₂) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
31	17/07/2019	90.42	52.48	25.68	41.27	0.62	BDL*	BDL*
32	22/07/2019	88.65	34.28	22.67	31.84	0.31	BDL*	BDL*
33	24/07/2019	79.80	42.35	17.64	40.68	0.79	BDL*	BDL*
34	29/07/2019	66.54	39.22	19.55	29.47	0.63	BDL*	BDL*
35	31/07/2019	81.29	44.25	15.59	34.27	0.87	BDL*	BDL*
36	05/08/2019	83.63	44.37	14.15	30.40	0.74	BDL*	BDL*
37	07/08/2019	92.92	50.30	10.53	33.50	0.68	BDL*	BDL*
38	12/08/2019	88.67	35.68	18.65	38.23	0.76	BDL*	BDL*
39	14/08/2019	69.86	31.85	20.24	35.31	0.87	BDL*	BDL*
40	19/08/2019	81.34	40.83	15.41	39.51	0.64	BDL*	BDL*
41	21/08/2019	78.65	43.38	22.26	43.58	0.39	BDL*	BDL*
42	26/08/2019	67.56	36.34	17.53	37.55	0.52	BDL*	BDL*
43	28/08/2019	80.34	39.38	23.56	36.26	0.50	BDL*	BDL*
44	03/09/2019	80.33	42.60	12.68	27.64	0.50	BDL*	BDL*
45	05/09/2019	70.36	29.25	18.57	31.61	0.58	BDL*	BDL*
46	09/09/2019	62.70	36.58	14.57	34.25	0.46	BDL*	BDL*
47	11/09/2019	75.67	32.67	24.66	39.31	0.26	BDL*	BDL*
48	16/09/2019	64.39	38.27	17.64	42.67	0.40	BDL*	BDL*
49	18/09/2019	87.70	47.29	9.68	29.68	0.47	BDL*	BDL*
50	23/09/2019	77.68	37.61	21.54	32.52	0.34	BDL*	BDL*
51	25/09/2019	89.33	43.55	16.65	37.56	0.62	BDL*	BDL*
52	30/09/2019	79.39	39.67	19.68	35.67	0.49	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO ₂)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit

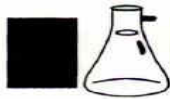
H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON****LABORATORIES PVT. LTD.**Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr. No.	Date of Sampling	Particulate Matter (PM ₁₀) µg/m ³	Particulate Matter (PM _{2.5}) µg/m ³	Sulphur Dioxide (SO ₂) µg/m ³	Oxides of Nitrogen (NO ₂) µg/m ³	Carbon Monoxide as CO mg/m ³	Hydrocarbon as CH ₄ mg/m ³	Benzene as C ₆ H ₆ µg/m ³
1	02/04/2019	52.74	22.65	22.70	32.44	0.44	BDL*	BDL*
2	03/04/2019	60.32	32.60	18.64	16.29	0.60	BDL*	BDL*
3	08/04/2019	70.67	40.62	14.37	26.33	0.73	BDL*	BDL*
4	10/04/2019	58.43	26.82	21.65	30.57	0.82	BDL*	BDL*
5	15/04/2019	74.56	44.51	7.61	23.42	0.57	BDL*	BDL*
6	17/04/2019	67.81	39.42	15.61	34.36	0.66	BDL*	BDL*
7	22/04/2019	55.44	23.64	19.67	31.59	1.00	BDL*	BDL*
8	24/04/2019	72.66	41.56	13.57	27.52	0.69	BDL*	BDL*
9	29/04/2019	82.60	34.26	10.54	36.35	0.93	BDL*	BDL*
10	01/05/2019	74.38	42.69	11.66	38.36	0.95	BDL*	BDL*
11	06/05/2019	65.34	29.34	24.36	35.53	0.50	BDL*	BDL*
12	09/05/2019	81.24	47.27	17.56	40.21	0.68	BDL*	BDL*
13	13/05/2019	79.68	39.30	20.27	17.49	0.74	BDL*	BDL*
14	15/05/2019	58.83	28.68	13.48	32.54	0.47	BDL*	BDL*
15	20/05/2019	82.32	45.25	6.61	29.27	0.87	BDL*	BDL*
16	22/05/2019	66.34	36.36	15.37	25.36	0.78	BDL*	BDL*
17	27/05/2019	86.80	48.64	8.36	19.54	0.85	BDL*	BDL*
18	29/05/2019	61.35	27.36	16.26	34.59	0.69	BDL*	BDL*
19	03/06/2019	49.32	27.60	15.57	27.51	0.37	BDL*	BDL*
20	05/06/2019	70.29	34.30	18.62	23.42	0.65	BDL*	BDL*
21	10/06/2019	65.31	39.34	11.51	19.32	0.78	BDL*	BDL*
22	17/06/2019	85.33	40.21	5.69	25.61	0.66	BDL*	BDL*
23	19/06/2019	56.53	32.56	13.58	22.69	0.36	BDL*	BDL*
24	24/06/2019	80.34	41.86	14.99	34.22	0.46	BDL*	BDL*
25	26/06/2019	74.38	21.61	9.65	28.45	0.57	BDL*	BDL*
26	01/07/2019	70.54	32.65	18.64	36.50	0.60	BDL*	BDL*
27	03/07/2019	65.41	28.43	8.09	25.50	0.55	BDL*	BDL*
28	08/07/2019	50.64	25.50	14.49	23.43	0.37	BDL*	BDL*
29	10/07/2019	67.68	33.27	10.40	30.29	0.64	BDL*	BDL*
30	15/07/2019	54.25	21.20	17.55	29.42	0.40	BDL*	BDL*

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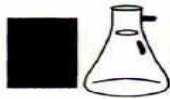
H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON****LABORATORIES PVT. LTD.**Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

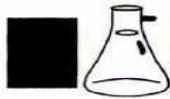
Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

RESULT OF AMBIENT AIR QUALITY MONITORING

NEAR FIRE STATION								
Sr.N o.	Date of Sampling	Particulate Matter (PM ₁₀) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM _{2.5}) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO ₂) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
31	17/07/2019	74.59	35.37	15.60	37.50	0.50	BDL*	BDL*
32	22/07/2019	82.48	37.10	12.38	26.76	0.72	BDL*	BDL*
33	24/07/2019	63.96	31.24	19.56	24.43	0.71	BDL*	BDL*
34	29/07/2019	58.35	36.45	21.30	34.37	0.86	BDL*	BDL*
35	31/07/2019	76.29	41.24	11.54	22.67	0.58	BDL*	BDL*
36	05/08/2019	67.55	40.25	10.50	20.52	0.23	BDL*	BDL*
37	07/08/2019	72.65	45.66	15.20	26.30	0.30	BDL*	BDL*
38	12/08/2019	68.26	31.53	22.37	35.65	0.48	BDL*	BDL*
39	14/08/2019	60.51	27.52	9.26	27.63	0.73	BDL*	BDL*
40	19/08/2019	75.28	38.39	11.51	23.44	0.57	BDL*	BDL*
41	21/08/2019	58.35	26.12	7.22	30.56	0.45	BDL*	BDL*
42	26/08/2019	79.39	42.36	16.23	39.57	0.29	BDL*	BDL*
43	28/08/2019	69.48	32.44	21.59	34.53	0.41	BDL*	BDL*
44	03/09/2019	64.58	36.65	9.15	18.40	0.60	BDL*	BDL*
45	05/09/2019	54.36	25.37	6.71	15.37	0.52	BDL*	BDL*
46	09/09/2019	71.36	33.64	11.72	20.58	0.39	BDL*	BDL*
47	11/09/2019	52.68	20.41	7.70	26.24	0.31	BDL*	BDL*
48	16/09/2019	76.24	42.73	12.61	35.73	0.30	BDL*	BDL*
49	18/09/2019	67.58	41.20	15.73	22.64	0.55	BDL*	BDL*
50	23/09/2019	65.42	29.67	18.63	30.69	0.37	BDL*	BDL*
51	25/09/2019	73.52	31.57	22.48	32.79	0.32	BDL*	BDL*
52	30/09/2019	68.35	35.58	16.59	29.45	0.36	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO ₂)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit

H. T. Shah**Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

**POLLUCON****LABORATORIES PVT. LTD.**Environmental Auditors, Consultants & Analysts.
Cleaner Production / Waste Minimization Facilitator

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RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM ₁₀) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM _{2.5}) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO ₂) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
1	02/04/2019	68.30	31.55	11.54	21.67	0.86	BDL*	BDL*
2	03/04/2019	52.32	26.20	19.64	28.62	0.70	BDL*	BDL*
3	08/04/2019	60.49	37.52	18.55	33.67	0.61	BDL*	BDL*
4	10/04/2019	76.33	22.29	9.67	17.51	0.96	BDL*	BDL*
5	15/04/2019	54.33	29.70	10.28	29.34	0.84	BDL*	BDL*
6	17/04/2019	62.35	35.63	13.63	26.65	0.94	BDL*	BDL*
7	22/04/2019	73.65	32.47	7.70	23.42	0.48	BDL*	BDL*
8	24/04/2019	64.53	36.55	16.42	22.23	0.40	BDL*	BDL*
9	29/04/2019	75.64	30.54	21.64	24.32	0.64	BDL*	BDL*
10	01/05/2019	67.33	39.50	24.38	26.71	0.77	BDL*	BDL*
11	06/05/2019	87.33	25.78	13.27	23.55	1.00	BDL*	BDL*
12	09/05/2019	75.76	40.30	15.65	35.43	0.81	BDL*	BDL*
13	13/05/2019	85.67	46.27	23.43	30.24	0.27	BDL*	BDL*
14	15/05/2019	78.55	35.63	9.71	18.69	0.56	BDL*	BDL*
15	20/05/2019	68.40	42.52	18.57	24.50	0.73	BDL*	BDL*
16	22/05/2019	72.66	29.40	16.37	37.57	0.37	BDL*	BDL*
17	27/05/2019	62.84	31.55	11.78	31.39	0.64	BDL*	BDL*
18	29/05/2019	86.34	36.72	14.57	25.36	0.79	BDL*	BDL*
19	03/06/2019	66.52	31.55	8.56	15.65	0.49	BDL*	BDL*
20	05/06/2019	76.36	39.50	15.25	28.48	0.22	BDL*	BDL*
21	10/06/2019	60.52	36.26	19.42	23.43	0.63	BDL*	BDL*
22	17/06/2019	69.26	30.50	13.57	22.65	0.74	BDL*	BDL*
23	19/06/2019	50.20	25.66	16.25	32.62	0.29	BDL*	BDL*
24	24/06/2019	66.62	34.58	11.30	26.52	0.68	BDL*	BDL*
25	26/06/2019	79.86	32.39	7.59	21.64	0.34	BDL*	BDL*
26	01/07/2019	82.42	41.89	7.60	27.51	0.53	BDL*	BDL*
27	03/07/2019	73.63	26.37	10.68	30.23	0.61	BDL*	BDL*
28	08/07/2019	55.21	29.40	6.54	20.49	0.32	BDL*	BDL*
29	10/07/2019	71.23	37.27	8.63	23.44	0.39	BDL*	BDL*
30	15/07/2019	59.32	27.51	22.43	33.53	0.47	BDL*	BDL*

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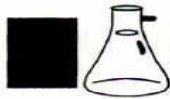
H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

**POLLUCON****LABORATORIES PVT. LTD.**Environmental Auditors, Consultants & Analysts.
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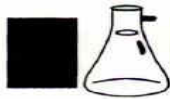
Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

RESULT OF AMBIENT AIR QUALITY MONITORING

ADANI HOUSE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO ₂) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
31	17/07/2019	62.47	32.22	18.23	28.51	0.74	BDL*	BDL*
32	22/07/2019	74.38	28.46	13.52	22.41	0.84	BDL*	BDL*
33	24/07/2019	69.45	38.23	20.23	32.47	0.24	BDL*	BDL*
34	29/07/2019	52.42	30.24	17.53	26.67	0.69	BDL*	BDL*
35	31/07/2019	70.66	36.26	21.20	31.41	0.52	BDL*	BDL*
36	05/08/2019	62.51	35.58	19.22	24.51	0.42	BDL*	BDL*
37	07/08/2019	77.50	38.82	21.53	29.53	0.37	BDL*	BDL*
38	12/08/2019	65.35	41.56	11.25	26.59	0.40	BDL*	BDL*
39	14/08/2019	56.20	20.57	13.62	19.34	0.60	BDL*	BDL*
40	19/08/2019	70.69	34.28	18.29	28.55	0.18	BDL*	BDL*
41	21/08/2019	64.23	23.64	9.76	22.60	0.46	BDL*	BDL*
42	26/08/2019	72.41	29.44	7.56	31.53	0.25	BDL*	BDL*
43	28/08/2019	57.31	30.45	16.90	30.22	0.58	BDL*	BDL*
44	03/09/2019	56.22	29.70	17.59	23.41	0.36	BDL*	BDL*
45	05/09/2019	62.39	34.62	14.57	24.43	0.44	BDL*	BDL*
46	09/09/2019	50.42	26.42	16.51	30.35	0.13	BDL*	BDL*
47	11/09/2019	60.54	23.77	12.70	20.26	0.48	BDL*	BDL*
48	16/09/2019	69.35	27.68	7.59	27.57	0.21	BDL*	BDL*
49	18/09/2019	74.62	36.68	20.50	37.64	0.25	BDL*	BDL*
50	23/09/2019	53.69	25.41	15.66	25.44	0.41	BDL*	BDL*
51	25/09/2019	78.32	39.16	10.40	21.61	0.29	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO ₂)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit

H. T. Shah**Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

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RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 DG HOUSE								
Sr.N o.	Date of Sampling	Particulate Matter (PM10) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM 2.5) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO2) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO2) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
1	02/04/2019	64.36	25.41	20.33	29.64	0.78	BDL*	BDL*
2	03/04/2019	77.69	40.31	23.39	33.50	0.92	BDL*	BDL*
3	08/04/2019	80.42	46.18	11.68	37.41	0.37	BDL*	BDL*
4	10/04/2019	71.65	32.48	6.56	20.55	0.89	BDL*	BDL*
5	15/04/2019	60.47	35.30	15.66	34.38	0.41	BDL*	BDL*
6	17/04/2019	81.26	47.22	9.40	23.43	0.72	BDL*	BDL*
7	22/04/2019	65.34	27.52	14.56	26.62	0.65	BDL*	BDL*
8	24/04/2019	87.54	54.37	17.35	30.47	0.49	BDL*	BDL*
9	29/04/2019	68.67	26.57	13.49	19.66	0.87	BDL*	BDL*
10	01/05/2019	88.67	50.24	15.48	21.67	1.01	BDL*	BDL*
11	06/05/2019	70.33	35.67	21.52	30.48	0.88	BDL*	BDL*
12	09/05/2019	86.37	45.31	10.51	25.33	0.48	BDL*	BDL*
13	13/05/2019	74.33	29.42	26.29	37.21	0.63	BDL*	BDL*
14	15/05/2019	63.47	25.66	7.55	22.62	0.76	BDL*	BDL*
15	20/05/2019	87.35	51.23	19.58	32.49	1.02	BDL*	BDL*
16	22/05/2019	78.39	40.18	13.56	40.27	0.58	BDL*	BDL*
17	27/05/2019	67.86	39.44	18.41	36.70	0.36	BDL*	BDL*
18	29/05/2019	75.32	30.33	12.20	29.38	0.94	BDL*	BDL*
19	03/06/2019	55.17	20.32	6.49	19.21	0.61	BDL*	BDL*
20	05/06/2019	63.28	25.37	23.52	32.76	0.52	BDL*	BDL*
21	10/06/2019	78.37	44.32	13.80	17.56	0.80	BDL*	BDL*
22	17/06/2019	74.27	45.40	18.39	27.51	0.84	BDL*	BDL*
23	19/06/2019	68.42	35.79	11.55	35.63	0.48	BDL*	BDL*
24	24/06/2019	72.56	43.53	9.36	22.67	0.38	BDL*	BDL*
25	26/06/2019	90.56	54.37	12.52	25.64	0.77	BDL*	BDL*
26	01/07/2019	88.62	46.35	14.51	30.64	0.78	BDL*	BDL*
27	03/07/2019	78.48	42.33	16.61	33.48	0.30	BDL*	BDL*
28	08/07/2019	62.53	34.26	12.28	38.44	0.54	BDL*	BDL*
29	10/07/2019	81.63	49.41	17.53	26.46	0.82	BDL*	BDL*
30	15/07/2019	70.46	38.28	20.33	20.27	0.66	BDL*	BDL*

H. T. Shah**Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

RESULT OF AMBIENT AIR QUALITY MONITORING

CT-3 DG HOUSE								
Sr.N o.	Date of Sampling	Particulate Matter (PM ₁₀) $\mu\text{g}/\text{m}^3$	Particulate Matter (PM _{2.5}) $\mu\text{g}/\text{m}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{m}^3$	Oxides of Nitrogen (NO ₂) $\mu\text{g}/\text{m}^3$	Carbon Monoxide as CO mg/m^3	Hydrocarbon as CH ₄ mg/m^3	Benzene as C ₆ H ₆ $\mu\text{g}/\text{m}^3$
31	17/07/2019	80.36	43.45	26.50	36.51	0.89	BDL*	BDL*
32	22/07/2019	69.61	30.42	18.63	29.25	0.94	BDL*	BDL*
33	24/07/2019	58.43	24.21	22.39	34.54	0.57	BDL*	BDL*
34	29/07/2019	72.43	45.64	15.64	18.90	0.90	BDL*	BDL*
35	31/07/2019	90.47	52.35	19.65	28.64	0.41	BDL*	BDL*
36	05/08/2019	74.32	37.49	16.24	23.42	0.33	BDL*	BDL*
37	07/08/2019	86.34	55.66	19.51	35.64	0.54	BDL*	BDL*
38	12/08/2019	90.22	45.35	13.55	27.60	0.61	BDL*	BDL*
39	14/08/2019	72.34	41.59	15.36	24.54	0.71	BDL*	BDL*
40	19/08/2019	61.84	46.35	21.46	31.22	0.47	BDL*	BDL*
41	21/08/2019	70.36	39.73	24.53	39.21	0.24	BDL*	BDL*
42	26/08/2019	62.34	31.28	11.46	33.42	0.44	BDL*	BDL*
43	28/08/2019	76.35	34.68	25.33	38.23	0.72	BDL*	BDL*
44	03/09/2019	72.63	33.77	14.71	20.72	0.23	BDL*	BDL*
45	05/09/2019	65.41	37.62	12.72	22.62	0.63	BDL*	BDL*
46	09/09/2019	56.43	41.26	18.74	28.46	0.33	BDL*	BDL*
47	11/09/2019	66.72	29.50	22.62	33.62	0.18	BDL*	BDL*
48	16/09/2019	58.29	32.53	10.52	29.48	0.56	BDL*	BDL*
49	18/09/2019	80.31	50.40	17.54	31.33	0.38	BDL*	BDL*
50	23/09/2019	70.57	34.64	23.51	34.63	0.53	BDL*	BDL*
51	25/09/2019	84.37	47.34	15.46	24.40	0.45	BDL*	BDL*
52	30/09/2019	75.40	40.26	20.55	26.45	0.37	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO ₂)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

*Below detection limit



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	T1 TERMINAL NR.MARINE BUILDING					
		Result [Leq dB(A)]					
	Sampling Date & Time	19/04/2019	06/05/2019	14/06/2019	19/07/2019	16/08/2019	23/09/2019
1	6:00-7:00	64.2	65.2	64.1	68.3	56.3	68.1
2	7:00-8:00	67.1	62.7	68.8	64.4	60.4	62.8
3	8:00-9:00	67.8	73.4	65.1	62.4	59.4	63.4
4	9:00-10:00	66.3	73.1	72.1	68.4	62.6	69.9
5	10:00-11:00	70.3	70.6	71.4	64.4	65.4	72.4
6	11:00-12:00	68.3	71.4	68.9	64.2	68.4	74.1
7	12:00-13:00	63.5	68.4	72.4	68.5	68.9	70.1
8	13:00-14:00	67.3	62.8	68.8	68.4	67.3	66.4
9	14:00-15:00	63.6	63.2	68.2	68.9	65.5	68.4
10	15:00-16:00	65.2	66.4	72.6	72.5	62.3	62.8
11	16:00-17:00	68.4	66.9	70.2	65.3	65.3	65.6
12	17:00-18:00	64.2	69.4	69.2	63.9	64.2	68.8
13	18:00-19:00	67.3	65.8	71.8	66.8	62.3	64.1
14	19:00-20:00	70.2	66.4	74.2	65.4	65.4	63.4
15	20:00-21:00	65.2	63.8	68.1	68.3	61.3	68.9
16	21:00-22:00	64.5	67.6	62.5	64.4	64.4	66.8
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	T1 TERMINAL NR.MARINE BUILDING					
		Result [Leq dB(A)]					
	Sampling Date & Time	19/04/2019	06/05/2019	14/06/2019	19/07/2019	16/08/2019	23/09/2019
1	22:00-23:00	68.7	63.8	60.4	63.1	63.4	68.4
2	23:00-00:00	65.1	65.7	58.1	60.4	60.1	65.5
3	00:00-01:00	62.8	64.1	55.1	59.1	62.4	62.4
4	01:00-02:00	68.4	62.8	59.5	65.4	60.4	63.1
5	02:00-03:00	64.9	63.7	60.4	63.1	60.8	61.4
6	03:00-04:00	69.1	63.9	62.1	64.4	59.4	68.4
7	04:00-05:00	65.5	69.8	60.8	64.9	60.3	64.2
8	05:00-06:00	68.2	62.7	62.7	62.8	62.1	63.1
Night Time Limit*		70 Leq dB(A)					



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	24/04/2019	17/05/2019	17/06/2019	10/07/2019	14/08/2019	09/09/2019
1	6:00-7:00	68.4	63.7	62.4	68.4	68.3	65.7
2	7:00-8:00	65.0	61.8	64.2	65.1	64.4	68.3
3	8:00-9:00	67.3	65.4	62.8	63.4	62.4	65.2
4	9:00-10:00	63.5	69.4	68.2	65.1	68.4	65.1
5	10:00-11:00	74.2	74.1	65.1	72.1	64.4	73.3
6	11:00-12:00	71.3	72.5	66.1	68.8	64.2	70.3
7	12:00-13:00	69.3	68.4	72.1	65.1	68.5	65.3
8	13:00-14:00	67.1	65.4	70.1	69.8	68.4	70.2
9	14:00-15:00	70.3	61.5	69.1	67.2	68.9	69.3
10	15:00-16:00	65.2	60.4	65.1	65.3	72.5	64.3
11	16:00-17:00	61.3	69.1	68.1	62.1	65.3	67.2
12	17:00-18:00	63.2	62.4	62.4	63.4	63.9	64.0
13	18:00-19:00	65.3	62.9	66.3	65.8	66.8	67.1
14	19:00-20:00	68.2	67.1	63.4	66.9	65.4	62.1
15	20:00-21:00	60.1	62.8	61.4	71.4	68.3	65.2
16	21:00-22:00	65.2	65.1	62.8	72.8	64.4	61.9
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	NEAR FIRE STATION					
		Result [Leq dB(A)]					
	Sampling Date & Time	24/04/2019	17/05/2019	17/06/2019	10/07/2019	14/08/2019	09/09/2019
1	22:00-23:00	63.2	64.1	63.4	68.4	65.1	67.4
2	23:00-00:00	59.4	63.4	68.4	65.5	62.4	64.3
3	00:00-01:00	60.3	62.1	65.2	62.4	59.4	58.4
4	01:00-02:00	60.3	60.4	62.7	63.1	61.7	66.3
5	02:00-03:00	65.3	68.4	69.4	60.4	62.1	64.3
6	03:00-04:00	62.3	63.4	65.1	61.8	65.4	62.1
7	04:00-05:00	60.2	65.4	62.8	63.7	66.1	57.2
8	05:00-06:00	62.4	67.1	66.6	62.8	60.4	62.2
Night Time Limit*		70 Leq dB(A)					



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
		15/04/2019	03/05/2019	04/06/2019	03/07/2019	05/08/2019	04/09/2019
1	6:00-7:00	60.3	67.2	61.7	65.4	65.4	64.3
2	7:00-8:00	63.4	65.9	67.3	68.1	66.3	68.8
3	8:00-9:00	62.3	68.1	65.2	62.5	66.9	65.7
4	9:00-10:00	67.4	62.4	70.3	73.1	67.4	70.1
5	10:00-11:00	65.6	62.8	73.2	70.5	63.2	72.4
6	11:00-12:00	68.4	61.8	68.3	69.9	62.4	63.4
7	12:00-13:00	70.4	68.4	68.1	66.4	67.4	60.4
8	13:00-14:00	65.3	68.7	62.4	62.1	65.3	67.9
9	14:00-15:00	69.4	68.2	69.3	68.4	62.5	67.5
10	15:00-16:00	69.7	64.1	66.9	63.4	68.4	62.4
11	16:00-17:00	67.3	69.1	70.2	68.1	68.3	70.3
12	17:00-18:00	65.3	73.1	63.2	66.8	68.7	71.9
13	18:00-19:00	63.8	70.4	64.0	63.1	64.3	68.8
14	19:00-20:00	64.3	64.1	61.0	62.9	62.7	62.1
15	20:00-21:00	67.4	62.8	68.0	65.4	65.8	60.1
16	21:00-22:00	63.8	60.8	65.5	66.7	63.6	64.1
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	ADANI HOUSE					
		Result [Leq dB(A)]					
		15/04/2019	03/05/2019	04/06/2019	03/07/2019	05/08/2019	04/09/2019
1	22:00-23:00	60.4	65.7	67.3	65.5	60.4	62.4
2	23:00-00:00	65.1	67.1	59.5	62.1	62.4	67.3
3	00:00-01:00	65.4	61.5	63.1	63.4	68.7	64.3
4	01:00-02:00	61.8	60.4	61.0	68.1	60.1	67.4
5	02:00-03:00	63.4	60.3	61.3	62.7	63.1	60.3
6	03:00-04:00	62.4	62.8	63.4	60.1	60.8	62.3
7	04:00-05:00	65.7	64.1	68.3	60.9	61.4	65.3
8	05:00-06:00	67.1	62.9	66.2	63.1	64.1	68.4
Night Time Limit*		70 Leq dB(A)					



H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	CT-3 DG HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	29/04/2019	13/05/2019	24/06/2019	26/07/2019	28/08/2019	18/09/2019
1	6:00-7:00	68.9	61.5	65.3	56.3	62.4	61.2
2	7:00-8:00	70.3	59.4	67.2	60.4	64.5	68.7
3	8:00-9:00	65.3	63.4	70.2	59.4	67.3	65.2
4	9:00-10:00	64.3	65.5	66.4	62.6	66.0	64.3
5	10:00-11:00	64.2	62.3	62.6	65.4	69.9	63.8
6	11:00-12:00	62.1	63.8	60.3	68.4	72.4	69.9
7	12:00-13:00	68.3	64.1	65.2	68.9	67.3	62.7
8	13:00-14:00	73.7	62.8	68.3	67.3	70.3	62.3
9	14:00-15:00	69.9	69.2	66.4	65.5	72.3	65.1
10	15:00-16:00	67.3	67.2	61.4	62.3	67.3	65.4
11	16:00-17:00	68.3	66.1	65.2	65.3	63.2	65.3
12	17:00-18:00	65.7	68.4	68.3	64.2	65.7	68.1
13	18:00-19:00	63.8	68.3	66.2	62.3	69.2	64.2
14	19:00-20:00	63.8	62.4	72.6	65.4	64.1	62.8
15	20:00-21:00	64.9	64.3	70.2	61.3	64.2	65.1
16	21:00-22:00	65.8	63.8	69.3	64.4	67.3	63.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	CT-3 DG HOUSE					
		Result [Leq dB(A)]					
	Sampling Date & Time	29/04/2019	13/05/2019	24/06/2019	26/07/2019	28/08/2019	18/09/2019
1	22:00-23:00	62.1	68.7	61.1	67.5	62.4	60.4
2	23:00-00:00	65.0	65.1	65.1	65.2	61.8	62.4
3	00:00-01:00	58.3	62.8	62.8	63.1	60.4	60.4
4	01:00-02:00	59.4	68.4	63.6	60.4	57.1	65.2
5	02:00-03:00	63.4	64.9	63.9	65.1	59.8	63.1
6	03:00-04:00	67.8	69.1	65.1	62.8	60.4	64.5
7	04:00-05:00	60.4	61.4	60.4	61.2	60.8	68.4
8	05:00-06:00	62.4	68.2	61.8	62.8	62.1	62.1
Night Time Limit*		70 Leq dB(A)					



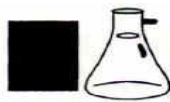
H. T. Shah

Lab Manager




Dr. Arun Bajpai

Lab Manager (Q)

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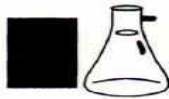
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RESULT OF STACK MONITORING

SR NO	TEST PARAMETERS	UNIT	STD. LIMIT	THERMIC FLUID HEATER (BITUMEN-01)	THERMIC FLUID HEATER (BITUMEN-02)	HOT WATER SYSTEM-1	HOT WATER SYSTEM-2	TEST METHOD
APRIL 2019								
1	Particulate Matter	mg/Nm ³	150	--	--	19.83	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	--	--	6.74	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	--	--	39.32	--	IS:11255 (Part-VII):2005
MAY 2019								
1	Particulate Matter	mg/Nm ³	150	--	--	21.81	14.37	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	--	--	6.68	5.53	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	--	--	34.27	28.75	IS:11255 (Part-VII):2005
JUNE 2019								
1	Particulate Matter	mg/Nm ³	150	--	--	23.74	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	--	--	5.45	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	--	--	36.56	--	IS:11255 (Part-VII):2005
JULY 2019								
1	Particulate Matter	mg/Nm ³	150	--	--	--	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	--	--	--	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	--	--	--	--	IS:11255 (Part-VII):2005
AUGUST 2019								
1	Particulate Matter	mg/Nm ³	150	12.33	--	20.41	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	3.62	--	6.98	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	23.61	--	32.61	--	IS:11255 (Part-VII):2005
SEPTEMBER 2019								
1	Particulate Matter	mg/Nm ³	150	18.75	--	--	--	IS:11255 (Part-I):1985
2	Sulfur dioxide	ppm	100	4.24	--	--	--	IS:11255 (Part-II):1985
3	Oxides of Nitrogen	ppm	50	28.47	--	--	--	IS:11255 (Part-VII):2005

*Below detection limit

Results on 11 % O₂ Correction when Oxygen is greater than 11 %. And 12% CO₂ correction when CO₂ is less than 12%**H. T. Shah****Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

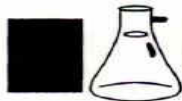
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RESULTS OF D.G. STACK MONITORING**16/05/2019**

SR. NO.	TEST PARAMETERS	Unit	Adani Port	GPCB Limit	Test Method
			D.G. Set – 6, 7 & 8* (1250 KVA, each)		
1	Particulate Matter	mg/Nm ³	17.36	150	IS:11255 (Part-I):1985
2	Sulphur Dioxide	ppm	5.26	100	IS:11255 (Part-II):1985
3	Oxide of Nitrogen	ppm	32.39	50	IS:11255 (Part-VII):2005
4	Carbon Monoxide	mg/m ³	4.9	Not Specified	Digital Gas Analyzer
5	Hydro Carbon NMHC	ppm	BDL*	Not Specified	Gas Chromatography

*DG sets are used as standby, so stack monitoring is done on quarterly basis. Results on 15 % O₂ Correction when Oxygen is greater than 15 %**H. T. Shah****Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**

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Minimum Detection Limit [MDL]

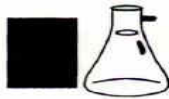
Ambient Air Parameters		
Sr. No.	Test Parameter	MDL
1	Particulate Matter (PM ₁₀) (µg/m ³)	10
2	Particulate Matter (PM 2.5) (µg/m ³)	10
3	Sulphur Dioxide (SO ₂) (µg/m ³)	5
4	Oxides of Nitrogen (µg/m ³)	5
5	Hydrogen Sulphide as H ₂ S (µg/m ³)	6

Stack Parameters		
Sr.No.	Test Parameter	MDL
1	Particulate Matter (mg/Nm ³)	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide (mg/Nm ³)	0.1
5	Haydro Carbon NMHC (ppm)	1.0

Sea Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	pH	--	2
2	Temperature	°C	2
3	Total Suspended Solids	mg/L	2
4	BOD (3 Days @ 27 °C)	mg/L	1
5	Dissolved Oxygen	mg/L	0.1
6	Salinity	ppt	1
7	Oil & Grease	mg/L	2
8	Nitrate as NO ₃	µmol/L	0.5
9	Nitrite as NO ₂	µmol/L	0.01
10	Ammonical Nitrogen as NH ₃	µmol/L	0.2
11	Phosphates as PO ₄	µmol/L	0.5
12	Petroleum Hydrocarbon	µg/L	1
13	Total Dissolved Solids	mg/L	10
14	COD	mg/L	3
15	Primary productivity	mgC/L/day	0.1
16	Chlorophyll	mg/m ³	0.1
17	Phaeophytin	mg/m ³	0.1
18	Cell Count	No. x 10 ³ /L	1

Sea Sediment Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	Organic Matter	%	0.1
2	Phosphorus as P	µg/g	1
3	Petroleum Hydrocarbon	µg/g	1
4	Aluminum as Al	%	0.1
5	Manganese as Mn	µg/g	1
6	Mercury as Hg	µg/g	0.1

H. T. Shah**Lab Manager****Dr. Arun Bajpai****Lab Manager (Q)**



STP Water parameter(mg/L)		
Sr. No.	Test parameter	MDL
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

ETP Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	Colour	Co-pt	2
2	pH	--	2
3	Temperature	°C	2
4	Total Suspended Solids	mg/L	2
5	Total Dissolved Solids	mg/L	10
6	COD	mg/L	3
7	BOD (3 Days @ 27 °C)	mg/L	1
8	Chloride as Cl	mg/L	1
9	Oil & Grease	mg/L	2
10	Sulphate as SO ₄	mg/L	1
11	Ammonical Nitrogen as NH ₃	mg/L	0.2
12	Phenolic Compound	mg/L	0.005
13	Copper as Cu	mg/L	0.01
14	Lead as Pb	mg/L	0.01
15	Sulphide as S	mg/L	0.1
16	Cadmium as Cd	mg/L	0.002
17	Fluoride as F	mg/L	0.05

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"

FOR



**WATER FRONT DEVELOPMENT PROJECT [WEST PORT]
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421**

**MONITORING PERIOD:
APRIL 2019 TO SEPTEMBER 2019**

PREPARED BY:



POLLUCON LABORATORIES PVT.LTD.

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
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PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
E-mail: pollucon@gmail.com Web: www.polluconlab.com**

TC - 5945

ISO 9001:2015

ISO 14001:2015

OHSAS 18001:2007

RESULTS OF STP WATER OUTLET

SR · NO	TEST PARAMETERS	Unit	West Basin STP Outlet							
			April-19		May-19		June-19		GPCB permissible Limit	TEST METHOD
			05/04/ 2019	18/04/ 2019	07/05/ 2019	20/05/ 2019	04/06/ 2019	--		
1	pH	--	8.41	7.72	6.98	7.58	6.96	--	--	IS3025(P11) 83Re.02
2	Total Suspended Solids	mg/L	24	26	16	12	26	--	30	IS3025(P17) 84Re.02
3	BOD (3 days @ 270 C)	mg/L	12	8.0	10	5.0	19	--	20	IS 3025 (P44)1993R e.03Edition2 .1
4	Residual Chlorine	mg/L	0.6	0.6	0.8	0.8	0.4	--	Min 0.5	APHA(22ndE di)4500 Cl
5	Fecal Coliform	MPN/ 100 mL	220	170	210	140	170	--	< 1000	APHA (22ndEdi) 9221 C&E

SR NO	TEST PARAMETERS	Unit	West Basin STP Outlet							GPCB permissible Limit	TEST METHOD
			July-19		August-19		September-19				
			03/07/ 2019	--	06/08/ 2019	--	--	--			
1	pH	--	7.02	--	6.98	--	--	--	--	IS3025(P11) 83Re.02	
2	Total Suspended Solids	mg/L	21	--	13	--	--	--	30	IS3025(P17) 84Re.02	
3	BOD (3 days @ 270 C)	mg/L	16	--	12	--	--	--	20	IS 3025 (P44)1993R e.03Edition2 .1	
4	Residual Chlorine	mg/L	0.6	--	0.3	--	--	--	Min 0.5	APHA(22ndE di)4500 Cl	
5	Fecal Coliform	MPN/ 100 mL	140	--	110	--	--	--	< 1000	APHA (22ndEdi) 9221 C&E	

H. T. Shah
Lab Manager

Dr. ArunBajpai
Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

RESULT OF AMBIENT AIR QUALITY MONITORING

WEST PORT – PMC OFFICE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m ³	Particulate Matter (PM2.5) µg/m ³	Sulphur Dioxide (SO ₂) µg/m ³	Oxides of Nitrogen (NO ₂) µg/m ³	Carbon Monoxide as (CO) mg/m ³	Hydrocarbon as (CH ₄) mg/m ³	Benzene as (C ₆ H ₆) µg/m ³
1	02/04/2019	74.65	32.45	14.55	34.38	0.74	BDL*	BDL*
2	03/04/2019	50.30	25.35	7.41	17.52	0.34	BDL*	BDL*
3	08/04/2019	65.65	38.28	22.46	36.47	0.62	BDL*	BDL*
4	10/04/2019	75.38	34.56	20.38	26.35	0.98	BDL*	BDL*
5	15/04/2019	46.29	24.24	17.62	24.55	0.44	BDL*	BDL*
6	17/04/2019	60.25	33.28	8.41	19.40	0.78	BDL*	BDL*
7	22/04/2019	58.62	30.47	13.65	28.45	0.82	BDL*	BDL*
8	24/04/2019	66.86	39.27	12.54	31.22	0.52	BDL*	BDL*
9	29/04/2019	72.31	28.61	11.25	21.43	0.88	BDL*	BDL*
10	01/05/2019	70.61	33.53	12.62	24.56	0.98	BDL*	BDL*
11	06/05/2019	88.37	39.23	16.38	40.23	0.82	BDL*	BDL*
12	09/05/2019	76.37	44.35	9.58	21.24	0.54	BDL*	BDL*
13	13/05/2019	82.82	31.50	7.61	19.62	0.87	BDL*	BDL*
14	15/05/2019	90.46	37.33	23.70	30.63	0.94	BDL*	BDL*
15	20/05/2019	78.68	43.19	14.62	33.58	1.00	BDL*	BDL*
16	22/05/2019	59.25	28.61	24.27	42.47	0.57	BDL*	BDL*
17	27/05/2019	80.33	46.33	21.31	27.63	0.70	BDL*	BDL*
18	29/05/2019	77.51	34.19	15.16	32.56	0.39	BDL*	BDL*
19	03/06/2019	79.36	32.66	20.27	26.51	0.73	BDL*	BDL*
20	05/06/2019	81.25	26.67	6.75	16.88	0.68	BDL*	BDL*
21	10/06/2019	61.36	28.45	10.52	20.21	0.77	BDL*	BDL*
22	17/06/2019	66.25	35.39	12.98	28.45	0.72	BDL*	BDL*
23	19/06/2019	88.62	44.35	21.54	37.55	0.45	BDL*	BDL*
24	24/06/2019	93.54	57.64	8.20	17.30	0.39	BDL*	BDL*
25	26/06/2019	83.76	46.74	13.72	29.20	0.31	BDL*	BDL*
26	01/07/2019	87.35	43.44	16.72	34.21	0.48	BDL*	BDL*
27	03/07/2019	92.32	50.25	19.59	24.52	0.64	BDL*	BDL*
28	08/07/2019	83.61	40.22	8.67	37.58	0.50	BDL*	BDL*
29	10/07/2019	95.62	54.26	15.74	29.47	0.36	BDL*	BDL*
30	15/07/2019	73.67	29.48	18.67	26.34	0.84	BDL*	BDL*

Continue...

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

WEST PORT – PMC OFFICE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
31	17/07/2019	86.38	51.24	9.48	16.52	0.42	BDL*	BDL*
32	22/07/2019	79.32	38.24	14.51	28.50	0.81	BDL*	BDL*
33	24/07/2019	85.38	44.59	7.56	18.10	0.74	BDL*	BDL*
34	29/07/2019	91.20	52.44	11.66	21.23	0.87	BDL*	BDL*
35	31/07/2019	88.25	48.39	17.57	33.21	0.69	BDL*	BDL*
36	05/08/2019	70.34	45.67	15.86	36.52	0.57	BDL*	BDL*
37	07/08/2019	82.49	42.36	20.23	22.63	0.66	BDL*	BDL*
38	12/08/2019	89.34	48.68	17.60	31.28	0.36	BDL*	BDL*
39	14/08/2019	71.53	35.30	21.18	25.64	0.30	BDL*	BDL*
40	19/08/2019	93.36	50.33	14.49	15.68	0.58	BDL*	BDL*
41	21/08/2019	67.51	34.27	18.38	21.62	0.54	BDL*	BDL*
42	26/08/2019	80.46	43.52	22.22	35.67	0.41	BDL*	BDL*
43	28/08/2019	79.31	40.30	13.45	23.40	0.34	BDL*	BDL*
44	03/09/2019	66.30	31.55	16.55	32.60	0.44	BDL*	BDL*
45	05/09/2019	72.68	27.71	22.40	23.57	0.22	BDL*	BDL*
46	09/09/2019	78.24	34.56	13.51	15.64	0.40	BDL*	BDL*
47	11/09/2019	64.30	30.51	18.64	28.42	0.38	BDL*	BDL*
48	16/09/2019	77.63	39.31	23.54	31.32	0.29	BDL*	BDL*
49	18/09/2019	69.36	37.95	19.48	19.69	0.46	BDL*	BDL*
50	23/09/2019	85.65	42.69	12.66	20.27	0.24	BDL*	BDL*
51	25/09/2019	90.24	52.52	24.32	29.27	0.25	BDL*	BDL*
52	30/09/2019	82.65	48.76	21.57	33.25	0.30	BDL*	BDL*
	TEST METHOD	IS:5182 (Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob & Hochheiser (NaOH-NaAsO2)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/ CPCB Method

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

WEST PORT - HORTI CULTURE CABIN								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m ³	Particulate Matter (PM2.5) µg/m ³	Sulphur Dioxide (SO ₂) µg/m ³	Oxides of Nitrogen (NO ₂) µg/m ³	Carbon Monoxide as (CO) mg/m ³	Hydrocarbon as (CH ₄) mg/m ³	Benzene as (C ₆ H ₆) µg/m ³
1	02/04/2019	50.61	23.79	8.63	17.50	0.46	BDL*	BDL*
2	03/04/2019	63.44	34.64	15.67	29.67	0.76	BDL*	BDL*
3	08/04/2019	71.57	43.62	19.20	20.63	0.71	BDL*	BDL*
4	10/04/2019	61.20	28.43	7.51	23.50	0.80	BDL*	BDL*
5	15/04/2019	55.39	30.46	12.59	19.37	0.50	BDL*	BDL*
6	17/04/2019	76.64	45.31	14.56	31.28	0.69	BDL*	BDL*
7	22/04/2019	44.68	19.45	9.50	15.61	0.45	BDL*	BDL*
8	24/04/2019	51.20	29.45	18.70	24.32	0.56	BDL*	BDL*
9	29/04/2019	60.20	25.33	20.52	26.37	0.40	BDL*	BDL*
10	01/05/2019	89.73	49.24	23.49	30.20	0.90	BDL*	BDL*
11	06/05/2019	72.37	31.74	9.41	19.57	0.53	BDL*	BDL*
12	09/05/2019	59.41	35.67	20.33	34.75	0.58	BDL*	BDL*
13	13/05/2019	70.66	27.85	18.65	29.41	0.77	BDL*	BDL*
14	15/05/2019	79.32	23.30	8.67	26.34	0.63	BDL*	BDL*
15	20/05/2019	80.44	48.62	22.72	38.44	0.46	BDL*	BDL*
16	22/05/2019	71.62	38.24	17.56	22.54	0.64	BDL*	BDL*
17	27/05/2019	65.80	34.39	14.33	18.50	0.79	BDL*	BDL*
18	29/05/2019	50.76	21.64	11.39	17.67	0.84	BDL*	BDL*
19	03/06/2019	68.27	22.47	7.70	23.46	0.50	BDL*	BDL*
20	05/06/2019	59.39	40.22	16.79	25.68	0.63	BDL*	BDL*
21	10/06/2019	77.69	43.49	9.63	28.66	0.71	BDL*	BDL*
22	17/06/2019	73.59	46.76	19.67	32.44	0.37	BDL*	BDL*
23	19/06/2019	67.56	34.55	14.34	18.36	0.52	BDL*	BDL*
24	24/06/2019	52.47	31.53	18.22	29.46	0.44	BDL*	BDL*
25	26/06/2019	64.22	19.41	10.20	14.53	0.69	BDL*	BDL*
26	01/07/2019	49.38	23.67	9.63	18.69	0.95	BDL*	BDL*
27	03/07/2019	56.21	29.42	17.62	32.61	0.77	BDL*	BDL*
28	08/07/2019	60.57	32.40	15.36	19.11	0.62	BDL*	BDL*
29	10/07/2019	78.38	46.22	12.36	14.81	0.78	BDL*	BDL*
30	15/07/2019	61.29	20.32	8.59	23.75	0.57	BDL*	BDL*

Continue...

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

WEST PORT - HORTI CULTURE CABIN								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
31	17/07/2019	48.33	27.60	20.25	31.19	0.49	BDL*	BDL*
32	22/07/2019	66.27	42.31	7.49	33.78	0.34	BDL*	BDL*
33	24/07/2019	54.64	35.42	18.58	26.74	0.53	BDL*	BDL*
34	29/07/2019	71.58	40.26	10.84	30.16	0.79	BDL*	BDL*
35	31/07/2019	82.34	45.68	13.46	25.41	0.48	BDL*	BDL*
36	05/08/2019	81.30	41.55	12.29	28.39	0.38	BDL*	BDL*
37	07/08/2019	69.30	37.53	7.50	19.59	0.46	BDL*	BDL*
38	12/08/2019	74.23	34.59	14.37	17.55	0.79	BDL*	BDL*
39	14/08/2019	54.66	25.41	10.50	21.54	0.62	BDL*	BDL*
40	19/08/2019	67.58	33.35	16.17	24.24	0.42	BDL*	BDL*
41	21/08/2019	57.59	28.26	13.22	29.40	0.61	BDL*	BDL*
42	26/08/2019	70.35	39.44	18.61	23.59	0.49	BDL*	BDL*
43	28/08/2019	62.38	36.54	20.26	27.65	0.39	BDL*	BDL*
44	03/09/2019	78.67	37.53	20.24	26.67	0.26	BDL*	BDL*
45	05/09/2019	50.42	22.64	9.62	18.66	0.37	BDL*	BDL*
46	09/09/2019	68.30	29.38	15.44	21.70	0.36	BDL*	BDL*
47	11/09/2019	56.38	21.56	21.59	30.27	0.41	BDL*	BDL*
48	16/09/2019	66.27	34.55	18.68	22.58	0.34	BDL*	BDL*
49	18/09/2019	53.46	24.25	22.24	28.73	0.31	BDL*	BDL*
50	23/09/2019	60.33	30.33	17.59	24.56	0.27	BDL*	BDL*
51	25/09/2019	72.54	46.31	13.61	20.30	0.55	BDL*	BDL*
52	30/09/2019	65.41	43.49	14.56	27.60	0.40	BDL*	BDL*
	TEST METHOD	IS:5182 (Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182(Part II):Improved West and Gaeke	IS:5182(Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPCB Method

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

WEST PORT - MAIN GATE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m ³	Particulate Matter (PM2.5) µg/m ³	Sulphur Dioxide (SO ₂) µg/m ³	Oxides of Nitrogen (NO ₂) µg/m ³	Carbon Monoxide as (CO) mg/m ³	Hydrocarbon as (CH ₄) mg/m ³	Benzene as (C ₆ H ₆) µg/m ³
1	02/04/2019	66.34	27.23	17.31	39.28	0.97	BDL*	2.18
2	03/04/2019	82.49	47.29	12.97	35.63	0.57	BDL*	BDL*
3	08/04/2019	92.40	50.28	9.53	25.29	1.10	BDL*	BDL*
4	10/04/2019	81.26	36.22	16.59	29.61	0.94	BDL*	BDL*
5	15/04/2019	68.65	41.20	19.62	27.68	0.73	BDL*	BDL*
6	17/04/2019	85.34	48.24	24.62	38.35	0.58	BDL*	2.28
7	22/04/2019	71.24	28.35	21.28	32.66	0.64	BDL*	BDL*
8	24/04/2019	80.32	46.21	15.77	40.51	0.66	BDL*	BDL*
9	29/04/2019	76.38	32.66	23.42	37.63	1.00	BDL*	2.46
10	01/05/2019	93.54	54.38	27.82	44.38	0.74	BDL*	BDL*
11	06/05/2019	85.30	40.49	19.33	26.29	0.96	BDL*	BDL*
12	09/05/2019	97.51	51.56	28.60	41.43	0.80	BDL*	2.32
13	13/05/2019	83.20	37.39	14.79	38.32	0.66	BDL*	BDL*
14	15/05/2019	70.37	30.42	18.52	33.43	0.52	BDL*	BDL*
15	20/05/2019	95.39	55.33	20.24	45.27	1.05	BDL*	BDL*
16	22/05/2019	88.36	50.28	10.83	27.69	0.76	BDL*	BDL*
17	27/05/2019	76.37	42.69	22.13	30.46	0.86	BDL*	2.18
18	29/05/2019	81.26	45.30	25.68	36.33	0.65	BDL*	BDL*
19	03/06/2019	60.21	25.37	16.46	28.35	0.41	BDL*	BDL*
20	05/06/2019	75.61	33.45	11.49	33.20	0.54	BDL*	BDL*
21	10/06/2019	85.35	46.34	24.58	38.43	0.62	BDL*	BDL*
22	17/06/2019	88.40	42.57	17.83	37.59	0.80	BDL*	BDL*
23	19/06/2019	78.86	38.75	23.52	40.26	0.61	BDL*	BDL*
24	24/06/2019	82.64	58.36	15.36	36.24	0.87	BDL*	BDL*
25	26/06/2019	94.12	52.35	20.53	31.61	0.53	BDL*	BDL*
26	01/07/2019	78.36	39.21	27.32	38.52	0.80	BDL*	BDL*
27	03/07/2019	88.40	43.39	21.26	26.82	0.94	BDL*	BDL*
28	08/07/2019	73.57	35.60	28.64	42.34	0.73	BDL*	BDL*
29	10/07/2019	89.62	41.61	20.26	33.87	0.86	BDL*	BDL*
30	15/07/2019	80.35	23.42	25.34	30.38	0.46	BDL*	BDL*

Continue...

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

WEST PORT - MAIN GATE								
Sr. No.	Date of Sampling	Particulate Matter (PM10) µg/m3	Particulate Matter (PM2.5) µg/m3	Sulphur Dioxide (SO2) µg/m3	Oxides of Nitrogen (NO2) µg/m3	Carbon Monoxide as (CO) mg/m3	Hydrocarbon as (CH4) mg/m3	Benzene as (C6H6) µg/m3
31	17/07/2019	76.64	34.28	17.52	35.47	0.98	BDL*	BDL*
32	22/07/2019	83.49	48.20	19.60	39.93	0.92	BDL*	BDL*
33	24/07/2019	71.57	29.59	12.66	28.55	0.65	BDL*	BDL*
34	29/07/2019	84.30	46.67	26.35	40.20	0.70	BDL*	BDL*
35	31/07/2019	94.26	52.68	23.38	37.56	0.87	BDL*	BDL*
36	05/08/2019	92.63	54.38	21.23	32.56	0.98	BDL*	BDL*
37	07/08/2019	76.38	40.29	26.19	28.30	0.89	BDL*	BDL*
38	12/08/2019	81.20	37.51	23.40	33.40	0.63	BDL*	BDL*
39	14/08/2019	79.34	43.56	17.57	30.61	0.77	BDL*	BDL*
40	19/08/2019	86.38	41.32	12.34	42.67	0.94	BDL*	BDL*
41	21/08/2019	74.39	38.30	20.33	23.45	0.74	BDL*	BDL*
42	26/08/2019	65.76	30.75	24.32	38.41	0.57	BDL*	BDL*
43	28/08/2019	72.78	44.51	15.39	31.57	0.78	BDL*	BDL*
44	03/09/2019	84.33	45.67	18.66	29.35	0.69	BDL*	BDL*
45	05/09/2019	77.39	39.25	15.64	35.60	0.56	BDL*	BDL*
46	09/09/2019	82.71	40.29	10.29	26.59	0.74	BDL*	BDL*
47	11/09/2019	70.35	35.02	16.63	24.34	0.53	BDL*	BDL*
48	16/09/2019	61.26	28.68	22.38	37.63	0.42	BDL*	BDL*
49	18/09/2019	76.66	32.49	24.45	33.60	0.65	BDL*	BDL*
50	23/09/2019	67.22	36.51	14.34	28.32	0.48	BDL*	BDL*
51	25/09/2019	75.80	30.26	20.28	25.64	0.39	BDL*	BDL*
52	30/09/2019	60.25	33.82	11.59	21.58	0.33	BDL*	BDL*
	TEST METHOD	IS:5182(Part 23):Gravimetric CPCB - Method (Vol.I,May-2011)	Gravimetric-CPCB - Method (Vol.I,May-2011)	IS:5182 (Part II):Improved West and Gaeke	IS:5182 (Part VI):Modified Jacob &Hochheiser (NaOH-NaAsO2)	NDIR Digital Gas Analyzer	SOP: HC: GC/GCMS/Gas analyzer	IS 5182 (Part XI):2006/CPC B Method

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

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RESULTS OF NOISE LEVEL MONITORING

Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - PMC OFFICE					
		Result [Leq dB(A)]					
	Sampling Date & Time	03/04/2019	14/05/2019	12/06/2019	29/07/2019	19/08/2019	11/09/2019
1	6:00-7:00	59.6	62.9	64.9	63.4	61.5	60.2
2	7:00-8:00	57.1	61.4	68.4	60.7	59.4	65.2
3	8:00-9:00	62.4	67.6	65.4	68.4	63.4	67.8
4	9:00-10:00	65.1	61.5	62.1	65.1	65.5	70.4
5	10:00-11:00	69.1	69.9	69.7	62.8	62.3	68.5
6	11:00-12:00	69.8	62.4	62.5	63.7	63.8	73.4
7	12:00-13:00	65.4	72.1	71.5	67.5	64.1	70.3
8	13:00-14:00	62.4	70.4	70.2	66.1	62.8	66.3
9	14:00-15:00	62.8	63.4	70.6	68.1	69.2	74.1
10	15:00-16:00	65.3	61.8	69.4	70.2	67.2	69.4
11	16:00-17:00	63.4	63.4	65.2	69.4	66.1	63.2
12	17:00-18:00	61.7	67.9	68.2	63.1	68.4	65.3
13	18:00-19:00	61.5	63.0	63.1	61.5	68.3	65.2
14	19:00-20:00	65.2	61.9	62.8	65.8	62.4	67.3
15	20:00-21:00	65.8	62.1	62.9	65.2	64.3	69.4
16	21:00-22:00	61.8	63.8	69.4	62.9	63.8	62.3
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	WEST PORT - PMC OFFICE					
		Result [Leq dB(A)]					
	Sampling Date & Time	03/04/2019	14/05/2019	12/06/2019	29/07/2019	19/08/2019	11/09/2019
1	22:00-23:00	66.5	65.4	65.1	68.4	68.4	57.1
2	23:00-00:00	66.1	61.2	62.4	62.2	65.1	60.4
3	00:00-01:00	62.4	62.7	63.4	58.5	60.4	60.8
4	01:00-02:00	60.2	60.8	60.4	63.2	62.4	63.1
5	02:00-03:00	58.4	57.2	64.1	60.1	65.1	62.8
6	03:00-04:00	59.3	56.4	60.4	62.7	61.4	65.7
7	04:00-05:00	57.3	60.4	60.8	53.2	63.1	63.4
8	05:00-06:00	54.1	61.4	58.4	59.4	60.4	61.8
Night Time Limit*		70 Leq dB(A)					

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Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - HORTI CULTURE CABIN					
		Result [Leq dB(A)]					
	Sampling Date & Time	17/04/2019	08/05/2019	10/06/2019	17/07/2019	07/08/2019	16/09/2019
1	6:00-7:00	59.8	57.2	68.1	59.2	65.2	62.4
2	7:00-8:00	67.4	60.4	62.7	63.1	62.7	66.2
3	8:00-9:00	63.5	63.4	65.1	65.1	73.4	65.0
4	9:00-10:00	67.7	69.4	65.9	61.4	73.1	61.8
5	10:00-11:00	64.5	65.1	68.2	68.1	70.6	69.2
6	11:00-12:00	63.4	62.9	63.7	65.1	71.4	69.1
7	12:00-13:00	65.3	66.1	65.4	65.2	68.4	65.4
8	13:00-14:00	68.2	62.1	62.8	63.1	62.8	65.7
9	14:00-15:00	71.6	62.8	69.1	68.9	63.2	62.8
10	15:00-16:00	62.3	60.8	67.1	66.1	66.4	66.1
11	16:00-17:00	65.3	65.4	63.4	66.7	66.9	70.4
12	17:00-18:00	68.3	64.7	69.1	66.2	69.4	68.4
13	18:00-19:00	66.4	62.9	71.1	63.4	65.8	62.4
14	19:00-20:00	61.7	68.4	68.1	68.8	66.4	66.4
15	20:00-21:00	65.8	66.1	65.2	69.2	63.8	66.8
16	21:00-22:00	63.6	61.8	68.1	63.1	67.6	68.4
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

SR. NO.	Name of Location	WEST PORT - HORTI CULTURE CABIN					
		Result [Leq dB(A)]					
	Sampling Date & Time	17/04/2019	08/05/2019	10/06/2019	17/07/2019	07/08/2019	16/09/2019
1	22:00-23:00	65.9	65.1	62.1	64.2	65.1	62.1
2	23:00-00:00	63.3	62.4	56.3	68.4	62.4	65.4
3	00:00-01:00	60.1	59.4	57.3	57.3	60.4	61.8
4	01:00-02:00	58.3	61.7	60.2	60.3	59.4	69.1
5	02:00-03:00	60.3	62.1	63.1	63.1	56.1	64.8
6	03:00-04:00	62.3	65.4	58.3	65.2	60.1	63.1
7	04:00-05:00	60.3	66.1	60.3	62.1	61.4	65.8
8	05:00-06:00	60.1	60.4	61.8	62.5	60.4	67.1
Night Time Limit*		70 Leq dB(A)					

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Result of Noise level monitoring [Day Time]

SR. NO.	Name of Location	WEST PORT - MAIN GATE					
		Result [Leq dB(A)]					
	Sampling Date & Time	22/04/2019	20/05/2019	19/06/2019	08/07/2019	12/08/2019	25/09/2019
1	6:00-7:00	65.3	60.1	58.6	67.3	60.1	58.6
2	7:00-8:00	63.5	65.4	65.6	68.3	63.4	65.6
3	8:00-9:00	62.1	68.1	72.8	65.2	62.1	64.8
4	9:00-10:00	60.3	68.2	68.8	69.1	68.4	68.8
5	10:00-11:00	70.5	62.4	72.7	73.1	64.7	72.7
6	11:00-12:00	61.4	69.4	74.1	70.3	67.6	74.1
7	12:00-13:00	61.4	70.3	74.4	71.2	69.1	74.4
8	13:00-14:00	65.3	70.9	68.7	70.3	62.8	68.7
9	14:00-15:00	67.2	70.4	65.8	71.6	68.4	65.8
10	15:00-16:00	65.3	69.2	65.7	68.3	62.5	65.7
11	16:00-17:00	65.3	65.4	62.5	65.2	68.8	62.5
12	17:00-18:00	68.4	64.2	66.9	68.3	68.2	66.9
13	18:00-19:00	63.4	66.1	68.4	62.2	68.1	68.4
14	19:00-20:00	71.5	66.3	65.3	68.5	63.4	65.3
15	20:00-21:00	70.3	68.1	62.7	65.6	65.3	62.7
16	21:00-22:00	64.5	65.5	65.8	67.6	63.7	65.8
Day Time Limit*		75 Leq dB(A)					

Result of Noise level monitoring [Night Time]

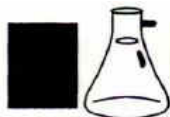
SR. NO.	Name of Location	WEST PORT - MAIN GATE					
		Result [Leq dB(A)]					
	Sampling Date & Time	22/04/2019	20/05/2019	19/06/2019	08/07/2019	12/08/2019	25/09/2019
1	22:00-23:00	65.3	60.4	67.3	62.3	62.4	63.1
2	23:00-00:00	63.3	62.4	62.3	67.3	60.4	68.1
3	00:00-01:00	60.4	68.7	67.6	59.3	61.7	66.1
4	01:00-02:00	60.2	60.1	65.3	62.5	65.0	66.8
5	02:00-03:00	61.3	63.1	63.4	65.7	62.1	69.8
6	03:00-04:00	64.3	60.8	65.1	62.1	60.4	65.5
7	04:00-05:00	67.3	61.4	61.3	60.1	65.8	69.8
8	05:00-06:00	63.4	64.1	59.4	63.5	63.1	64.1
Night Time Limit*		70 Leq dB(A)					

H. T. Shah

Lab Manager

Dr. ArunBajpai

Lab Manager (Q)

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MINIMUM DETECTION LIMIT [MDL]

Ambient Air Parameter		
Sr. No.	Test parameter	MDL
1	Particulate Matter (PM10) ($\mu\text{g}/\text{m}^3$)	10
2	Particulate Matter (PM 2.5) ($\mu\text{g}/\text{m}^3$)	10
3	Sulphur Dioxide (SO_2) ($\mu\text{g}/\text{m}^3$)	5
4	Oxides of Nitrogen ($\mu\text{g}/\text{m}^3$)	5
5	Carbon Monoxide as CO (mg/m^3)	0.1
6	Hydrocarbon as CH_4 ($\mu\text{g}/\text{m}^3$)	150
7	Benzene as C_6H_6 (mg/m^3)	2

STP Water parameter (mg/L)		
Sr. No.	Test parameter	MDL
1	pH	2
2	Total Suspended Solids (mg/L)	2
3	BOD (3 days @ 270 C) (mg/L)	1
4	Residual Chlorine (mg/L)	0.2
5	Fecal Coliform (MPN INDEX/100 mL)	1.8

Stack Parameters		
Sr.No.	Test Parameter	MDL
1	Particulate Matter (mg/Nm^3)	10
2	Sulphur Dioxide (ppm)	1.52
3	Oxides of Nitrogen (ppm)	2.65
4	Carbon Monoxide (mg/Nm^3)	0.1
5	Hydro Carbon NMHC (ppm)	1.0

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"HALF YEARLY ENVIRONMENTAL MONITORING REPORT"

FOR

BORE HOLE WATER
ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED
TAL: MUNDRA, KUTCH, MUNDRA – 370 421

MONITORING PERIOD:
APRIL 2019 TO SEPTEMBER 2019

PREPARED BY:**POLLUCON LABORATORIES PVT.LTD.**

**PLOT NO.5/6 "POLLUCON HOUSE", OPP. BALAJI INDUSTRIAL SOCIETY,
OLD SHANTINATH SILK MILL LANE, NEAR GAYTRI FARSAN MART,
NAVJIVAN CIRCLE, UDHANA MAGDALLA ROAD, SURAT-395007.
PHONE/FAX – (+91 261) 2455 751, 2601 106, 2601 224.
E-mail: pollucon@gmail.com Web: www.polluconlab.com**

TC - 5945**ISO 9001:2015****ISO 14001:2015****OHSAS 18001:2007**

Recognised by MoEF, New Delhi Under Sec. 12 of Environmental (Protection) Act-1986

RESULTS OF BORE HOLE WATER

SR. NO	TEST PARAMETERS	UNIT	RESULTS			TEST METHOD
			PUMP HOUSE-1	PUMP HOUSE-2	PUMP HOUSE-3	
	GPS Location		N 22° 44.554' E 069° 41.453'	N 22° 44.554' E 069° 41.453'	N 22° 44.554' E 069° 41.453'	
	Sampling Date		20/06/2019	20/06/2019	20/06/2019	
1	pH	--	7.70	8.10	8.06	IS3025(P11)83Re.02
2	Salinity	ppt	13.2	4.6	7.1	APHA 2520B
3	Oil & Grease	mg/L	BDL*	BDL*	2.0	APHA(22ndEdi)5520D
4	Hydrocarbon	mg/L	BDL*	BDL*	BDL*	GC/GC-MS
5	Lead as Pb	mg/L	0.048	0.056	0.075	AAS APHA(22ndEdi)3111 B
6	Arsenic as As	mg/L	BDL*	BDL*	BDL*	AAS APHA 3114 B
7	Nickel as Ni	mg/L	BDL*	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
8	Total Chromium as Cr	mg/L	BDL*	BDL*	BDL*	AAS 3111B
9	Cadmium as Cd	mg/L	0.011	0.036	0.025	AAS APHA(22ndEdi)3111 B
10	Mercury as Hg	mg/L	BDL*	BDL*	BDL*	AAS APHA- 3112 B
11	Zinc as Zn	mg/L	3.80	2.1	0.48	AAS APHA(22ndEdi)3111 B
12	Copper as Cu	mg/L	BDL*	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
13	Iron as Fe	mg/L	7.2	6.2	3.10	AAS APHA(22ndEdi)3111 B
14	Insecticides/Pesticides	mg/L	Absent	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	1.1	1.05	1.0	--

*BDL: Below Detection Limit



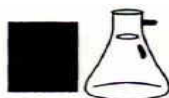
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Lab Manager




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Lab Manager (Q)



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SR. NO	TEST PARAMETERS	UNIT	RESULTS		TEST METHOD
			NEAR ETP OFFICE	NEAR PUMP HOUSE -1	
	GPS Location		N 22° 44.549' E 069° 41.464'	N 22° 44.50' E 069° 41.42'	
	Sampling Date		20/06/2019	20/06/2019	
1	pH	--	7.95	7.95	IS3025(P11)83Re.02
2	Salinity	ppt	19.4	8.60	APHA 2520B
3	Oil & Grease	mg/L	3.1	BDL*	APHA(22ndEdi)5520D
4	Hydrocarbon	mg/L	BDL*	BDL*	GC/GC-MS
5	Lead as Pb	mg/L	0.044	0.062	AAS APHA(22ndEdi)3111 B
6	Arsenic as As	mg/L	BDL*	BDL*	AAS APHA 3114 B
7	Nickel as Ni	mg/L	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
8	Total Chromium as Cr	mg/L	BDL*	BDL*	AAS 3111B
9	Cadmium as Cd	mg/L	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
10	Mercury as Hg	mg/L	BDL*	BDL*	AAS APHA- 3112 B
11	Zinc as Zn	mg/L	0.092	BDL*	AAS APHA(22ndEdi)3111 B
12	Copper as Cu	mg/L	BDL*	BDL*	AAS APHA(22ndEdi)3111 B
13	Iron as Fe	mg/L	0.35	5.1	AAS APHA(22ndEdi)3111 B
14	Insecticides/Pesticides	mg/L	Absent	Absent	GC/GC-MS
15	Depth of Water Level from Ground Level	meter	1.0	1.25	--

*BDL: Below Detection Limit

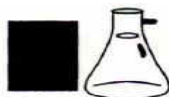
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Borehole Water Parameters			
SR. NO.	TEST PARAMETERS	UNIT	MDL
1	pH	--	2
2	Salinity	mg/L	0.5
3	Oil & Grease	mg/L	2
4	Hydrocarbon	mg/L	0.01
5	Lead as Pb	mg/L	0.01
6	Arsenic as As	mg/L	0.001
7	Nickel as Ni	mg/L	0.02
8	Total Chromium as Cr	mg/L	0.025
9	Cadmium as Cd	mg/L	0.002
10	Mercury as Hg	mg/L	0.005
11	Zinc as Zn	mg/L	0.06
12	Copper as Cu	mg/L	0.01
13	Iron as Fe	mg/L	0.1
14	Insecticides/Pesticides	mg/L	0.1

H. T. Shah

Lab Manager



Dr. Arun Bajpai

Lab Manager (Q)

MARINE MONITORING REPORT

September- 2019(Monsoon)

FOR

M/s. ADANI POWER (MUNDRA) LIMITED



At
Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
KUTCH, GUJARAT - 370 435

Prepared by



PREFACE

M/s. Adani Power (Mundra) Limited (APMuL) is a subsidiary company of Adani Group engaged in imported coal based thermal power plant at Mundra near village Tunda&Siracha, Taluka Mundra District Kutch, Gujarat has entrusted the work of carrying out Marine Monitoring to **M/s. UniStar Environment and Research Labs Pvt. Ltd., Vapi.**

Adani Power (Mundra) Limited has commissioned the first supercritical 660 MW unit in the country, engaged in imported coal based thermal power plant with capacity of 4620 MW at Mundra near village Tunda & Siracha, Taluka Mundra District Kutch, Gujarat. Has entrusted the work of carrying out Marine Monitoring to **M/S.UniStar Environment and Research Labs Pvt. Ltd., Vapi.**

The marine monitoring involves Physio-chemical and biological analysis of Marine water. Marine water quality of Sub-tidal and Intertidal regions, Flora and Fauna analysis in marine water area and Benthos in inter-tidal and sub-tidal analysis for the coastal area near Adani Power plant (Mundra) Limited. Water sample are collected from five location (station) and Benthos sample are collected from High water and low water transect area. Samples are brought to the laboratory by field sampling team and the analysis was carried out in our laboratory and the results are presented in this report.

These Marine Monitoring reports provide a data obtained from monitoring and analysis activities undertaken during (monsoon) September 2019.

Date: 27/09/2019

**M/S.UniStar Environment and
Research Labs Pvt. Ltd.**

White house, Char Rasta,
Vapi-396 191

Sampling by



(Bhavin Patel)

Report Prepared By



(Shweta Rana)

Approved by



(Jaivik Tandel)

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INTRODUCTION

1.1 Background

Adani Power (Mundra) Limited (APMuL) is engaged in imported coal based thermal power plant with capacity of 4620 MW at Mundra near village Tunda&Siracha, Taluka Mundra District Kutch, Gujarat.

Adani Power (Mundra) Limited (APMuL) is largest single location private coal based power plant in the world it is created history by synchronizing the first super-critical technology based 660MW generating unit at Mundra. This is not only the first super-critical generating unit in the country but also the fastest project implementation ever by any power developer in the country. The Phase III of the Mundra Project, which is based on supercritical technology, has received 'Clean Development Mechanism (CDM) Project' certification from United Nations Framework Convention on Climate Change (UNFCCC). This is the world's first thermal project based on supercritical technology to be registered as CDM Project under UNFCCC.

Adani Power (Mundra) Limited (APMuL) assessing marine environment it involves Physio-chemical and biological analysis of Marine water. Marine water quality of Sub-tidal and Intertidal regions, Flora Phytoplankton's and Phytopigments and Fauna analysis in marine water area it includes Zooplanktons, Benthos in inter-tidal and sub-tidal analysis for the coastal area near power plant marine outfall water mixing and Sea intake, with special reference to intake channel and seawater discharge.

This report is prepare by the **M/S.UniStar Environment and Research Labs Pvt. Ltd.**, at the instance of APMuL and addresses the marine environmental issues related to the APMuL's operational power plant.

1.2 Objectives:

- Physico chemical seawater parameter to be analyzed for understands the water quality in study area.
- Sediment samples will be analyzed for estimate selected trace metals.
- The prevailing marine biological status of the study area is evaluated based on the quantitative and qualitative data on marine life namely Phytoplankton, zooplankton, Chlorophyll & Pheophytin, Sub-tidal/ intertidal Macro benthos.
- To recommend adequate marine environmental management measures

1.3 Study program:

Period:

The field investigation is completed during September 2019 and sampling team was planned in such a manner so as to get a detailed picture of the marine environment characteristics of the study area and Sampling and analysis for marine environment has been carried out by **M/S.UniStar Environment and Research Labs Pvt. Ltd.**

Study Station locations:

A total of five subtidal station and three intertidal transects was selected for the sampling, here we are given exact location and their position were sampled.

Table 1: Station locations and co ordinates

Subtidal Station			
Station	Locations	Co ordinates	
1	Intake point	22°48 34.'56"N	69°32'58.95"E
2	Mouth of intake point	22°46'58.26"N	69°32'06.93"E
3	West port area	22°45'23.59"N	69°35'20.61"E
4	Outfall area	22°44' 49.69"N	69°36'29.61"E
5	Outfall area	22°44'44.68"N	69°36'46.64"E

Intertidal transect			
I	High Tide water level	22° 48' 09.6" N	69° 34' 27.8" E
	Low Tide water level	22° 56' 42.3" N	69° 52' 38.5" E
II	High Tide water level	22° 48' 18.0" N	69° 34' 03.4" E
	Low Tide water level	22° 52' 38.1" N	69° 52' 20.2" E
III	High Tide water level	22° 45' 30.0" N	69° 47' 34.1" E
	Low Tide water level	22° 45' 34.0" N	69° 35' 50.4" E

Figure 1.1: Study marine stations location map



1.4 Sampling

a) Sampling frequency:

All Sampling subtidal stations were monitored during flood to ebb. Water samples were collected in duplicate (surface and bottom) for assessing water quality and marine biological characteristics.

Intertidal sampling was completed during low tide, for assessed Macro benthic fauna samples were collect in duplicate from each transects.

b) Sampling methodology:

- Niskin (5 litre capacity) with a mechanism for closing at a desired depth using messenger was used for collecting sub–surface water samples. Sampling at the surface was done using a clean polyethylene bucket. Known volume of water sample (1 L) was preserved with 4% Lugol's iodine solution.
- For the analysis of Benthos, sub tidal sediment samples were collected using Van-veen grab covering an area of 0.04 m². Intertidal samples were collected using metal quadrant. Samples were sieved with 500 µ metal sieve and preserved with Rose Bengal-Formalin solution.
- For Zooplankton oblique hauls were made using Heron Tranter net attached with calibrated flow meter. After collection, samples were preserved with 5% formalin.

C) Methods of analysis:

I) Physicochemical Parameter: Samples were analyses by using analytical methods for estimations of Temperature, Turbidity, PH, SS, Salinity, DO, BOD, COD, Phosphate, Total nitrogen, Nitrite, Nitrate, Phenols and PHc.

II) Biological Samples: Phytoplankton, Zooplankton and Macro benthos.

a) Phytoplankton: Sample for cell count was preserved in Lugol's iodine solution, and identification of phytoplankton was done under a compound microscope using Sedgwick Rafter slide.

b) Chlorophyll: For the estimation of chlorophyll *a* and Pheophytin, the extinction of the acetone extract was measured using Turner Flurometer before and after treatment with dilute acid respectively.

c) **Zooplankton:** Volume (biomass) was obtained by displacement method. A portion (25-50 %) of the sample was analyzed under a microscope for faunal composition and population count.

d) **Benthos:** The total Macro benthos population (sub tidal& intertidal) was estimated as number of 1 m² area and biomass on wet weight basis.

WATER QUALITY

2.1 Marine Water quality:

Sea water samples have been collected during September 2019(Monsoon)

From Five locations, which are listed in Table 2

Table 2: Water sampling locations, September 2019(Monsoon)

Station no.	Location	Tide
1	Intake point	Flood
2	Intake point	Ebb to Flood
3	West port area	Flood to Ebb
4	Outfall area	Flood
5	Outfall area	Flood to Ebb

2.2 Physico chemical Water analysis result:

All the water sampled, which is collected by sampling team is brought to the lab for Physico chemical analysis. The marine water quality at different collected stations are measured during this investigation is presented in Table No.3

Table: 3 Physico chemical Water Analysis Result

Sr. No .	Parameters	Station 1		Station 2		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25 ° C	8.18	8.14	8.04	8.10	IS 3025(Part 11)1983
2.	Temperature (°C)	29.5	29.8	30.5	30.8	IS 3025(Part 9)1984
3.	Turbidity (NTU)	1	1	1	1	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	56	54	58	55	(APHA 23 rd Ed.,2017,2540-D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	4.8	4.6	5.6	5.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO ₄ (mg/l)	2840	2810	2784	2745	(APHA 23 rd Ed.,2017,4500-SO ₄ E)
4.	Ammonical Nitrogen(μmol/l)	0.5	0.7	1.2	0.9	(APHA 23 rd Ed.,2017,4500-NH ₃ B)
5.	Salinity (ppt)	35.8	36.1	34.8	35.0	By Calculation
6.	Dissolved Oxygen (mg/l)	5.1	5.2	5.9	5.6	IS 3025(Part 38)1989,
7.	Total Nitrogen (μmol/l)	9.58	6.28	7.69	8.58	(APHA 23 rd Ed.,2017,4500-O,B),
8.	Dissolved Phosphate (μmol/l)	1.28	1.08	1.14	1.68	APHA 23 rd Ed.,2017,4500 NH ₃ - B
9.	Nitrate (μmol/l)	5.06	5.08	6.45	7.15	(APHA 23 rd Ed.,2017,4500-P,D)
10.	Nitrite (μmol/l)	1.46	1.28	1.56	1.38	(APHA 23 rd Ed.,2017,4500 NO ₃ -B)
11.	Phenol(μg/l)	N.D.(MDL: 0.01)	N.D.(M DL:0.01)	N.D.(M DL:0.01)	N.D.(M DL:0.01)	APHA 23 rd Ed.,2017,4500NO ₂ B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Sr. No	Parameters	Station 3		Station 4		Test Method Permissible
		Surface	Bottom	Surface	Bottom	
PHYSICAL QUALITY						
1.	pH @ 25 ° C	7.98	7.95	8.08	8.02	IS 3025(Part 11)1983
2.	Temperature °C	29.5	31.0	30.5	30.8	IS 3025(Part 9)1984
3.	Turbidity (NTU)	2	2	3	3	IS 3025(Part 10)1984
CHEMICAL QUALITY						
1.	Total Suspended Solids (mg/l)	58	55	57	56	(APHA 23 rd Ed.,2017,2540-D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	5.3	6.2	5.8	6.0	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO ₄ (mg/l)	2899	2812	2685	2756	(APHA 23 rd Ed.,2017,4500-SO ₄ E)
4.	Ammonical Nitrogen(μmol/l)	0.6	1.0	0.9	1.2	(APHA 23 rd Ed.,2017,4500-NH ₃ B)
5.	Salinity (ppt)	34.8	36.2	35.1	36.8	By Calculation
6.	Dissolved Oxygen (mg/l)	5.4	5.2	5.6	5.2	IS 3025(Part 38)1989,
7.	Total Nitrogen (μmol/l)	11.12	9.62	10.28	10.54	(APHA 23 rd Ed.,2017,4500-O,B),
8.	Dissolved Phosphate (μmol/l)	1.15	1.08	1.14	1.05	APHA 23 rd Ed.,2017,4500 NH ₃ - B
9.	Nitrate (μmol/l)	7.8	8.2	9.67	9.54	(APHA 23 rd Ed.,2017,4500-P,D)
10.	Nitrite (μmol/l)	1.09	1.15	1.23	0.89	(APHA 23 rd Ed.,2017,4500 NO ₃ -B)
11.	Phenol(μg/l)	N.D.(MDL:0.01)	N.D.(MDL:0.01)	N.D.(MDL:0.01)	N.D.(MDL:0.01)	APHA 23 rd Ed.,2017,4500NO ₂ B
12.	PHc (ppb)	N.D.	N.D.	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

Sr. No.	Parameters	Station 5		Test Method Permissible
		Surface	Bottom	
PHYSICAL QUALITY				
1.	pH @ 25 ° C	8.15	8.11	IS 3025(Part 11)1983
2.	Temperature (°C)	31.5	31.2	IS 3025(Part 9)1984
3.	Turbidity (NTU)	3	4	IS 3025(Part 10)1984
CHEMICAL QUALITY				
1.	Total Suspended Solids	62	44	(APHA 23 rd Ed.,2017,2540- D)
2.	Biochemical Oxygen Demand (BOD) (mg/l)	3.6	3.8	IS 3025(Part 44)1993Amd.01
3.	Sulphate as SO ₄ (mg/l)	2434	2590	(APHA 23 rd Ed.,2017,4500-SO4 E)
4.	Ammonical Nitrogen(μmol/l)	0.8	1.2	(APHA 23 rd Ed.,2017,4500-NH3 B)
5.	Salinity (ppt)	37.5	37.2	By Calculation
6.	Dissolved Oxygen (mg/l)	5.6	5.5	IS 3025(Part 38)1989,
7.	Total Nitrogen (μmol/l)	14.03	10.97	(APHA 23 rd Ed.,2017,4500-O,B),
8.	Dissolved Phosphate (μmol/l)	1.47	1.15	APHA 23 rd Ed.,2017,4500 NH3 - B
9.	Nitrate (μmol/l)	12.90	11.56	(APHA 23 rd Ed.,2017,4500-P,D)
10.	Nitrite (μmol/l)	1.13	1.30	(APHA 23 rd Ed.,2017,4500 NO3-B)
11.	Phenol(μg/l)	N.D.(MDL:0.01)	N.D.(MDL:0.01)	APHA 23 rd Ed.,2017,4500NO2B
12.	PHc(ppb)1M Level	N.D.	N.D.	IS 3025(Part 43)1992Amd.02

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

a) Temperature: Marine water temperature of the study area was checked on site, so surface & bottom water temperature observed in the study area in range between 29°C to 31°C. The water temperature generally varied in accordance with the prevailing air temperature, tidal activity and seasonal variation.

b) pH: The pH of the water is generally buffering effect, influenced by the freshwater and anthropogenic discharge from land. The observed pH in the study area in range of 7.98 to 8.18 at surface level and 7.95 to 8.14 at bottom level.

c) Salinity: Salinity which is an indicator of seawater, the standard average salinity of sea water is 34 to 37 ppt, which is variable depending on the riverine flow, any fresh water discharge from landward side, rainy season and temperature in study area. Average salinity (ppt) for monsoon study is 34.8 to 37.5 ppt at surface water as well as 35.0 to 37.2 ppt at bottom water.

d) DO & BOD: High Dissolve oxygen level is measured of good oxidizing conditions in an aquatic environment. In unpolluted waters equilibrium is maintained between its generation through photosynthesis and dissolution from the atmosphere, and consumption by the respiration and decay of organic matter in a manner that Dissolve oxygen levels are close to or above saturation value.

Dissolve oxygen level of the study area is varied from 5.1 mg/l to 5.9 mg/l at water surface level & 5.2 mg/l to 5.6 mg/l at water bottom level. The comparison of average Dissolve oxygen value of monsoon period is 5.4 mg/l which show the good oxidizing conditions in study area aquatic environment.

BOD was generally indicating effective consumption of oxidisable matter in that water body. BOD of the study area is varied from 3.6 to 6.2mg/l at water surface level and 3.8 to 6.0mg/l at water bottom level.

e) Nutrients: Dissolved phosphorus and nitrogen compounds serve as the nutrients for phytoplankton which is the primary producer in aquatic food chain. Phosphorous compounds are present predominantly as reactive phosphate while combined nitrogen is present as nitrate, nitrite and ammonium species. So nutrient concentration (phosphate –nitrate - nitrite) in the study area is Phosphate range 1.14 to 1.47 $\mu\text{mol/l}$ in at Surface water and 1.05 to 1.68 $\mu\text{mol/l}$ at Bottom water , Nitrate range 5.06 to 12.90 $\mu\text{mol/l}$ in surface water and 5.08 to 11.56 $\mu\text{mol/l}$ at bottom water, Nitrite range 1.09 to 1.56 $\mu\text{mol/l}$ in surface level and 0.89 to 1.38 $\mu\text{mol/l}$ at bottom level. This nutrient concentration values indicate water healthiness.

f) PHc and phenol: The observed Phenol & level of PHc was below detection level which indicates in significant influence of anthropogenic inputs on the water body in study area.

g) Total suspended solids: The suspended solids generally constitute clay, silt and sand from the bed sediment and that from the upstream as well as contributed through shore erosion. Anthropogenic discharges also contribute to suspended solids in the form of contaminants such as oil and solid waste in polluted area. Suspended solids in the study area are little variable, surface area range observed 54 to 62mg/l as well as bottom area range is 44 to 56mg/l.

The Sediment quality at different stations are measured during this investigation is presented in Table No.4 and Table No.5

2.3 Inter tidal & Sub tidal Sediment analysis result

Table 4 : Sub Tidal Sediment Analysis Result

No.	Parameters	SUBTIDAL SEDIMENT QUALITY($\mu\text{g/g}$)					Test Method Permissible
		Station 1	Station 2	Station 3	Station 4	Station 5	
1.	Texture	Silty sand	sandy	sandy	Silty sand	Loamy sand	--
2.	Aluminum as Al	1.4	1.6	2.6	2.0	3.4	IS 3025(Part 55)2003
3.	Cobalt as Co	5	4	6	8	N.D.	AAS Method
4.	Copper as Cu	6	8	4	13	12	IS 3025(Part 42)1992amd.01,
5.	Zinc as Zn	0.553	0.534	0.574	0.595	0.423	IS 3025(Part 49)1994
6.	Mercury	N.D.	N.D.	N.D.	N.D.	N.D.	(APHA 22 nd Ed.,2012,3112-B)
7.	Phosphorous (Total)	373	325	405	422	391	(APHA22 nd Ed.,2012,4500 -P,D)
8.	C(Org.)%	0.9	1.4	1.2	1.5	0.8	Standard method (Walkley and Black, 1934).
9.	Chromium	18	24	16	38	43	IS 3025(Part 52)2003,
10.	Nickel	8	10	12	7	9	IS 3025(Part 54)2003,
11.	Manganese	731	649	773	574	755	APHA 22 nd Ed.,2012,3500 Mn B
12.	Iron%	2.3	3.1	1.6	1.4	2.4	IS 3025(Part 53)2003,
13.	PHc	0.1	0.1	0.4	0.1	0.1	G.C.Method
14.	Arsenic	N.D.	N.D.	N.D.	N.D.	N.D.	APHA 22 nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectabl

Table 5: Inter tidal Sediment Analysis Result

INTER TIDAL SEDIMENT QUALITY (µg/g)						
Sr. No	Parameters	Transect 1		Transect 2		Test Method Permissible
		High Tide	Low Tide	High Tide	Low Tide	
1.	Texture	Sandy	Sandy	Sandy	Sandy	--
2.	Aluminium as Al	1.8	1.6	2.0	2.9	IS 3025(Part 55)2003
3.	Cobalt as Co	3	5	4	2	AAS Method
4.	Copper as Cu	3	6	8	5	IS 3025(Part 42)1992amd.01,
5.	Zinc as Zn	0.486	0.523	0.556	0.495	IS 3025(Part 49)1994
6.	Mercury	N.D.	N.D.	N.D.	N.D.	(APHA 22 nd Ed.,2012,3112-B)
7.	Phosphorous (Total)	256	355	290	325	(APHA 22 nd Ed.,2012,4500-P,D)
8.	C(Org.)%	0.8	1.0	0.9	0.9	Standard method (Walkley and Black, 1934).
9.	Chromium	15	12	18	24	IS 3025(Part 52)2003,
10.	Nickel	6	8	10	7	IS 3025(Part 54)2003,
11.	Manganese	653	689	732	660	APHA 22 nd Ed.,2012,3500 Mn B
12.	Iron%	2.0	2.8	3.4	3.6	IS 3025(Part 53)2003,
13.	PHc	0.1	0.1	0.1	0.1	G.C.Method
14.	Arsenic	N.D.	N.D.	N.D.	N.D.	APHA 22 nd Ed.,2012,3114-C

Note: MDL = Minimum Detection Limit (MDL: 0.01) and N.D. = Not detectable

- The texture of sediment is sandy to sandy loam and sandy clay loam.
- The highest phosphorus content (422µgm/gm) was recorded at ST-4 and lowest phosphorous content (325 µgm/gm) was found at ST-2 in sub tidal region. In the Inter tidal region highest phosphorus content (355 µgm/gm) was recorded at IT-1(LWL) and lowest phosphorous content (256 µgm/gm) was found at IT-1(HWL)
- The Chromium content of marine sediment was ranged from 16µgm/gm to 43µgm/gm. The highest chromium content was recorded at ST-5 and lowest at ST-3. And in Intertidal region the highest chromium content (24 µgm/gm) was recorded at IT-2(LWL) and lowest chromium content (12 µgm/gm) was found at IT-1(LWL)
- The highest Nickel content (12 µgm/gm) was recorded at ST-3 and lowest Nickel content (7µgm/gm) was recorded at ST-4. In the Inter tidal region highest Nickel content (10µgm/gm) was recorded at IT-2(HWL) and lowest Nickel content (6µgm/gm) was found at IT-1(HWL).
- The highest Copper content (13 µgm/gm) was recorded at ST-4 and lowest copper content (4 µgm/gm) was recorded at ST-3. In the Inter tidal region highest copper content

(8µgm/gm) was recorded at IT-2(HWL) and lowest copper content (3µgm/gm) was found at IT-1(HWL).

- The highest Zinc content (0.595 µgm/gm) was recorded at ST-4 and lowest zinc content (0.423 µgm/gm) was recorded at ST-5. In the Inter tidal region highest Zinc content (0.486 µgm/gm) was recorded at IT-1(HWL) and lowest Zinc content (0.556µgm/gm) was found at IT-2(HWL).
- The highest Organic carbon content (1.5 %) was recorded at ST-4 and lowest Organic carbon content (0.8 %) was recorded at ST-5. In the Inter tidal region highest Organic carbon content (1.0 %) was recorded at IT-1(LWL) and lowest Organic carbon content (0.8 %) was found at IT-1(HWL).
- The highest Iron content (3.1 %) was recorded at ST-2 and lowest Iron content (1.4%) was recorded at ST-4. In the Inter tidal region highest Iron content (3.6%) was recorded at IT-2(LWL) and lowest Iron content (2.0%) was found at IT-1(HWL).
- The highest Manganese content (773µgm/gm) was recorded at ST-3 and lowest Manganese content (574µgm/gm) was recorded at ST-4. In the Inter tidal region highest Manganese content (732µgm/gm) was recorded at IT-2(HWL) and lowest Manganese content (653µgm/gm) was found at IT-1(HWL).
- The highest Aluminium content (3.4µgm/gm) was recorded at ST-5 and lowest Aluminium content (1.4µgm/gm) was recorded at ST-1. In the Inter tidal region highest Aluminium content (2.9µgm/gm) was recorded at IT-1(LWL) and lowest Aluminium content (1.6µgm/gm) was found at IT-1(LWL).
- The highest Cobalt content (8.0µgm/gm) was recorded at ST-4 and lowest Cobalt content (0.0µgm/gm) was recorded at ST-5. In the Inter tidal region highest Cobalt content (5.0µgm/gm) was recorded at IT-1(LWL) and lowest Cobalt content (2.0µgm/gm) was found at IT-2(LWL).
- Arsenic & Mercury was not detected in any station.

BIOLOGICAL CHARACTERISTICS (BIODIVERSITY STUDIES):

Marine environment is unique ecosystems involve the complex interaction between abiotic and biotic components. Any change in the abiotic factors leads to change in aquatic organisms (biotic factor). The human interventions always compromise the health of marine ecosystem by disturbing the ecological balance. Hence the assessment of the biotic components along with abiotic factors is an integral part of Environmental assessment and monitoring study. During the present study at APL the abundance and distribution of marine organisms (plankton and benthos) were studied as part of routine environmental monitoring.

3.1 Planktonic Forms:

The name plankton is derived from the Greek word “planktons”, meaning “wanderer” or “drifter”. While some forms of plankton are capable of independent movement and can swim up to several hundred meters in a single day, their position is primarily determined by currents in the body of water they inhabit. By definition, organisms classified as "plankton" are unable to resist ocean currents. Plankton is primarily divided into broad functional groups:

1. Phytoplankton
2. Zooplankton

This scheme divides the plankton community into broad producer and consumer groups.

a) Phytoplankton:

The organisms responsible for primary production in all aquatic ecosystems are known as “phytoplankton.” These miraculous microscopic organisms not only form the base of life in our oceans, but also produce up to 90% of the oxygen in our atmosphere.

Phytoplankton is microscopic plants that live in the ocean, freshwater and other terrestrial based water systems. There are many species of phytoplankton, each of which has a characteristic shape, size and function. Marine species of phytoplankton grow abundantly in oceans around the world and are the foundation of the marine food chain. Marine Phytoplankton is the producing (autotrophic) component in the ocean. There are fourteen classes of phytoplankton. Each class of phytoplankton contains unique attributes in size, cell structure, nutrients and function.

b) Zooplankton:

Zooplankton are the consumer organism, incapable of making its own food from light or inorganic compounds, and feeds on organisms or the remains of other organisms to get the energy necessary for survival. They are primarily depends on the phytoplankton and other small organisms groups for their nutritional needs.

3.2 Significance of Phytoplankton and Zooplankton:

Phytoplankton are the major primary producers of organic matter in the aquatic ecosystem. They contribute up to 90% in primary productivity in the Oceanic environment. As part of photosynthesis process they produce organic compounds from carbon dioxide with the help of sunlight and inorganic compound. Collectively, they directly or indirectly support the entire animal population, and thus form the basis of most marine food webs. Phytoplankton also helps in the carbon dioxide sequestration process. The significance of zooplanktons is found in their role in transferring biological production from phytoplankton to large organisms in the marine food web and to the sea floor. A large number of phytoplankton species are grazed upon by the microscopic protozoan, tunicates, copepods and other crustaceans. These in turn become food for other animals further linking the food web. Therefore, variability in the reproduction of copepods would affect the survival of young fish that depend on them.

Table: 6 Test methods for Phytoplankton & Zooplankton analysis

Sr. no.	Test performed	Method
1	Phytoplankton	APHA, Edition 21, Part 10000, 10200 F
2	Zooplankton	APHA, Edition 21, Part 10000, 10200 G

3.3 Phytoplankton:

Phytoplankton sampling was carried out at 5 stations. At each station water samples were collected from surface and bottom waters. The sampling location is given in following table.7

Table 7: Phytoplankton Sampling Station

Station	Location	Co ordinates		Water depth	Tide
1	Intake point	22°48'34.56"N	69°32'58.95"E	6 m	Flood
2	Intake point Mouth area	22°46'58.26"N	69°32'06.93"E	6.5 m	Ebb - Flood
3	West port area	22°45'23.59"N	69°35'20.61"E	10 m	Flood - Ebb
4	Outfall area	22°44'49.69"N	69°36'29.61"E	6 m	Flood
5	Outfall area	22°44'44.68"N	69°36'46.64"E	5 m	Flood - Ebb

A Niskin sampler with a closing mechanism at a desired depth was used for collecting sub surface water samples. Surface samples were collected using a clean polyethylene bucket. Samples were stored in amber colored plastic containers fitted with inert cap liners. Further Lugol's solution was added to preserve the phytoplankton cells for further enumeration. The identification of phytoplankton were carried out under a microscope using Sedgwick Rafter slide.

3.3.1 Microscopic Observations

For phytoplankton enumeration 0.5 ml of the sample was taken on Sedgwick-Rafter counting cells. The identification was done using a microscope under 40X or 100X magnification. The standard keys given by Desikachary, 1959; Sournia, 1974; Tomas 1997; Horner, 2002 were used for the identification of phytoplankton cells. Species were identified to a genus level.

3.3.2 Phytoplankton Diversity

During the sampling period a total of 35 phytoplankton genera (29 diatom genera and 6 dinoflagellate genera) were observed in sampled water (Table 8). Diatom genera includes, Amphora sp., Bacillaria sp., Biddulphia sp., Chaetoceros sp., Cocconeis sp., Coscinodiscus sp., Cylindrotheca sp., Diploneis sp., Ditylum sp., Fragillaria sp., Gramatophora sp., Gyrosigma sp., Lauderia sp., Leptocylindrus sp. Melosira sp., Navicula sp., Nitzschia sp., Odontella sp., Pinnularia sp., Planktoniella sp., Pleurosigma sp., Rhizosolenia sp., Scrippsiella sp., Skeletonema sp., Surirella sp., Thalassionema sp., Thalassiosira sp., Thalassiothrix sp. and Trachyneis sp.. Whereas, dinoflagellate includes Ceratium sp., Dinophysis sp., Noctiluca sp., Peridinium sp., Prorocentrum sp. and Protoperidinium sp. were identified from sub-tidal and intertidal region. Average phytoplankton abundance recorded in surface waters was

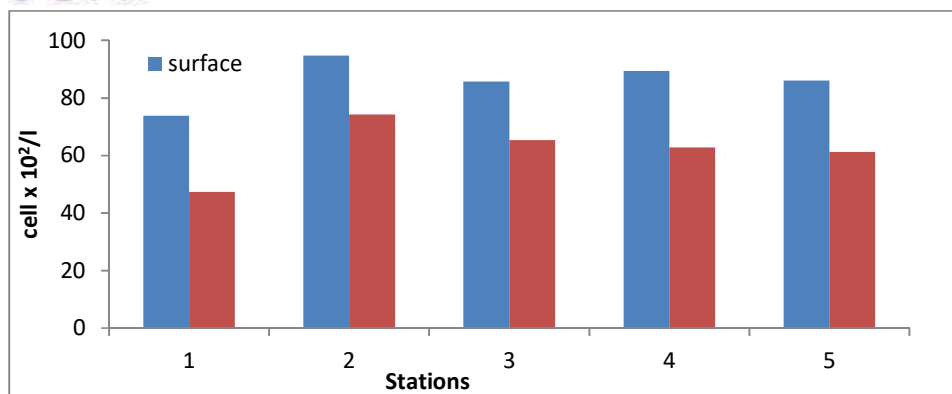
81.91±7.79 cells x 10²/l, whereas, in bottom waters phytoplankton abundance was 62.15±9.72 cells x 10²/l.

The phytoplankton abundance in the study region was ranged from 73.74 cells x 10²/l to 94.69 cells 10²/l (Table 8) in surface waters. In surface water samples, highest phytoplankton abundance was observed at surface water of Station 2 (94.69 cells 10²/l), whereas in bottom water samples, the highest phytoplankton abundance was recorded at Station 2 (74.22 cells 10²/l). The phytoplankton community in the sampling area was dominated by *Nitzschia* sp. (23.01%), *Thalassionema* sp. (14.36%), *Rhizosolenia* sp.(14.96), *Navicula* sp. (9.25%) and *Coscinodiscus* sp. (6.50%).

The increase abundance of phytoplanktons at particular station might be due to increase density of single genus for example *Nitzschia* sp. The study shows that marine water around APL, Mudra are well supported for growth of phytoplankton species.

Table 8: Phytoplankton composition and abundance (Cells x 10²/l) at sub-tidal and inter-tidal stations in the coastal waters of APMuL, Mundra during September 2019 (S=Surface; B=Bottom).

Phytoplankton genera	Sampling Stations									
	Station 1		Station 2		Station 3		Station 4		Station 5	
	S	B	S	B	S	B	S	B	S	B
Diatoms										
<i>Amphora sp.</i>	0.6	0.5	1.8	0.5	0.24	0.1	0.2	0.5	0.6	0.3
<i>Bacillaria sp.</i>	0.5	0	0.2	0	0	0	0.1	0	0	0.2
<i>Biddulphia sp.</i>	1.4	1.2	0.95	1.3	1.6	1.5	1	0.7	1.65	1.78
<i>Chaetoceros sp.</i>	0.1	0.12	0.2	0	0.35	0.14	0.3	0.1	0.2	0
<i>Cocconeis sp.</i>	0.5	0	0.2	0	0	0.2	0	0.5	0	0.5
<i>Coscinodiscus sp.</i>	1.6	1	4.6	3.1	6.4	4.5	7.3	5.4	8.8	5.4
<i>Cylindrotheca sp.</i>	0	0	0	0	0	0.6	0.5	0.3	0.8	0.6
<i>Diploneis sp.</i>	2.3	0.2	1.7	0.3	0.26	0.3	1.7	0.6	2.1	0.9
<i>Ditylum sp.</i>	0.7	0.2	0.4	0	0.4	0.2	0.4	0.1	0.64	0.2
<i>Fragillaria sp.</i>	1.7	2.4	1.6	0.8	3.65	2.2	5.7	3.5	5.8	4.1
<i>Grammatophora sp.</i>	0.5	0.9	7.9	2.2	0.65	0.2	0.7	0.65	0.9	0.6
<i>Gyrosigma sp.</i>	0	0.6	0	0	0.25	0	0.6	0.7	0.3	0.5
<i>Lauderia sp.</i>	0.23	0.15	0.8	0.34	0.78	0.1	0.3	0.5	0.4	0
<i>Leptocylindrus sp.</i>	0.15	0.16	0.7	0.21	0.34	0.1	0.12	0	0.7	0.2
<i>Melosira sp.</i>	0.5	0	0	0.6	1.32	0.8	0.7	0.3	1.2	0.6
<i>Navicula sp.</i>	4.8	6.5	1.4	6.9	8.8	7.9	10.4	6.8	8.4	6.6
<i>Nitzschia sp.</i>	29.5	15.2	18.6	18.7	16.7	13.6	19.4	11.6	15.4	11.6
<i>Odontella sp.</i>	0.4	1.6	0	1.4	0	0.2	0.6	0.2	0.65	0.2
<i>Pinnularia sp.</i>	0.4	0	0.2	0.15	0	0	0.1	0	0.1	0
<i>Planktoniella sp.</i>	0	0	0.1	0	0.2	0	0.4	0.5	0.3	0.5
<i>Pleurosigma sp.</i>	5.5	3.9	2.7	2.4	3.6	2.5	5.4	3.2	4.4	2.2
<i>Rhizosolenia sp.</i>	12.6	0	27.9	19.4	10.9	8.1	7.7	6.2	6.8	5.2
<i>Scrippsiella sp.</i>	0	0	0	0	0.2	0	0.4	0	0.4	0
<i>Skeletonema sp.</i>	0.3	0.12	0.14	0.1	0.3	0.15	0.6	0.7	0.5	0.2
<i>Surirella sp.</i>	1.7	0.5	0.4	0.6	1.2	1.5	1.5	1.3	1.67	0.8
<i>Thalassionema sp.</i>	1.9	6.8	8.9	6.9	17.1	15.3	12.6	10.6	14.6	11.6
<i>Thalassiosira sp.</i>	0.8	0	2.7	0.7	1.1	0.2	0.6	0.8	0.8	0.4
<i>Thalassiothrix sp.</i>	1.8	4.6	2.7	4.9	2.2	0	3.1	1.62	0.4	0.6
<i>Trachyneis sp.</i>	0	0	0	0	0	0.2	0	0.2	0	0
Dinoflagellates										
<i>Ceratium sp.</i>	2.3	0.3	4.7	1.6	5.2	3.5	4.2	3.5	5.7	4.5
<i>Dinophysis sp.</i>	0.6	0	0.8	0.2	0.7	0.8	0.6	0.5	0.4	0.2
<i>Noctiluca sp.</i>	0	0	0.7	0	0.6	0.1	0.8	0.3	0.7	0
<i>Peridinium sp.</i>	0	0.2	1.2	0.7	0.32	0.2	0.4	0.5	0.4	0.5
<i>Prorocentrum sp.</i>	0.2	0	0.3	0.1	0.1	0	0.7	0.1	0	0.1
<i>Proto-peridinium sp.</i>	0.16	0.1	0.2	0.12	0.3	0.15	0.25	0.28	0.32	0.1
Total abundance (cells x 10²/l)	73.74	47.28	94.69	74.22	85.76	65.34	89.37	62.75	86.03	61.18



Graph 1.2: Abundance of phytoplankton (cells L⁻¹) observed in surface and bottom waters at the sampling stations.



Odontella sp.



Ditylum sp.



Pinnularia sp.



Rhizosolenia sp.



Nitzschia sp. and Navicula sp.



Pleurosigma sp.



Ceratium sp.



Noctiluca sp.



Coscinodiscus sp.

1.3 Microphotographs of phytoplankton reported at sampling stations

3.4 Zooplankton:

Zooplankton samples were collected at 5 selected locations. The sampling details are given in following table 9.

Table 9: Zooplankton Sampling Station

Station	Location	Co ordinates		Water depth	Tide
1	Intake point	22°48 34.'56"N	69°32'58.95"E	6 m	Flood
2	intake point	22°46'58.26"N	69°32'06.93"E	6.5 m	Ebb - Flood
3	West port area	22°45'23.59"N	69°35'20.61"E	12 m	Flood - Ebb
4	Outfall area	22°44' 49.69"N	69°36' 29.61"E	5 m	Flood
5	Outfall area	22°44'44.68"N	69°36' 46.64"E	6 m	Flood - Ebb

Oblique hauls for Zooplankton were made using Heron Tranter net with calibrated flow meter. Samples were preserved with formalin and stored in plastic containers with inert cap liners till further analysis.

3.4.1 Microscopic Observations

For quantification of zooplankton, 0.5 ml of the sample was taken in zooplankton counting chamber. The identification was carried out under Stereomicroscope at 45X or 100X magnification. The zooplanktons were identified using standard identification keys given by Kasturirangan 1963; Santhanam and Srinivasan, 1994 and Conway et al., 2003 etc. Species were identified to group level.

3.4.2 Zooplankton Diversity

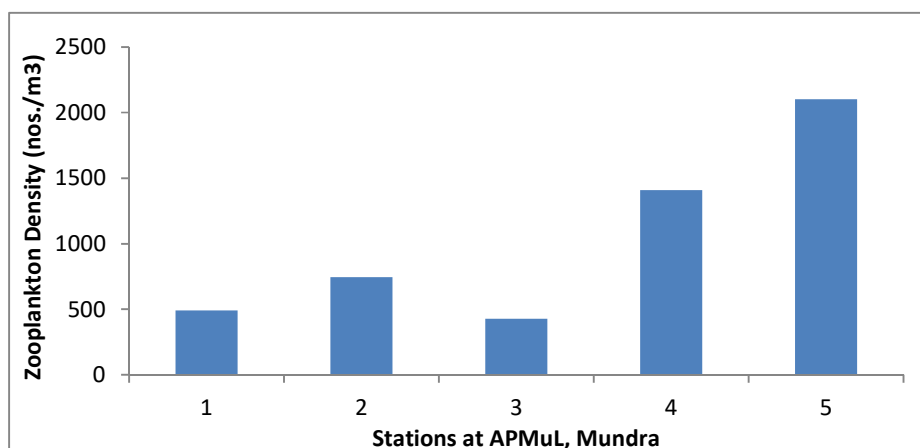
A maximum 11 groups of Zooplankton consisting of Copepods, Copepod nauplii, Decapoda (euphausids and shrimps), Amphipoda, Oikoplura, fish larvae, polychate larvae, Gastropod larvae, Crustacean larvae (brachyuran and anomuran crab larvae), Bivalve larvae, Fish and shrimp eggs were identified from study area. (Table 10). Copepods and copepod nauplii, which on an average constituted 73.35% and 14.36% of total zooplankton density respectively in all the stations. Fish and decapods eggs are another major group reported from study area contributing 6.67% of total zooplankton density at all stations. Crustacean larvae (brachyuran and anomuran crab larvae) is another group of importance which mainly consist of zoea stage larvae contributed 2.01%. Decapods, gastropod larvae and eggs of shrimps and fishes are

another major group reported in study area. Occurrence of copepods and their nauplii as well as crustacean larvae, decapods and fish larvae/eggs in zooplankton samples suggest that the study area has fair production potentials for live food organism's resources for fish and shellfishes.

Zooplankton standing stock in terms of abundance revealed substantial spatial variation within all stations. Zooplankton biomass (ml/m³) and density (no.s/m³) is presented in Table 10. Among all the stations, least zooplankton biomass of 0.128 ml/m³ was recorded at Station 1 while, maximum biomass was reported at Station 5 (0.243 ml/m³). Minimum zooplankton population density was reported at Station 1 (491 nos./m³), whereas, maximum density reported at station 5 (2103 nos./m³).

Table 10: Total abundance, biomass and groups of zooplankton at the sampling stations

Stations	Biomass (ml/m ³)	Population (no./m ³)	Total groups	Zooplankton groups observed in the study
ST-1	0.128	491	8	Copepod, Copepod nauplii, Decapoda (euphausids and shrimps), Okiopleura, Gastropod larvae, Crustacean larvae, Bivalve larvae, Fish and decapods egg
ST-2	0.194	745	7	Copepod, Copepod nauplii, Decapoda (euphausids and shrimps), Polychate larvae, Crustacean larvae, Bivalve larvae, Fish and decapods egg
ST-3	0.118	429	8	Copepod, Copepod nauplii, Decapoda (euphausids and shrimps), Okiopleura, Polychate larvae, Crustacean larvae, Bivalve larvae, Fish and decapods egg
ST-4	0.169	1408	9	Copepod, Copepod nauplii, Decapoda (euphausids and shrimps), Amphipoda, Okiopleura, Gastropod larvae, Crustacean larvae, Bivalve larvae, Fish and decapods egg
ST-5	0.243	2103	8	Copepod, Copepod nauplii, Decapoda (euphausids and shrimps), Okiopleura, Gastropod larvae, Crustacean larvae, Bivalve larvae, Fish and decapods egg



Graph 1.4: Total number of zooplankton (no. m⁻³) at the sampling stations.

Table 11: Density (Nos. m⁻³) and contribution (% in parentheses) of various zooplankton groups at station 1 to 5 in the APMuL marine waters, Mudra during September, 2019

Zooplankton group	Station 1	Station 2	Station 3	Station 4	Station 5
Copepods	431 (87.78%)	682 (91.54%)	289 (67.37%)	1025 (72.80%)	1369 (65.10%)
Copepods nauplii	14 (2.85%)	26 (3.49%)	41 (9.56%)	203 (14.42%)	459 (21.83%)
Decapoda (shrimps and euphausiids)	6 (1.22%)	11 (1.48%)	9 (2.10%)	21 (1.49%)	39 (1.85%)
Amphipoda	0	0	0	1 (0.07%)	0
Oikoplura	2 (0.41%)	0	7 (1.63%)	12 (0.85%)	11 (0.52%)
Fish larvae	0	0	0	0	0
Polychate larvae	0	1 (0.13%)	1 (0.23%)	0	0
Gastropod larvae	1 (0.20%)	0	0	3 (0.21%)	11 (0.52%)
Crustacean larvae	10 (2.04%)	8 (1.07%)	5 (1.17%)	13 (0.92%)	68 (3.23%)
Bivalve larvae	11 (2.24%)	6 (0.81%)	1 (0.23%)	15 (1.07%)	19 (0.90%)
Eggs (fish and shrimps)	16 (3.26%)	11 (1.48%)	76 (17.76%)	115 (8.17%)	127 (6.04%)
Total density (nos/m³)	0.128	0.194	0.118	0.169	0.243
Total biomass (ml/m³)	491	745	429	1408	2103



Copepod



Nauplii



Egg



Gastropod larvae



Anomuran crab larvae



Brachyuran crab larvae

1.5 Microphotographs of zooplanktons reported at sampling stations

3.5 Benthic Fauna

The benthic zone is the ecological region at the lowest level of a water (such as an ocean or a lake) which include the sediment surface and some sub-surface layers. The superficial layer of sediment is an integral part of the benthic zone, as it influences greatly the biological activity which takes place there. Organisms living in this zone are called benthos. They

generally live in close relationship with the substrate bottom; many such organisms are attached to the bottom. Some benthic organisms are mainly dwelling at the bottom of the substratum but at times may travel upwards in the water column. They may also occupy rock crevices, organic debris and other microhabitat at the bottom. The benthic invertebrates ranges from microscopic (e.g. micro invertebrates, <10 microns) to a few tens of centimeters or more in length (e.g. macro invertebrates, >50 cm).

Benthic organisms are morphologically different from that planktonic organisms. Many are adapted to live on the substrate (bottom). In benthic habitats they can be considered as dominant creatures. These organisms adapted to deep-water pressure so cannot survive in the upper parts of the water column. Since light does not penetrate very deep ocean-water, the benthic organisms often depends on the organic matter falling from the upper water column as their main energy source. This dead and decaying matter sustains the benthic food chain. The most benthic organisms in are scavengers or detritivores. These organisms by virtue of being relatively stationary, are constantly exposed to changes undergoing in overlying water, and hence, respond very well to aquatic pollution. The macro benthic population is very sensitive to environmental perturbation and is highly influenced by the physicochemical characteristics of water, nature of substratum, food, predation and other factors. The density of benthic invertebrates also fluctuates widely with the changes in the season.

3.5.1 Significance of benthic macro invertebrates

The biomass of benthic organisms in estuaries and coastal embayment is often high. It declines if communities are affected by prolonged periods of poor water quality especially when anoxia and hypoxia are common. Burrowing and tube-building by deposit-feeding benthic organisms (bioturbators) helps to mix the sediment and enhances decomposition of organic matter. Nitrification and denitrification are also enhanced because a range of oxygenated and anoxic micro-habitats are created. For example, the area of oxic-anoxic boundaries and the surface area available for diffusive exchange are increased by tube-building macro invertebrates. Loss of nitrification and denitrification (and increased ammonium efflux from sediment) in coastal and estuarine systems is an important cause of hysteresis, which can cause a shift from clear water to a turbid state.

The loss of benthic suspension-feeders can further enhance turbidity levels because these organisms filter suspended particles including planktonic algae, and they enhance sedimentation rates through bio deposition (*i.e.* voiding of their wastes and unwanted food). Changes in the macro fauna (and flora) cause changes in nutrient storage pools. Macro fauna are also important constituents of fish diets and thus are an important link for transferring energy and nutrients between trophic levels, also driving pelagic fish and crustacean production. For these reasons the benthic organisms are extremely important indicators of environmental change.

3.5.2 Methodology

To enumerate the macro-benthic population sediment samples were collected from 5 sub-tidal and 3 inter-tidal transects. The details are as mentioned in the table (13 & 14). Sample was collected in the month of September 2019.

Table 12: Test method for Benthos analysis

Sr. No	Test performed	Method
1	Benthos	APHA, Edition 21, Part 10000,10500 A-10500 D

Table 13: Sub-tidal Benthos Sampling Sites

Station	Location	Co ordinates		Sediment quality
1	Intake point	22°48'34.56"N	69°32'58.95"E	Silty clay
2	intake point	22°46'58.26"N	69°32'06.93"E	Silty clay
3	West port area	22°45'23.59"N	69°35'20.61"E	Silty clay
4	Outfall area	22°44'49.69"N	69°36'29.61"E	Sandy
5	Outfall area	22°44'44.68"N	69°36'46.64"E	Silty clay

Table 14: Sub-tidal Benthos Sampling Sites

Transect	Location	Co ordinates	Intertidal expose area (m)	Sediment quality
I	High water level	22°56'33.4"N 69°46'31.3"E	42 m	Sandy
	Low water level	22°56'42.3"N 69°52'38.5"E		Silty-sand
II	High water level	22°48'18.0"N 69°34'03.4"E	54 m	Sandy
	Low water level	22°52'38.1"N 69°52'20.2"E		Silty-sand
III	High water level	22°56'41.1"N 69°47'34.1"E	47m	Sandy
	Low water level	22°45'30.0"N 69°35'50.4"E		Sandy

For the analysis of Benthos subtidal sediment samples were collected using Van-veen grab as well as intertidal samples were collected using metal quadrant.

The total Macro benthos population (sub tidal & intertidal) was estimated as number of 1 m² area and biomass on wet weight basis.

3.5.3 Handling and Preservation

The samples were first sieved with 500 µ size metal sieve and then washed with sea water. Sieving yields residual mixture of benthic organisms and detritus matter. The organisms were handpicked using forceps and paint brush. After sorting, macro benthic organisms were identified to the group level. Organisms were preserved in 10% formalin.

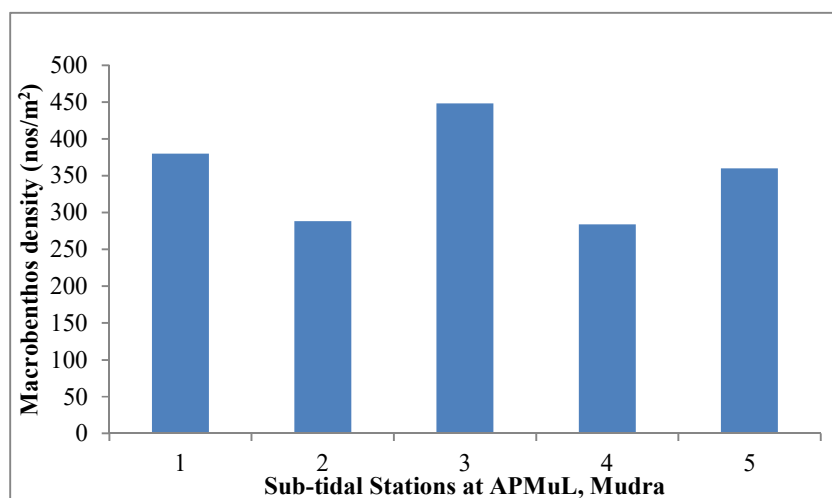
3.5.4 Identification

Identification of the organisms was done under stereo-microscope. Day, 1967, Fauchald, 1977 were used as standard reference for identification of the macro invertebrates.

3.5.5 Benthic Diversity

During present study, high macrobenthos abundance and biomass was reported at sub-tidal stations than inter-tidal stations at APL, Mundra. The macrobenthos biomass was measured from 2.98 mg m⁻² to 5.1 mg m⁻² from all stations at APL marine monitoring area. Whereas, least density of benthic macro organisms was reported as 284 nos. m⁻² whereas, highest density was reported as 448 nos. m⁻² respectively at Station 4 and Station 3. Polychaete species contributed (65.68%) to the total macrobenthic abundance at these stations followed by crustaceans (18.18%). Polychaetes belongs to family Ampharetidae, Capitellidae, Nereidae and Glyceridae were dominated the macrobenthic population at the sampling region (Table 7). More occurrence of this group could indicate the organic carbon enrichment in the sediment. Overall, the presence of polychaete, sipuncula worms and amphipods suggest availability of food organisms for higher predators in the area.

The macrobenthos biomass was measured from 0.45 mg m⁻² to 3.2 mg m⁻² from all stations at APL marine monitoring area). Whereas, least density of benthic macro organisms was reported as 32 nos. m⁻² at station IT-2 (HW) whereas, highest density was reported as 392 nos. m⁻² at Station IT-1 (LW). Polychaete species contributed (66.87%) to the total macrobenthic abundance at these stations followed by sipuncula (19.48%).



Graph 1.6: Abundance of subtidal macrobenthos (no. m⁻²).

Table 15: Standing stock and abundance of sub tidal macro benthos

Station	Biomass (mg. m ⁻²)	Abundance (no. m ⁻²)	Total Group (No.)	Major Group
ST-1	4.9	380	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids
ST-2	3.7	288	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids
ST-3	5.1	448	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids
ST-4	2.98	284	6	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids, Pisces
ST-5	3.45	360	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids

Sub tidal region:

- A maximum 6 group of *Polychaeta*, Isopoda, Sipunculids, Bivalvia, Pisces and Amphipoda identified from St-4. A minimum of 5 benthos groups were recorded at ST-1, ST-2, ST-3 and ST-5.
- In the sub-tidal region macro benthos abundance was higher at ST-3 (448 no. m⁻²), whereas lowest abundance was recorded at ST-2 (288 no. m⁻²). Higher macrobenthic biomass was recorded at ST-3 (5.1 mg. m⁻²) as compared to other stations (Table: 15).

Table 16: Standing stock and abundance of intertidal macro benthos

Station	Biomass (mg. m ⁻²)	Abundance (no. m ⁻²)	Total Group	Macro benthic groups observed in the study
IT-1 (LW)	3.2	392	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids
IT-1 (HW)	1.56	108	4	Polychaeta, Isopoda, Amphipoda and Sipunculids
IT-2 (LW)	0.77	84	5	Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids
IT-2 (HW)	0.45	32	4	Polychaeta, Isopoda, Amphipoda and Sipunculids
IT-3 (LW)	-	-	-	Dead bivalve and gastropod shells.
IT-3 (HW)	-	-	-	Dead bivalve and gastropod shells.

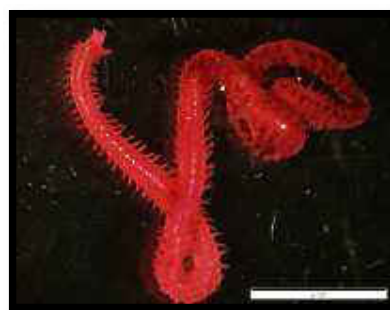
Note: LW-low water during low tide; HW: high water during high tide

Inter tidal region:

- Three benthic groups were identified at stations, IT-1 (LW), IT-1 (HW), IT-2 (LW) and IT-2 (HW). Organisms belongs to benthic group Bivalvia, Polychaeta, Isopoda, Amphipoda and Sipunculids were identified from IT-1 (LW) and IT-2 (LW), whereas at station IT-1 (HW) & IT-1 (HW) Polychaeta, Isopoda, Amphipoda and Sipunculids were reported.
- The highest macro benthos abundance (392 no. m⁻²) was reported at IT-1 (LW). Highest biomass (3.2 mg. m⁻²) was recorded at IT-1 (LW) (Table: 16).



Capitellidae



Glyceridae



Ampharetidae



Nereidae



Amphipods



Isopods

1.7 Microphotographs of macro benthic organisms.

3.6 Phytoplankton pigments (Chlorophyll and Pheophytin)

Chlorophyll and Pheophytin concentration:

Marine phytoplankton contains the essential as well as accessory pigment similar as that of terrestrial plants. Chlorophyll is the essential photosynthetic, green molecule responsible for energy fixation in the process of photosynthesis. The energy fixed by the phytoplankton gets transfer to higher tropic level in the food web through grazing process by the consumers. Chlorophyll is a measure of algal biomass and it acts as an empirical link between nutrient concentrations.

Algal chlorophyll forms a series of degradation products upon degradation. In addition to Chlorophyll the naturally occurring pigments in algal cells, a filtered water sample will also contain colored degradation products of these pigments. The nature of these degradation products depends on which part of the chlorophyll molecule that is affected. As chlorophyll degrades, the initial step is either the loss of the magnesium from the center of the molecule or the loss of the phytol tail. This results in the formation of the molecule, *phaeophytin*. Depending on the parent molecule a number of distinct molecules like phaeophytins, chlorophyllides, and pheophorbides can be produced. Thus in addition to Chlorophyll *a* filtered sea water contains colored degradation products of phytoplankton pigments.

Figure 1.8 : The Degradation Pathways Of Chlorophyll

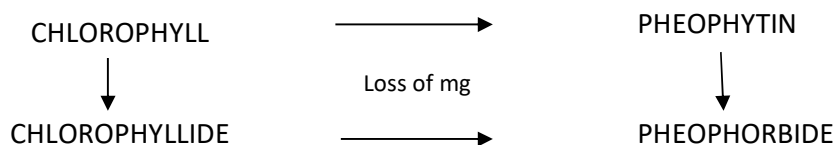


Table 17: Method of analysis for Chlorophyll a and Pheophytin

Sr. no	Test performed	Method
1	Chlorophyll <i>a</i> and Pheophytin	APHA, Edition 21, Part 10000, 10200 H (with some modification)

3.6.1 Estimation of Chlorophyll *a* and Pheophytin:

- Sampling locations were same as that of the plankton samples. Surface water samples were collected in clean plastic dark bottles.
- Water samples were filtered through Whattman glass microfiber filters (GF/F: 47 mm) and paper was macerated in 90% acetone and one night stored in the dark at 4°C.
- The extraction slurry was transferred to 15 ml centrifugation tube and centrifuged at ~2000 rpm for 10 min.
- The extract was decanted into a 15 ml centrifuge tube, volume was adjusted to 10 ml with 90% acetone.
- Clarified extract was transferred to cuvette. Chlorophyll fluorescence was measured using Turner Flurometer.
- The extract was then acidified in the cuvette with 0.1 ml of 0.1 N NH₄Cl. The acidified extract is gently agitated and phaeophytin fluorescence was measured using Turner Flurometer (after acidification).
-

3.6.2 Results

Distribution of phytoplankton biomass expressed in terms of Chlorophyll *a* (Chl *a*) and phaeophytin at sub-tidal and inter-tidal stations in the marine environment of APL, Mundra is presented in. In sub-tidal region, concentrations of Chl *a* ranged from 0.49 to 2.01 mg m⁻³ at surface (station 5 and station 2, respectively) and from 0.43 to 1.02 mg m⁻³ at bottom, (station 5 and station 1, respectively). The content of phaeophytin in surface waters ranged from 0.57 to 0.97 mg m⁻³ (station 5 and station 2, respectively) and from 0.55 to 0.76 mg m⁻³ in the bottom waters (station 5 and station 3, respectively). The measured concentrations of Chl *a* and Phaeophytin showed a marginally elevated levels in the surface waters as compared to the bottom waters. The small variations observed between the surface and bottom waters could be due to the natural biological variability inherent to such dynamic ecosystems. The

lower Chl *a* and Pheophytin values recorded at station 4 & 5 were attributed to the outfall discharge compared to the other stations. The concentration of pheophytin is a measure of the dead cells and is an indirect indicator of biotic and abiotic stress conditions of the algae leading to deterioration of chlorophyll *a*. The ratio from concentrations of chlorophyll *a* and pheophytin in an aquatic ecosystem suggest balance between the growth and mortality of phytoplankton life. In healthy environments, ratios of chlorophyll *a* to pheophytin generally exceed 1.2. Ratios of Chl *a* to pheophytin in the sub-tidal and inter-tidal study area of APL, Mundra ranged from 0.78 to 2.07. The ratios of the concentrations of chl *a* and pheophytin in the sampled stations were generally high (>1) except station 5, indicating that the appropriate conditions prevailed for the phytoplankton growth.

Table 18: Chlorophyll *a* and Pheophytin (mg/l)

Sampling locations	Chlorophyll <i>a</i> mg m ⁻³	Pheophytin mg m ⁻³	Chl <i>a</i> : Pheophytin ratio
Station-1 Surface	1.43	0.7	2.04
Station-1 Bottom	1.12	0.62	1.81
Station-2 Surface	2.01	0.97	2.07
Station-2 Bottom	1.36	0.75	1.81
Station-3 Surface	1.23	0.64	1.92
Station-3 Bottom	1.09	0.76	1.43
Station-4 Surface	0.87	0.69	1.26
Station-4 Bottom	0.78	0.66	1.18
Station-5 Surface	0.49	0.57	0.86
Station-5 Bottom	0.43	0.55	0.78

3.7 Conclusion

- The phytoplankton abundance in the study region was ranged from 73.74 cells x 102/l to 94.69 cells 102/l. in surface waters. In surface water samples, highest phytoplankton abundance was observed at surface water of Station 2 (94.69 cells 102/l), whereas in bottom water samples, the highest phytoplankton abundance was recorded at Station 2 (74.22 cells 102/l).
- In general, the concentrations of chl a and phaeophytin in the sampled stations were generally high (>1) except station 5, indicating that the appropriate conditions prevailed for the phytoplankton growth.
- Zooplankton biomass of 0.128 ml/m³ was recorded at Station 1 while, maximum biomass was reported at Station 5 (0.243 ml/m³). Minimum zooplankton population density was reported at Station 1 (491 nos. /m³), whereas, maximum density reported at station 5 (2103 nos. /m³).
- In the sub-tidal region macro benthos abundance was higher at ST-3 (448 no. m⁻²), whereas lowest abundance was recorded at ST-2 (288 no. m⁻²). Higher macrobenthic biomass was recorded at ST-3 (5.1 mg. m⁻²) as compared to other stations
- The highest macro benthos abundance (392 no. m⁻²) was reported at IT-1 (LW). Highest biomass (3.2 mg. m⁻²) was recorded at IT-1 (LW)
- Complete sampling data valuation reveals that the physicochemical and marine living parameters of the monsoon analyses data were not deviated from the baseline monitoring data. However, the unsteady benthic sediment as the effect of natural tidal currents and exchange with sediment carriage activity moves the settlement of the benthic fauna, predominantly in the west port area.

Table 19: Names of the Marine Monitoring Team Members

Sr. No.	Name of Person
1.	Dr. Sushant Sanaye (Marine Scientist)
2.	Mr. Vijay Thanki (Env. Chemist)
3.	Mr. Pravin Singh (Env. Chemist)
4.	Miss. Shweta A. Rana (Env. Microbiologist)
5.	Dr. Shivan Gouda (Marine Biologist)



DIFFERENT TYPES OF SAMPLING PHOTOGRAPHS

Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : April - 2019

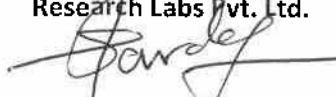
Name of Location : Village - Siracha

ID No. : URA/ID/A-19/04/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/04/2019	76.2	32.5	15.4	23.7		--
2.	05/04/2019	63.6	25.9	23.8	29.5		--
3.	09/04/2019	81.2	37.2	18.6	20.2		--
4.	12/04/2019	72.4	33.3	21.6	14.3		--
5.	16/04/2019	78.5	41.7	18.7	25.6		--
6.	19/04/2019	63.2	28.3	23.1	25.2	20.8	BDL
7.	23/04/2019	79.3	37.5	26.4	18.5		--
8.	26/04/2019	69.2	34.5	21.7	26.4		--
9.	30/04/2019	84.8	37.2	22.3	28.1		--
Average		74.3	34.2	21.3	23.5		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : April - 2019

Name of Location : Village - Kandagara

ID No. : URA/ID/A-19/04/002

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/04/2019	73.5	35.4	21.1	28.3		--
2.	05/04/2019	66.9	36.1	16.4	17.5		--
3.	09/04/2019	80.6	35.1	17.6	25.1		--
4.	12/04/2019	75.8	35.9	21.5	15.2		--
5.	16/04/2019	65.8	24.4	19.3	24.7		--
6.	19/04/2019	72.4	32.1	22.8	23.2	18.9	BDL
7.	23/04/2019	78.5	36.4	12.6	25.4		--
8.	26/04/2019	68.2	23.4	24.2	23.8		--
9.	30/04/2019	69.4	30.1	21.3	10.5		--
Average		72.3	32.1	19.6	21.5		--

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

Analysis Method Reference: SPM-- IS: 5182 (Part 4), 1999, PM₁₀-- IS: 5182 (Part 23), 2006, PM_{2.5}-- Guidelines by CPCB (Vol-1), SO₂-- IS: 5182 (Part 2), 2001, NO_x-- IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : April - 2019

Name of Location : Village - Wandh

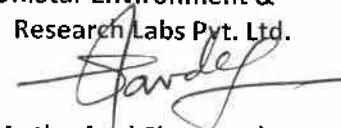
ID No. : URA/ID/A-19/04/003

Sr. No.	Sampling Date	Concentration in Ambient Air ($\mu\text{g} / \text{m}^3$)					
		PM ₁₀ $\mu\text{g}/\text{M}^3$	PM _{2.5} $\mu\text{g}/\text{M}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{M}^3$	Nitrogen Dioxide (NO ₂) $\mu\text{g}/\text{M}^3$	Ozone (O ₃) $\mu\text{g}/\text{M}^3$	Mercury (Hg) $\mu\text{g}/\text{M}^3$
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/04/2019	65.8	28.8	18.3	22.8		--
2.	05/04/2019	72.4	31.4	21.1	23.4		--
3.	09/04/2019	68.5	30.5	13.6	16.7		--
4.	12/04/2019	79.5	28.7	20.3	25.4		--
5.	16/04/2019	68.7	24.3	17.6	21.8		--
6.	19/04/2019	58.7	30.1	20.5	28.5	16.4	BDL
7.	23/04/2019	62.6	29.1	16.7	16.3		--
8.	26/04/2019	76.5	29.3	21.5	22.7		--
9.	30/04/2019	73.1	32.1	18.9	21.4		--
Average		69.5	29.4	18.7	22.1		--

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Consultant Organization

GPCB Recognized Environmental
Auditor (Schedule-II)

OHSAS18001:2007
Certified Company

ISO 9001:2015
Certified Company

Monthly Average Report
Ambient Air Quality Monitoring

Name and Address of Client

: M/s. Adani Power (Mundra) Ltd.
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring

: May - 2019

Name of Location

: Village - Siracha

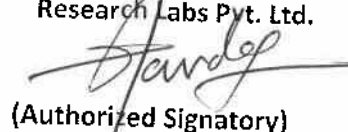
ID No.

: URA/ID/A-19/05/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/05/2019	75.2	33.1	22.5	17.2		--
2.	07/05/2019	66.6	31.3	20.1	27.5		--
3.	10/05/2019	75.5	30.1	14.8	26.4	20.4	BDL
4.	14/05/2019	84.6	39.2	11.5	20.7		--
5.	17/05/2019	77.1	24.5	21.4	19.4		--
6.	21/05/2019	71.6	38.0	14.7	15.5		--
7.	24/05/2019	57.0	29.1	24.0	25.2		--
8.	28/05/2019	73.9	36.4	21.7	26.4		--
9.	31/05/2019	68.4	30.5	22.3	28.1		--
Average		72.2	32.5	19.2	22.9		--
Analysis Method Reference: SPM - IS: 5182 (Part 4): 1992							

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method - 3112 B APHA 22 Edison & Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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OHSAS18001:2007
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Monthly Average Report Ambient Air Quality Monitoring

Name and Address of Client

: M/s. Adani Power (Mundra) Ltd.
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch.
GUJARAT – 370 435.

Month of Monitoring

: May - 2019

Name of Location

: Village - Kandagara

ID No.

: URA/ID/A-19/05/002

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/05/2019	66.1	27.5	16.3	29.5		--
2.	07/05/2019	62.9	25.2	20.8	15.2		--
3.	10/05/2019	77.1	30.3	15.4	28.4	20.7	BDL
4.	14/05/2019	81.6	37.3	15.7	20.5		--
5.	17/05/2019	79.6	34.9	10.5	15.5		--
6.	21/05/2019	61.1	23.0	25.3	24.2		--
7.	24/05/2019	77.0	35.4	21.8	19.7		--
8.	28/05/2019	70.8	34.4	24.2	23.8		--
9.	31/05/2019	51.4	31.2	21.3	20.5		--
Average		69.8	31.0	19.0	21.9		--
Remark: Calibrated equipment & instruments were used.							

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

Analysis Method Reference: SPM- IS: 5182 (Part 4), 1999, PM₁₀- IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂- IS: 5182 (Part 2), 2001, NO_x- IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Monthly Average Report Ambient Air Quality Monitoring

Name and Address of Client

: M/s. Adani Power (Mundra) Ltd.
Village: Tunda & Siracha,
Tal. Mundra, Dist.: Kutch,
GUJARAT - 370 435.

Month of Monitoring

: May - 2019

Name of Location

: Village - Wandh

ID No.

: URA/ID/A-19/05/003

Sr. No.	Sampling Date	Concentration in Ambient Air ($\mu\text{g} / \text{m}^3$)					
		PM ₁₀ $\mu\text{g}/\text{M}^3$	PM _{2.5} $\mu\text{g}/\text{M}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{M}^3$	Nitrogen Dioxide (NO ₂) $\mu\text{g}/\text{M}^3$	Ozone (O ₃) $\mu\text{g}/\text{M}^3$	Mercury (Hg) $\mu\text{g}/\text{M}^3$
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/05/2019	65.7	29.5	14.6	28.5		--
2.	07/05/2019	76.2	30.1	20.2	18.9		--
3.	10/05/2019	63.8	29.0	17.5	23.5	18.3	BDL
4.	14/05/2019	63.4	21.8	22.8	27.7		--
5.	17/05/2019	70.0	28.9	23.5	25.3		--
6.	21/05/2019	76.7	27.7	23.1	32.2		--
7.	24/05/2019	80.1	37.8	20.5	25.6		--
8.	28/05/2019	63.7	28.8	18.7	26.3		--
9.	31/05/2019	50.5	26.6	19.6	23.2		--
Average		67.8	28.9	20.1	25.7		--
Remark: Calibrated equipment & instruments were used during monitoring.							

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : June - 2019


Name of Location : Village - Siracha

ID No. : URA/ID/A-19/06/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	04/06/2019	78.7	39.1	19.3	26.4		--
2.	07/06/2019	70.6	32.1	28.5	22.3		--
3.	11/06/2019	80.1	33.2	21.4	29.4		--
4.	14/06/2019	74.2	32.0	15.7	27.8		--
5.	18/06/2019	66.3	25.5	25.1	21.3	22.3	BDL
6.	21/06/2019	69.9	27.2	22.5	18.5		--
7.	25/06/2019	73.2	31.1	17.3	23.4		--
8.	28/06/2019	67.0	27.8	19.5	14.7		--
Average		72.5	31.0	21.2	23.0		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method - 3112 B APHA 22 Edison & Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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GPCB Recognized Environmental
Auditor (Schedule-II)

OHSAS18001:2007
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Monthly Average Report

Ambient Air Quality Monitoring

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

Month of Monitoring : June - 2019

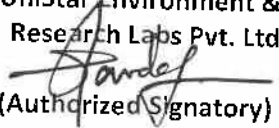
Name of Location : Village - Kandagara

ID No. : URA/ID/A-19/06/002

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	04/06/2019	71.9	34.2	23.8	28.5		--
2.	07/06/2019	57.4	26.2	21.1	24.3		--
3.	11/06/2019	67.2	31.5	20.3	30.7		--
4.	14/06/2019	77.9	32.0	18.7	16.7		--
5.	18/06/2019	70.2	26.1	23.1	21.4	17.8	BDL
6.	21/06/2019	75.7	28.1	13.4	17.5		--
7.	25/06/2019	60.8	27.2	19.5	12.2		--
8.	28/06/2019	71.1	32.1	21.4	20.3		--
Average		69.0	29.7	20.2	21.5		--
Remarks: Calibrated equipment & instrument used.							

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

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, PM₁₀– IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂– IS: 5182 (Part 2), 2001, NO_x– IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : June - 2019

Name of Location : Village - Wandh

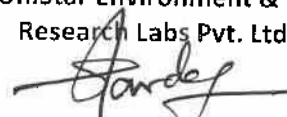
ID No. : URA/ID/A-19/06/003

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	04/06/2019	66.9	24.8	15.2	23.8		--
2.	07/06/2019	76.2	38.5	21.7	29.4		--
3.	11/06/2019	60.4	26.4	20.5	16.5		--
4.	14/06/2019	62.6	35.4	16.3	27.1		--
5.	18/06/2019	59.4	21.9	23.8	19.5	16.2	BDL
6.	21/06/2019	74.6	33.7	18.5	25.2		--
7.	25/06/2019	79.7	31.5	22.1	21.6		--
8.	28/06/2019	73.0	27.3	13.4	18.3		--
Average		69.1	29.9	18.9	22.7		--

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : July - 2019

Name of Location : Village - Siracha

ID No. : URA/ID/A-19/07/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/07/2019	77.3	33.3	23.1	21.8		--
2.	05/07/2019	75.3	31.3	17.4	19.5		--
3.	09/07/2019	66.1	27.9	21.6	25.7	18.6	BDL
4.	12/07/2019	65.9	29.5	20.5	18.3		--
5.	16/07/2019	60.8	26.8	18.3	19.5		--
6.	19/07/2019	63.0	24.7	13.4	23.7		--
7.	23/07/2019	Rain Fall					
8.	26/07/2019						
9.	30/07/2019						
Average		68.1	28.9	19.1	21.4		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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MoEF&CC (GOI) Recognized Environmental
Laboratory under the EPA-1986(12.01.2015 to 11.01.2020)

QC/NABET Accredited BIA
Consultant Organization

GPCB Recognized Environmental
Auditor (Schedule-II)

OHSAS18001:2007
Certified Company

ISO 9001:2015
Certified Company

Monthly Average Report Ambient Air Quality Monitoring

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

Month of Monitoring : July - 2019

Name of Location : Village - Kandagara

ID No. : URA/ID/A-19/07/002

Sr. No.	Sampling Date	Concentration in Ambient Air ($\mu\text{g} / \text{m}^3$)					
		PM ₁₀ $\mu\text{g}/\text{M}^3$	PM _{2.5} $\mu\text{g}/\text{M}^3$	Sulphur Dioxide (SO ₂) $\mu\text{g}/\text{M}^3$	Nitrogen Dioxide (NO ₂) $\mu\text{g}/\text{M}^3$	Ozone (O ₃) $\mu\text{g}/\text{M}^3$	Mercury (Hg) $\mu\text{g}/\text{M}^3$
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/07/2019	66.7	31.1	19.3	26.2		--
2.	05/07/2019	76.1	30.6	15.7	22.7		--
3.	09/07/2019	65.1	31.6	18.2	20.4	16.2	BDL
4.	12/07/2019	55.3	21.6	10.9	15.7		--
5.	16/07/2019	52.7	25.6	15.5	22.5		--
6.	19/07/2019	66.7	24.3	17.2	20.2		--
7.	23/07/2019	Rain Fall					
8.	26/07/2019						
9.	30/07/2019						
Average		63.8	27.5	16.1	21.3		--

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

Analysis Method Reference: SPM- IS: 5182 (Part 4), 1999, PM₁₀- IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂- IS: 5182 (Part 2), 2001, NO_x- IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Monthly Average Report Ambient Air Quality Monitoring

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

Month of Monitoring : July - 2019

Name of Location : Village - Wandh

ID No. : URA/ID/A-19/07/003

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/07/2019	73.4	23.8	18.5	25.8		--
2.	05/07/2019	60.4	30.5	17.2	20.5		--
3.	09/07/2019	62.5	31.7	17.3	24.6	15.1	BDL
4.	12/07/2019	57.4	27.3	14.5	20.2		--
5.	16/07/2019	63.8	26.0	16.8	14.3		--
6.	19/07/2019	53.1	29.5	21.5	17.3		--
7.	23/07/2019	Rain Fall					
8.	26/07/2019						
9.	30/07/2019						
Average		61.8	28.1	17.6	20.5		--

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method -3112 B APHA 22 Edison & Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
Research Labs Pvt. Ltd.

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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : August - 2019

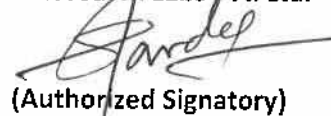
Name of Location : Village - Siracha

ID No. : URA/ID/A-19/08/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/08/2019	78.0	31.4	18.6	15.2		--
2.	06/08/2019	65.1	19.1	15.7	23.4		--
3.	09/08/2019	70.8	19.9	19.2	25.7		--
4.	13/08/2019	71.1	22.3	19.5	20.4		--
5.	16/08/2019	65.7	22.5	17.4	22.1	13.5	BDL
6.	20/08/2019	60.5	21.0	21.8	18.4		--
7.	23/08/2019	73.4	33.8	16.1	16.3		--
8.	27/08/2019	65.0	24.2	19.5	23.7		--
9.	30/08/2019	Rain Fall					
Average		68.7	24.3	18.5	20.7		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5} - Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg: AAS by VGA Method - 3112 B APHA 22 Edison & Hg: 2 ppb O₃ - IS - 5182 (Part 9) 2009 Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
Research Labs Pvt. Ltd.


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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : August - 2019

Name of Location : Village - Kandagara

ID No. : URA/ID/A-19/08/002

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/08/2019	66.2	22.0	15.3	19.4		--
2.	06/08/2019	64.9	21.0	12.5	20.1		--
3.	09/08/2019	56.6	23.4	17.3	10.4		--
4.	13/08/2019	72.6	32.8	21.5	23.7		--
5.	16/08/2019	58.4	20.6	20.2	16.2	15.7	BDL
6.	20/08/2019	56.6	24.6	15.8	19.7		--
7.	23/08/2019	71.3	28.7	22.4	21.7		--
8.	27/08/2019	68.5	18.2	13.7	20.5		--
9.	30/08/2019	Rain Fall					
Average		64.4	23.9	17.3	19.0		--

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

Analysis Method Reference: SPM- IS: 5182 (Part 4), 1999, PM₁₀- IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂- IS: 5182 (Part 2), 2001, NO_x- IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS - 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : August - 2019

Name of Location : Village - Wandh

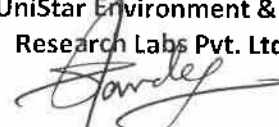
ID No. : URA/ID/A-19/08/003

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m ³)					
		PM ₁₀ µg/M ³	PM _{2.5} µg/M ³	Sulphur Dioxide (SO ₂)µg/M ³	Nitrogen Dioxide (NO ₂)µg/M ³	Ozone (O ₃)µg/M ³	Mercury (Hg) µg/M ³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	02/08/2019	66.2	25.4	15.3	18.5		--
2.	06/08/2019	79.7	34.2	22.2	24.8		--
3.	09/08/2019	70.3	26.8	11.4	20.4		--
4.	13/08/2019	66.0	25.4	18.2	25.1		--
5.	16/08/2019	74.9	31.1	20.5	17.3	23.5	BDL
6.	20/08/2019	62.4	22.5	16.2	22.6		--
7.	23/08/2019	73.5	24.6	26.2	20.8		--
8.	27/08/2019	67.8	23.8	21.5	24.6		--
9.	30/08/2019	Rain Fall					
Average		70.1	26.7	18.9	21.8		--

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
Research Labs Pvt. Ltd.



Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : September - 2019

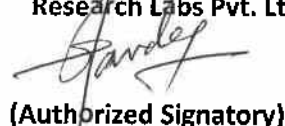
Name of Location : Village - Siracha

ID No. : URA/ID/A-19/09/001

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/09/2019	Rain Fall					--
2.	06/09/2019	Rain Fall					--
3.	10/09/2019	Rain Fall					--
4.	13/09/2019	Rain Fall					--
5.	16/09/2019	55.4	17.2	12.4	20.3	13.4	BDL
6.	18/09/2019	63.5	27.8	16.7	14.5		--
7.	24/09/2019	74.1	25.1	20.5	23.6		--
8.	26/09/2019	54.7	20.2	19.5	23.7		--
Average		61.9	22.6	17.3	20.5		--

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppbO₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
Research Labs Pvt. Ltd.


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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : September - 2019

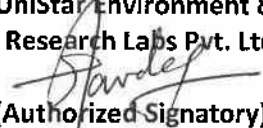
Name of Location : Village - Kandagara

ID No. : URA/ID/A-19/09/002

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/09/2019	Rain Fall					--
2.	06/09/2019	Rain Fall					--
3.	10/09/2019	Rain Fall					--
4.	13/09/2019	Rain Fall					--
5.	16/09/2019	52.0	21.2	14.4	13.8	14.7	BDL
6.	18/09/2019	58.7	17.8	15.2	19.2		--
7.	24/09/2019	68.4	24.0	17.3	18.5		--
8.	26/09/2019	62.8	23.6	13.7	20.5		--
Average		60.4	21.7	15.2	18.0		--

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

Analysis Method Reference: SPM– IS: 5182 (Part 4), 1999, PM₁₀– IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂– IS: 5182 (Part 2), 2001, NO_x– IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

UniStar Environment &
Research Labs Pvt. Ltd.

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Monthly Average Report
Ambient Air Quality Monitoring

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

Month of Monitoring : September - 2019

Name of Location : Village - Wandh

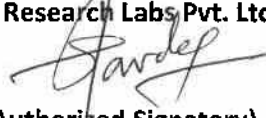
ID No. : URA/ID/A-19/09/003

Sr. No.	Sampling Date	Concentration in Ambient Air (µg /m³)					
		PM ₁₀ µg/M³	PM _{2.5} µg/M³	Sulphur Dioxide (SO ₂)µg/M³	Nitrogen Dioxide (NO ₂)µg/M³	Ozone (O ₃)µg/M³	Mercury (Hg) µg/M³
GPCB Permissible Limit (TWA for 24 hrs.)		100	60	80	80	100	N.A.
1.	03/09/2019	Rain Fall					--
2.	06/09/2019	Rain Fall					--
3.	10/09/2019	Rain Fall					--
4.	13/09/2019	Rain Fall					--
5.	16/09/2019	68.2	21.7	14.7	21.5	18.5	BDL
6.	18/09/2019	74.5	25.6	16.2	18.3		--
7.	24/09/2019	73.1	33.7	23.5	26.7		--
8.	26/09/2019	63.5	29.6	16.3	24.6		--
Average		69.8	27.6	17.7	22.8		--

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

Analysis Method Reference: SPM - IS: 5182 (Part 4), 1999, PM₁₀ - IS: 5182 (Part 23), 2006, PM_{2.5}- Guidelines by CPCB (Vol-1), SO₂ - IS: 5182 (Part 2), 2001, NO_x - IS: 5182 (Part 6), 2006, Hg:AAS by VGA Method -3112 B APHA 22 Edison&Hg: 2 ppb O₃: IS – 5182 (Part 9) 2009Ozone BDL limit: 5 $\mu\text{g}/\text{m}^3$

**UniStar Environment &
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Annexure – 5

Rain Water Recharging System





Annexure – 6

Cost of Environmental Protection Measures

Sr. No.	Activity	Cost incurred (INR in Lacs)			Budgeted Cost (INR in Lacs)
		20 17 – 18	20 18 – 19	20 19 – 20 (Till Sep'19)	20 19 – 20
1.	Environmental Study / Audit and Consultancy	9.0	6.7	1.35	6.0
2.	Legal & Statutory Expenses	5.07	4.42	0.78	5.7
3.	Environmental Monitoring Services	27.02	20.36	11.23	25
4.	Hazardous / Non Hazardous Waste Management & Disposal	65.62	95.72	44.57	78.5
5.	Environment Days Celebration	2.85	0.28	3.5	10
6.	Treatment and Disposal of Bio-Medical Waste	1.13	1.21	0.68	1.5
7.	Mangrove Plantation, Monitoring & Conservation	60.0	47.0	Nil	Nil
8.	Other Horticulture Expenses	547.0	579.32	546.60	696.46
9.	O&M of Sewage Treatment Plant and Effluent Treatment Plant (including STP, ETP of Port & SEZ & Common Effluent Treatment Plant)	70.02	144.29	43.42	116.44
10.	Expenditure of Environment Dept. (Apart from above head)	102.15	109.28	75.13	102.5
Total		889.86	1008.58	727.26	1042.10

Annexure - 7

Compliance Report of EMP & Mitigation Measures

Sr. No.	Suggested Measures	Compliance Status
✎ Construction Phase:		
1	Proper care is warranted while dredging which should be in a controlled manner. It should also be insured that reclamation, dredging, widening and slop stabilization measures do not significantly alter the stabilized erosional-accretional regime and prevailing rate of exchange of water between the outer area of the intricate creek system as well as the free flow of tidal water, to protect the mangroves.	All construction and operation activities as well as dredging and reclamation activities are being carried out as per the approvals. Please refer condition no. 8 & 9 of the CRZ recommendation compliance report for further details.
2	Good sanitation, water and fuel should be made available to the work force. Labour colonies should be set-up landward of the HTL and away from mangrove.	Most of the construction labours resides in the nearby villages where all basic facilities are easily available. However, for those residing near the construction site, infrastructure facilities such as water supply, fuel, sanitation, first aid, ambulance etc. are provided by APSEZ. Details were submitted as a part of compliance report submission for the period Apr'17 to Sep'17. Please refer general condition no. ii of the EC & CRZ clearance for further details.
✎ Operation Phase:		
1	Wastewater such as generated during cleaning of jetties, floor washing, domestic use etc. should be collected in a settling pond and released to marine environment only after ascertaining that it is free from oil and SS. The toilets on the jetties must have compact sewage treatment facilities.	Entire quantity of sewage generated from APSEZ premises is being treated in designated ETP / STP and treated sewage is used for Horticulture purposes. Please refer specific condition no. xii of the EC & CRZ clearance or further details.
2	Dust should be routinely monitored at the vantage points and corrective measures such as water sprinkling should be practiced if it increases beyond permissible limits.	Ambient Air Quality (twice in a week) monitoring is being carried out by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd. Adequate safeguard measures are being taken for abatement of dust emissions. Please refer specific condition no. xi of the EC & CRZ clearance or further details.
3	It should be ensured that the effluent released into the Gulf meets	Entire quantity of effluent / sewage generated from APSEZ premises is being

Sr. No.	Suggested Measures	Compliance Status
	the prescribed GPCB criteria at all times.	<p>treated in designated ETP / STP and treated water is being utilized on land for Horticulture purposes after compliance with GPCB standards.</p> <p>Please refer specific condition no. xii of the EC & CRZ clearance or further details.</p>
4	Appropriate spill response scheme (Tier-1 to Tier-3) should be in place to minimize impacts on marine environment, should a spill occur.	Oil spill contingency plan is in place to handle Tier 1 level oil spills considering different accident scenarios, and the vulnerable areas are identified and mitigation plan is prepared. A copy of the plan updated & approved by coast guard was submitted during half yearly compliance report submission for the period Oct'18 to Mar'19.
5	MPSEZL should commit mangrove restoration programme through afforestation in a defined time frame over larger and promising areas and should monitored periodically and protect from anthropogenic pressures.	<p>APSEZ has carried out mangrove afforestation in more than 2850 ha. area across the coast of Gujarat.</p> <p>Please refer specific condition no. i & vii of the EC & CRZ clearance or further details.</p>
6	A comprehensive marine quality monitoring programme with periodic investigations at predetermined locations should be undertaken by a specialized agency.	<p>Marine monitoring is being carried out once in a month by NABL and MoEF&CC accredited agency namely M/s. Pollucon Laboratories Pvt. Ltd.</p> <p>Please refer specific condition no. ix of the EC & CRZ clearance or further details.</p>
7	The dust and noise levels at pre-decided locations including the jetty sites should be periodically monitored and remedial action taken if the levels exceed the prescribed norms.	<p>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. Pollucon Laboratories Pvt. Ltd.</p> <p>Please refer specific condition no. xi of the EC & CRZ clearance or further details.</p>
8	MPSEZL should establish an Environment Management Cell (EMC) directly under the control of the Chief Executive.	M/s APSEZ has a well structured Environment Management Cell, staffed with qualified manpower for implementation of the Environment Management Plan. The Environment Management Cell is headed by Sr. Manager who directly reports to the top management. Environment Cell Organogram is attached as Annexure – 23 .

Annexure – 8

19.10.2015

To,
Member Secretary,
Gujarat Coastal Zone Management Authority
Forest and Environment Department, Government of Gujarat,
Block no. 14/8, Sachivalaya,
Gandhinagar – 382 010


Subject: Compliance of direction no. *ii, iv and v* of MoEF&CC Order dated 18.09.2015
(copy attached)


Dear Sir,

With reference to the Show Cause Notices dated 15.10.2010 and 30.09.2013 issued to APSEZ, MoEF&CC has disposed of both the notices and have issued certain directions vide an Order dated 18.09.2015.

As per the direction no. *ii, iv and v*, NCSCM shall prepare a comprehensive and integrated conservation plan in consultation with NIOT, APSEZ and GCZMA. We therefore kindly request you to consider our case in the next GCZMA meeting by inviting concerned authorities so that terms of reference for the stated work can be discussed and finalized.

Thanking you,
Yours faithfully,


P. N. Roy Chowdhury
Head – Environment


નાયબ સેક્શન અધિકારી
રજીસ્ટ્રી શાખા
વન અને પર્યાવરણ વિભાગ
સચિવાલય, ગાંધીનગર

Annexure – 9

Minutes of the 28th meeting of the Gujarat Coastal Zone Management Authority held on 22-04-2016

The 28th meeting of the Gujarat Coastal Zone Management Authority (GCZMA) was held on 22-04-2016 under chairmanship of Shri Punamchand Parmar, IAS, Principal Secretary, Forests & Environment Department and Chairman, GCZMA in the Committee Room, Forests and Environment Department, Gandhinagar. A list of the members and other participants, who attended the meeting, appears at **Annexure-A**. Also a list of the representative of various project proponents, who have made presentation before the Authority appears at **Annexure-B**.

Initiating the meeting, with the permission of the Principal Secretary, Forests & Environment Department, and Chairman of GCZMA, the Member Secretary, GCZMA, welcomed all the members of the newly constituted GCZMA and other participants. He also brief all the members regarding functions and duties of the GCZMA as per constitution order of the MOEF&C, GOI.

Then after he briefed the Members of the GCZMA about the agenda items for the meeting and various actions taken by the Department in compliance of the various decisions taken during last meeting.

The agenda wise discussion and decisions taken thereafter is as under:

→AgendaitemNo:28.1:-

❖Compliance report with respect to the decision taken in the 27th meeting of the GCZMA, which was held on 15-09-2015.

- a) Preparation of an action plan for development of Bio- Shielding project for entire area between Dahej and Hazira by way of planting various species of vegetation, such as mangroves, seaweeds, sea grass, casuarinas to control the soil erosion, stabilize the area sand for protection in case of Tsunami in association with any institute / Organization having some experience in this Field.**

The GEC apprised the authority that the GEC visited potential sites as recommended by the M.S. University and they have completed

28.17 Strengthening of GCZMA through manpower, infrastructures and purchasing Instruments like advance cameras, GPS meter etc.

The Authority was apprised that the Secretariat of Gujarat Coastal Zone Management Authority is working in the Directorate (Environment) in the Forests and Environment Department, Government of Gujarat as PS, F&ED is the chairman of GCZMA and Director(Environment) is the Member Secretary of the GCZMA. At present, the work related to GCZMA is being looked after by the Director(Env) along with all other works related to Environment Sector of the State. There is only three Deputy Environment Engineers working under Directorate on loan service from GPCB. No other supporting staff is there. Moreover, it is also require to strengthen the GCZMA by providing adequate infrastructure like colour printers, computers, advanced cameras, GPC meters etc and also providing sufficient men powers to assists the GCZMA for better implementation of CRZ Notification 2011 in the State including to carry out work related to various court.

The Authority decided that the necessary proposal in this regard necessary action would be initiated by the Forests and Environment Department to strengthen the GCZMA. The other instruments would be purchased trough GMB from the GCZMA account being maintained by the GMB.

28.18 Issues related to M/S Adani Port and SEZ Limited as per Directions issued by the MOEF&CC,GOI

The Authority was apprised that the Ministry of Environment, Forests and Climate Change, Government of India has issued an office order No: F.NO.10-47/2008-IA.III dated 18th September, 2015 with reference to Show Cause notice dated 15-12-2010 issued to M/S Adani Port and SEZ Limited for alleged violations. The Ministry has issued detailed order with following directions specific directions:

“A comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks/mangroves area including buffer zone , mapping of co-ordinates , running length , HTL, CRZ boundary will be put in place. The plan will take note of all the conditions of approvals granted to all project proponents in this area e.g. the reported

case of disappearance of mangrove near Navinal creek. The preservation of entire area to maintain the fragile ecology conditions will be a part of the plan in relation to the creeks, mangrove conservation and conservation of Bocha island up to Bharadimata and others.

The NCSCM will prepare the plan in consultation with NIOT, PP and GCZMA.. In recognition of the fact that the existing legal provisions under 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”

The representative of NCSCM, Chennai made a presentation before the GCZMA on the draft scope of work for preparation of a comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks/mangroves area including buffer zone , mapping of co-ordinates , running length , HTL, CRZ boundary.

After detailed deliberation and discussion, the Authority decided to constitute a committee of following members from GCZMA under chairmanship of PCCF(WL) to finalize scope of work to be carried out by the for NCSCM as per directives issued by the MOEF&CC, GOI

1. Shri J.A,Khan, IFS, PCCF(WL) ----- Chairman
2. Shri H.S.Singh, Retd. PCCF, Member GCZMA-----Member
3. Shri H.B. Chauhan, ISRO, Member GCZMA-----Member
4. S.K.Chaturvedi,IFS, MS, GEC, Member GCZMA-----Member
5. Shri Rajesh. I. Shah, Member, GCZMA -----Member
6. Shri Hardik Shah, IAS, Director(Env)& MS, GCZMA—Convener

28.19 Table Agenda- CRZ Clearance for proposed up gradation of for widening and improvement of Wamleshwar Ankalwa – Dhamrad, Aniyadra , Sunerkhurd Road at Taluka: Hansot, Dist: Bharuch Under National Cyclone Risk Mitigation Project(NCRMP) Funded By G.S.D.M.A (World Bank Assisted) in the State of Gujarat by the Road and Building Department, Government of Gujarat

The Authority was further apprised that the Road and Building and Panchayat Department has approached this Department for seeking the

Annexure-10

25.04.2016

To,
Member Secretary,
Gujarat Coastal Zone Management Authority
Forest and Environment Department, Government of Gujarat,
Block no. 14/8, Sachivalaya,
Gandhinagar – 382 010

Subject: Compliance of direction no. *ii, iv and v* of MoEF&CC Order dated 18.09.2015

Reference: Our presentation during 28th GCZMA committee meeting on 22.04.2016

Dear Sir,

In continuation to the discussions during the above stated reference meeting, please find enclosed proposal that we have received from NCSCM. It may please be noted that as per the discussion, NCSCM will now start the studies as per the scope identified and presented in the meeting. The scope is submitted to your office for consideration and approval.

Thanking you,
Yours faithfully,


Shalin Shah
Head – Environment

26/4/2016
નાયબ સેક્શન અધિકારી
રજીસ્ટ્રી શાખા
ગન અને પર્યાવરણ વિભાગ
સચિવાલય, ગાંધીનગર.

Proposed activities to fulfill NCSCM's role in checking compliance of Environmental Clearance accorded for Adani Port & Special Economic Zone Ltd

1. Introduction

The Ministry of Environment and Forests have accorded Environmental Clearance (EC) to M/s Adani Ports and Special Economic Zone Ltd (APSEZ) to set up a multi-product SEZ at Mundra, Kachchh, Gujarat (Fig.1). The project involves development of SEZ in a notified SEZ area of 6641.2784 ha for which Environmental and CRZ clearance has been given. The activities proposed in the SEZ include:

- Processing zones
- Non-processing zones
- Warehousing zones
- Road network (trunk as well as internal)
- Bridges or culverts over natural drains
- Rail and IT communication networks
- Effluent collection network
- Water supply thro' freshwater sources and desalination
- Conservation & drainage network
- Effluent collection network
- Social infrastructure
- Existing/proposed airstrip
- Municipal solid waste disposal site
- Utilities & supporting infrastructure
- Disposal of treated sewage, effluents and brine from desalination plant

The SEZ covers both inland and water front areas. Industrial plots will be made by APSEZ and shall be given to the firms that would be setting up individual industries of above types who need to obtain EC before initiating their projects. The industries envisage to utilize the services of Adani port for transport of imported and exported goods. While according EC to the project, the MoEF have stipulated General and Special conditions. A summary of these conditions are given in Annex 1. The MoEF have also specified that while implementing the project, the firm should furnish half-yearly reports on compliance of EC conditions to the Regional Office of MoEF at Bhopal, CPCB and SPCB of Gujarat.

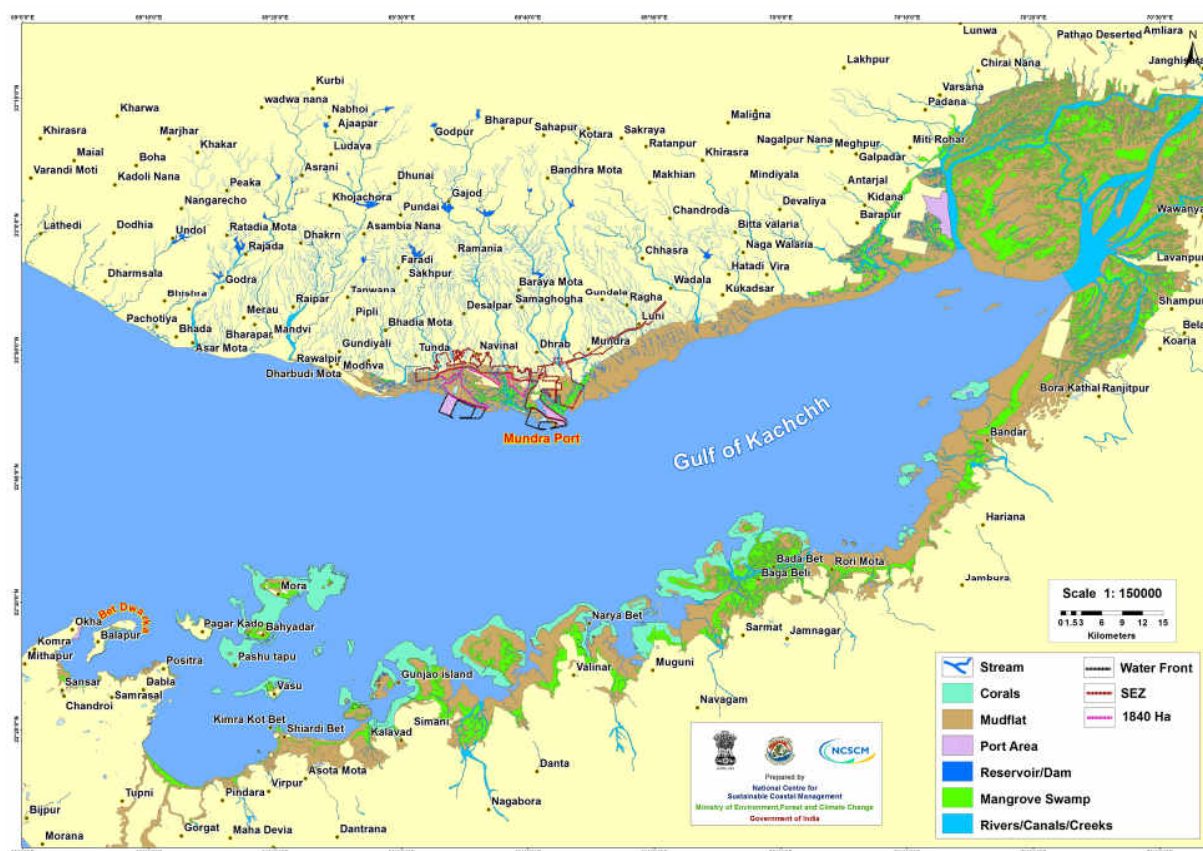


Fig.1. Gulf of Kachchh showing Adani Port Special Economic Zone area

2.0. Environs of APSEZ

The project area is located in Mundra region of Kachchh district in Gujarat (Fig.1). 14 villages of Mundra taluk are in the vicinity of the project area. The western, central and central-eastern zones are mainly barren land. The eastern zone is mainly dry cultivated agriculture and the southern zone is coastal belt facing the Arabian Sea. Ephemeral rivers like Khari, Dhaneswari and Nagavanti flow in the region. The study area comprises of sea area of 43.88% in Gulf of Kachchh and remaining are inland water bodies and land. Reserved forests like Danderi, Baroi, Luni, Bhadreswar, Mundra Dhruv and Mundra mangrove exist in the study area. Few other Reserve Forests also exist in the study area. As per the EIA report of the project, in the land area of the SEZ, 50.77% is non-vegetative area, 45.83% is covered with water bodies, 2.72% is scrubs, 0.41% degraded vegetation, 0.26% is sparse and dense mangroves and 0.01% is marshy vegetation and plantation. Regarding geology, the area comprises of rocky uplands (>

55m AMSL), undulating pediment plain (30-55 m AMSL), Alluvial plain (20-30m AMSL) and coastal plain (<20 m AMSL).

Though the region is dry, it has natural resources with unique sea bathymetry which attracted port development in the last two decades with the last decade experiencing rapid industrialization. The Mundra Adani Port was established in 1998. According to reports available, there are 31 large to small scale industries in and around Mundra. They belong to the categories of Port, power plants, steel plant, oil and coal refineries, mineral and mining industry etc. Adani Port serves for import and export of raw materials and finished products. The main import materials are edible oil, coal, steel, container, machinery, wood, phosphoric acid and the exported ones are wheat, bentonite, bauxite, salt, lignite and steel pipes. The major industrial pockets are around Mundra, Jharpara, Navinal, Kapaya, Siracha, Tunda, Samaghgha, Vadala, Luni and Bhadreshvar villages. The industrial growth led to rise of population of Mundra town from 12,900 (2001) to 20,300 (2011). Besides, the area will foresee rapid industrial development due to establishment of APSEZ. The proposed industries are heavy engineering, steel and cement plant, minerals and metals, textile chemical, pharma, plastic and apparel parks, petrochemical hubs, auto/auto accessories, light engineering, power plant etc.

The project area which is around Mundra, has mangrove formation which ranges from scattered to dense mangroves. Limited information on distribution of mangrove area is available in the literature. A committee chaired by Ms Sunita Narain evaluated impact of development of Adani Port and APSEZ on the health of creeks and mangroves. The committee has made several recommendations for conservation of creeks and mangroves. Accordingly, the MoEF, in its EC also have specified to conduct extensive bathymetric survey to facilitate actions that ensure availability of appropriate water to the mangrove areas and continued opening of mouths of creeks and also to restore creeks that were closed by the proponent.

Keeping the likely impacts on environment in mind, under the conditions of EC, the MoEF has specified following roles to the R & D institutions:

1. The APSEZ at its cost inspection study done once in a year by organization like NEERI or any other approved by the Ministry. – to ensure compliance of all EC

conditions to (i) ensure compliance of all the EC conditions (ii) development of SEZ meeting of the environment norms and iii) advise any mid-term correction that can be introduced depending on the recommendation of the independent third party.

2. The Project Proponent (PP) shall get detailed bathymetry done for all the creeks and rivers within Port and SEZ areas along with mapping of co-ordinates, running length, HTL, CRZ boundary, mangrove area including buffer zone through NCSCM/NIOT.

3. PP shall also get prepared a detailed action plan for conservation and protection of creeks, mangrove area etc. through NCSCM/NIOT and submit the same to GCZMA for their examination and recommendation. GCZMA will submit its recommendations to MoEF for approval.

The APSEZ personnel discussed with NCSCM which is an institution under MoEF about undertaking the tasks numbers 2 and 3 as above. Since one of the mandates of NCSCM is to assist MoEF in implementing the CRZ notification, NCSCM has proposed to undertake the following tasks with funding by APSEZ:

3. Tasks proposed

1. Detailed bathymetry of creeks including the ones distributed in the seawater side, water ways and rivers along with mapping of co-ordinates, running length, HTL, CRZ boundary within the Mundra Port and APSEZ area
2. Mapping of mangroves distributed in the Mundra Port and APSEZ area including their seaward side with buffer zones and Development of an action plan for preservation and conservation of mangroves and creeks.

3.1. Detailed activities and Date of commencement of activities

Details of activities proposed under these tasks, schedule, performance indicators, deliverables and budget are given in Sections 4 and 5 below. The activities will be initiated in the first quarter of 2015 and planned to be conducted for a period of 1 year which includes initial preparation time of 3 months.

4. Determination of Bathymetry of rivers and creeks, their mapping with details on co-ordinates, HTL and CRZ boundaries

4.1. Introduction

One of the conditions of Environmental Clearance accorded by MoEF while approving the establishment of Adani Port Special Economic Zone (APSEZ) is to carry out fresh bathymetry survey and mapping of creeks, rivers within Port and SEZ area and is to be done by NCSCM/NIOT. In order to obtain details on distribution of water bodies, a map containing distribution of rivers, streams, canals, major and minor creeks has been prepared using high

resolution satellite image of April, 2013 (the latest date available in Google Earth) and the details are displayed in Fig.2. Since the field situation on the distribution of creeks may vary, occurrence of these creeks with water can be determined only during the field survey.

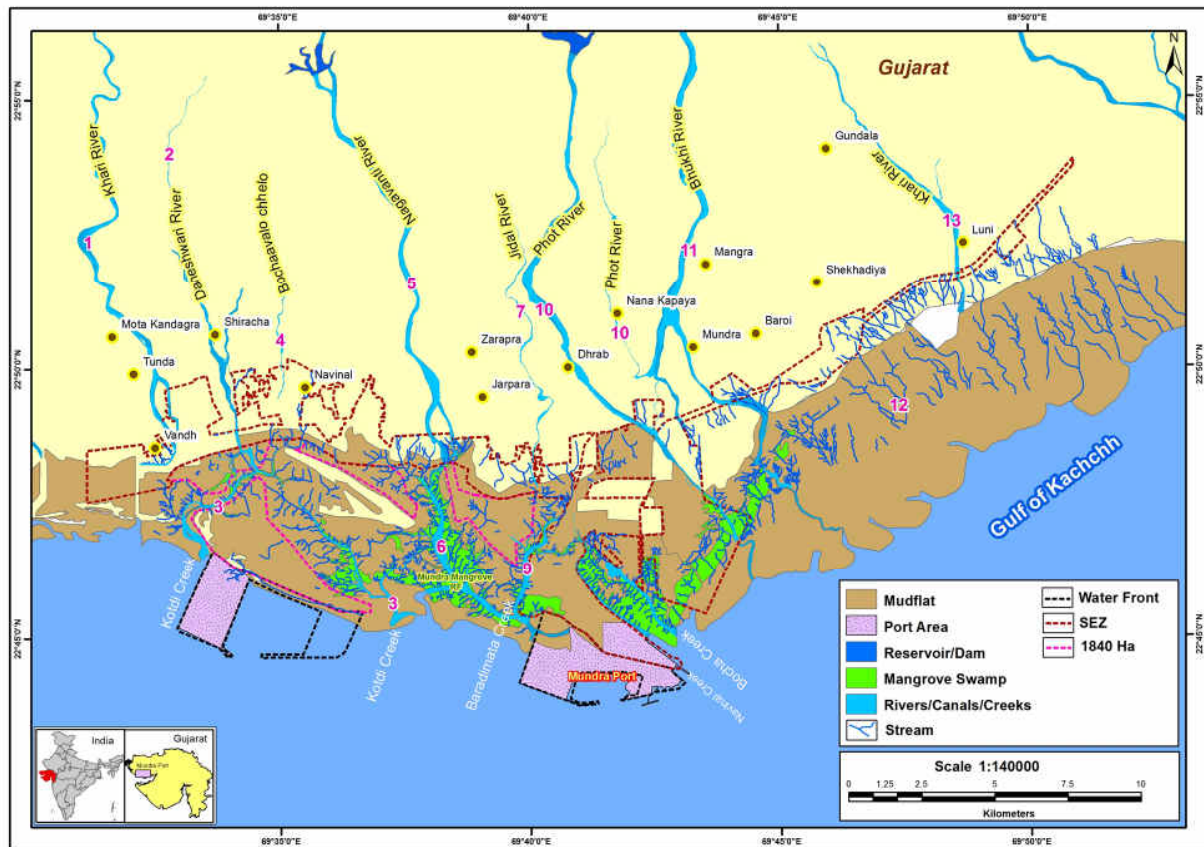


Fig .2. Major rivers,creeks, canals and minor streams in the APSEZ.

It is proposed to determine the bathymetry of these water bodies using echosounders and graduated/tide poles depending on the depth.

4.2. Tasks involved

1. Mapping of major rivers, creeks and canals that contribute significantly to the growth and survival of mangroves and conducting bathymetric survey incorporating HTL and CRZ boundaries.
2. Documentation of minor creeks and canals which are beyond the mangrove area. The information will be useful to decide about suitability of these areas to facilitate water flow for plantation of mangrove and allied species.
3. Development of GIS based database on bathymetry of rivers, creeks etc., to facilitate periodical monitoring on physical presence of these water bodies over a period of years.

4. 3. Description of tasks

4.3.1. Mapping of rivers, creeks, canals etc

As seen in Fig.2 the area has numerous medium and small creeks distributed in a complex manner. An attempt has been made using satellite data of 2013 (Google Earth) to isolate the major and minor creeks besides rivers, streams etc to estimate length of these water bodies. Table 1 gives approx. length of these water bodies.

Table 1 : Length and number of Major/Minor rivers and associated canals

Id	River / Creek Name	No. of Streams	Approx Length in (km)
1	Khari River		9.71
	Streams	13	2.14
2	Daneshwari River		4.65
	Streams	5	1.01
3	Kotadi Creek		62.60
	Streams	329	84.76
4	Bochaavalo chhelo		2.55
	Streams	3	1.13
5	Nagavanti River		4.53
	Streams	17	6.37
6	Baradimata Creek		51.48
	Streams	337	84.58
7	Jidal River		2.44
	Streams	6	2.50
8	Navinal Creek		11.72
	Streams	51	16.40
9	Bocha Creek		7.81
	Streams	94	25.41
10	Phot River		17.28
	Streams	79	37.47
11	Bhukhi River		11.35
	Streams	123	34.72
12	Bhukhi River and Khari River between Streams	124	74.37
13	Khari River		2.54
	Streams	106	81.39
	Total	1287	640.94

As per the above table, the total approximate estimated length for which bathymetry to be measured is for 640 line km. This may vary as some of the creeks/branches may be too shallow for making any measurement. The actual line km will be known only at the time of survey,

4.4. Methodology proposed for bathymetric/elevation survey

A preliminary survey using graduated poles will be carried out to determine approx depth of water bodies and locations for survey will be finalised. An appropriate echosounder will be used to measure bathymetry for rivers, creeks and canals. For other shallow water bodies (depth < 0.5m) tide poles will be used to measure the depth. Water depth data will be collected at close transects and it would be not less than 500m intervals during high tide. During low tide elevation data will be collected in the exposed area using RTK GPS. The measurements made will be represented with reference to MSL as appropriate to the location. A suitable benchmark will be established at appropriate locations by transferring the level from the nearby Survey of India benchmark location. The depth recordings will be corrected for tide by deploying suitable tide gauge. Necessary quality control of data will be performed. The collected data will be plotted as bathymetry charts and will be added as a part of the database.

Mapping of creeks, rivers etc will be carried in GIS using LISS IV images (of latest year) with finer details verified using images from CARTOSAT/World View. Steps involved in mapping are given in Fig.3. Co-ordinates of creeks will be obtained from field survey. HTL will be drawn based on Aerial photographs available with Survey of India. The CRZ boundaries will be drawn based on HTL contours and habitats distributed along the creek.

4.5. Schedule

Mapping of river, creeks, HTL, CRZ and their field verification will be carried out in subsequent 6 months period. During this period, the entire bathymetry/elevation data will be collected in a period of 3 months and the data will be processed. The bathymetry charts and creek maps will be made available in the following 3 months.

4.6. Performance indicators

1. Locations for collection of bathymetry data finalised
2. Survey of bathymetry completed and bathymetric chart prepared

3. Mapping of rivers, creeks, water ways (canals) completed

4.8. Deliverables

1. Bathymetry chart of major rivers, creeks, canals
2. GIS based maps on rivers, creeks, canals, streams and other water ways

4.9. Budget

Cost of bathymetry/elevation survey, plotting etc will be at the rate of Rs. 20000 per line km. Charges will be made on actual line km. An expert assistance will be taken in field planning of field survey and for fixing locations.

5. Action plan for Preservation and Conservation of Mangroves in Mundra, Gujarat and associated APSEZ areas

5.1. Introduction

Mundra is a coastal taluk at the northern flank of the Gulf of Kachchh and it has wide intertidal area. This area has been known to be rich in mangroves (13.35 sq.km- source BISAG) and is second largest next to Kori creek. The mangrove vegetation was found essentially on Navinal , Bocha, Aban and Baradimatha creeks and adjoining intertidal mud flats (Fig.2). This scenario started changing when this area was identified for the major port development. Some of earlier observations also indicate heavy erosion in the Bocha island. Several other changes including change of sparse mangrove areas as mud flats, reclaimed land etc have been reported in the Sunita Narain's Report.

Earlier studies conducted in this area have classified the mangrove vegetation in to 4 major categories: (i) Dense, (ii) Moderately dense, (iii) Degraded and (iv) Sparse. The major single species encountered in the dense and moderately dense areas is *Avicennia marina*. In addition, *Ceriops tagal*, *Rhizophora mucronata* and *Aegiceras corniculatum* are also seen. *Sonneratia apetala* is also seen in moderately dense areas. In sparse areas, *Acanthus ilicifolius* is seen.

In order to assess the current status of mangroves and creeks and to explore the possibility of ensuring free flow of seawater in to the existing mangrove areas from already existing water sources like creeks and rivers, it is proposed to prepare maps of mangroves and integrate them

in creek maps of the Port and APSEZ. Even though, studies have been conducted by various agencies on mapping of mangroves, the information available does not facilitate detailed assessment on health of the mangroves as the scale of maps are lower say 1:25000 scales. Therefore, mangrove maps at a scale of 1:10000 or 1:5000 will be prepared to fulfill this gap. This will help to classify the existing mangroves as, (i) Pristine(undisturbed), (ii)vulnerable to degradation, (iii) degrading and (iv) degraded. Further, It is also necessary to identify the area under natural regeneration and areas suitable for plantation. In order to accomplish these tasks, preparation of an action plan for preservation and conservation of mangroves of APSEZ is essential. The present activity aims to develop such an action plan.

5. 2. Tasks to be undertaken

1. Preparation mangrove maps in 1:10000/1:5000 Scale maps along with buffer using satellite image of 2011 and latest 2014 and validating 2014 data with field observations in the second quarter of 2015.
2. Assessment of status of mangrove areas and associated water ways for preparation of an action plan for conservation and restoration of mangroves and associated creeks, thro' appropriate strategies

5. 3. Detailed description of tasks

Proposed activities to carry out the above tasks include:

5.3.1. Preparation of mangrove and habitat maps

LISS IV Satellite data of latest year (2014) will be procured and used for preparation of 1:10000/1:5000 scale maps of mangrove areas. Extensive ground truth data on dense sparse species level etc., will be collected to validate the satellite data. Data on distribution of various species of mangrove plants, associated fauna and flora shall also be collected. Since natural flow of tidal and fresh water affect the mangroves, detailed observations will be made on the tidal incursions, depth of creeks and rivers in the area (from the bathymetry data collected and creek maps prepared), rate of sedimentation in water ways and anthropogenic impacts (pollution, embankments, animal grazing, cutting of trees etc.). A long-term digital database on mangroves and associated habitats of Mundra region will be developed to facilitate long-term monitoring of environment of Mundra area. Steps involved in preparation of mangrove and creek maps are given below (Fig.3).

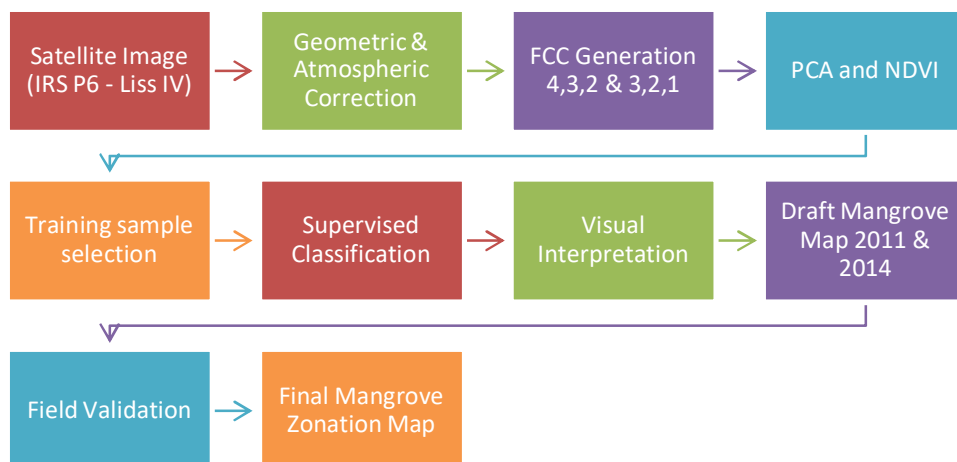


Fig.3. Flow diagram on steps involved in preparation of maps

5. 3. 3. Assessment of health of mangroves and associated habitat

Based on data collected, thorough annual assessment on loss and gain of mangrove and creek area along with changes in distribution of species will be made between the present condition and the past i.e., 2011 (year of CRZ notification) or as suggested by MoEF & CC etc. Wherever significant changes on these aspects are noticed, the cause of such changes will be assessed and remedial measures such as plantation of mangroves, deepening/widening of creeks or creek mouth, restoration of lost creek area, construction of new canals to facilitate flow of water in to the mangrove areas etc., will be suggested. Recommendations relevant to conservation of mangroves and creeks made in the report of Sunita Narain (2013) will also be taken into account while preparing the action plan. Details on method of implementation of action plan including, techniques involved for restoration etc will be suggested at an appropriate stage of the project.

5.3.4. Socio-economic survey

Since there are villages surrounding the mangrove area, information on extent of their dependence on resources of mangroves and creeks is essential. A onetime survey will be conducted to collect data on users of mangroves, extent of their dependence etc.

5.4. Schedule

Survey of entire mangrove and creek and other water bodies will be completed in ~ 4 months and in the following 4 months GIS based maps on mangroves will be produced.

5.5. Performance indicators

- Mangrove and associated habitat maps of 2011 and latest year prepared
- Assessment of changes in mangrove and creek areas made and remedial measures suggested
- Extent of dependence by local communities on resources of mangrove assessed
- Action plan for preservation and conservation of mangroves prepared

5.6. Deliverables

- Fine scale maps of mangroves and creeks of APSEZ region and a relational data base on aquatic biodiversity of Mundra
- Action plan for preservation and conservation of mangroves

6.0. Overall Performance indicators

- Survey of bathymetry completed and contour maps produced
- Maps on distribution of mangroves and creeks developed and health status reported
- GIS database on distribution and health of mangroves and associated creeks and biodiversity of the aquatic habitats developed

7.0 Final Deliverables

- Detailed close grid bathymetry of rivers, creeks and canals and indicating locations where deepening of creeks/mouth required to facilitate permanent flow of seawater
- 1:10000 or 1:5000 scale maps showing distribution of mangroves and creeks in Mundra, assessment of health of mangroves and recommendations for preservation and conservation of mangrove areas
- GIS database on mangrove habitat and associated organisms

8.0. Budget:

Rs. in lakhs	
Item	Amount
Mapping of rivers, creeks, water ways	28.20
Bathymetry/Elevation survey	128.00*
Development of action plan for mangroves and related field survey and socio-economic survey	80.20
Engagement of expert consultants	16.00
Sub- Total	252.40
Institutional charges (25%) as charges for use of equipment, computers, software etc.,	63.10
Total	315.50**

*Approximate cost indicated. Charges will be made as per actual line km surveyed @ Rs.20000 per line km.

** Service tax as applicable and will be charged extra

**F. No. 10-138/2008-IA.III
Government of India
Ministry of Environment & Forests**

**Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.**

Dated: July 15, 2014

**To
M/s Adani Port and SEZ Ltd
Adani House, Near Mithakhali Six Roads,
Navarangpura, Ahmedabad,
Gujarat- 380 009.**

Subject: EC for proposed Multi- Product SEZ and CRZ clearance for Desalination, sea water intake, outfall facility and pipeline, at Mundra by M/s Adani Port and SEZ Ltd. – Reg.

This has reference to letter No. ENV-10-2010-1601-E dated 27.03.2012 of the Director (Environment) & Additional Secretary, Govt. of Gujarat and your subsequent letters dated 10.05.2012, 14.05.2012, 26.05.2012 and 29.04.2013 seeking prior Environmental and CRZ Clearance for the above project under the EIA Notification, 2006 and Coastal Regulation Zone Notification, 2011. The proposal has been appraised as per prescribed procedure in the light of provisions under the EIA Notification, 2006 and the Coastal Regulation Zone Notification, 2011 on the basis of the mandatory documents enclosed with the application viz., the Questionnaire, EIA, EMP, recommendations of the State Coastal Zone Management Authority and the additional clarifications furnished in response to the observations of the Expert Appraisal Committee constituted by the competent authority in its meetings held on 16th -17th April, 2012, 4th -5th June, 2012 and 9th -10th July, 2012.

2. It is, interalia, noted that the project involves development of multi product SEZ on a plot area of 18,000 ha. of which 6641.2784 ha. is presently notified under Special Economic Zone (SEZ). As per the proponent, the Multi product SEZ at Mundra comprising of various processing zones, non-processing zones, warehousing zones, Road Network (trunk as well as internal), Bridges or culverts over natural drains, Rail Network, IT-Telecommunication network, Electrical Network, Water supply, conservation & drainage Network, Effluent collection network, Desalination Plant with proposed intake & outfall locations, Common Effluent Treatment Plants & Sewage Treatment Plants, Natural Gas line network, Social Infrastructure, Existing Airstrip, Municipal Solid Waste Disposal site, utilities & supporting infrastructure etc. For the first phase of development total water requirement will be 150 MLD. Power requirement will be approx. 360 MW. Desalination plant of 150 MLD output capacity is proposed. 11 MLD water will be sourced through Narmada water pipeline. Two CETP each of capacity 50 MLD and 17 MLD as well as STP of 62 MLD is proposed. This will require 375 MLD of seawater intake and 241 MLD of treated waste water outfall into the sea. For final phase of development total water requirement will be 450 MLD and power requirement will be approx. 1000 MW.



3. A suitable seawater intake point has been identified on the eastern end of the approved East Port Basin at Latitude 22°48'30.76"N; Longitude 69°46'34.06"E where a depth of 6 m below CD would be available after the port development. As per modelling study the combined discharge of 241MLD which includes 16MLD from CETP and 225 MLD from desalination plant as RO reject is expected having 57.57ppt of salinity, 14.41 mg / l of BOD and 94.39 mg/l of COD. After careful consideration of many aspects a suitable outfall location is identified on the west of the Eastern basin at Latitude 22°46'44.04"N; Longitude 69°45'5.51"E taking advantage of the expected 7.5m below CD basin depth. The outfall pipe line length is approximately 5.7 km and diffuser designed to attain a minimum dilution of 40-50 times.
4. The Centre for Earth Science Studies demarcated HTL, LTL and CRZ area. As per the CESS report and GCZMA, out of 6641.2784 ha of SEZ area, 1473.39 ha area falls within CRZ area. No SEZ industrial activity is proposed in the CRZ area. Only the Desalination plant pipeline for intake and outfall is proposed in CRZ areas. The Gujarat SCZMA in their 14th meeting held on 27-02-2012 considered the proposal of intake, outfall facilities, Desalination plant and laying pipeline and recommended the same vide their letter no.ENV-10-2010-1601-E dated 27th March 2012. Gujarat Pollution Control Board has granted Consent to Establishment of Marine outfall (NOC) vide letter dated 10.11.2011. The length of the intake will be approximately 5 Kms. As the sea water intake demand is 15000m³/h, drawal by pipe system is suitable by incorporating a wet well structure at the location. The intake point proposed is within the proposed East Port basin with a depth of 6 m below CD. The projected quantity of water can be transported through a single pipe of 1.3 m dia with a flow velocity of 3 m/ s or with a 1.6 m pipe with flow velocity of 2m/s.
5. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and additional clarifications furnished in response to its observations, have recommended for the grant of Environment and CRZ Clearance for the SEZ in an area of 8481.2784 ha. However, SEZ for 1840 ha has been approved in principle by Ministry of Commerce and Industries.
6. Hon'ble High Court of Gujarat in WP No. 21 of 2013 vide order dated 13.01.2014 has directed that the Ministry to take a decision of its own so far as the issue of grant of environmental clearance is concerned considering the position prevailing as on date and also the aspects which have been highlighted by us in this judgment, within a period of thirty days from the date of this judgment without fail. Further, vide order dated 27.01.2014 Hon'ble Supreme Court in SLP No. 1526 of 2014 which was filed against the Order of High Court by the Respondent-1 has passed order that in case, the MOEF is unable to complete the process within the time stipulated by the High Court, it will be open for them to approach this Court for extension of time. Accordingly, Ministry has filed a petition before the Hon'ble Supreme Court seeking extension of two months time.
7. It is noted from the Judgement dated 13.01.2014 of Hon'ble High Court of Gujarat in PIL 21 of 2013 the Hon'ble Court has construed the grant of lease to units prior to



obtaining EC by M/s APSEZL as violation of EIA, Notification, 2006. Therefore, according to the OM's dated 12.12.2012 and 27.06.2013, PP was addressed for Board Resolution and the State Government was addressed to take credible action against the PP for the violation. Direction under Section 5 of E(P)Act, 1986 was also issued to APSEZ not to take up and allow any further construction activity within SEZ till the grant of clearance.

8. Further, Hon'ble Supreme Court video order dated 02.05.2014 in SLP 1526 of 2013 had ordered for stay of Ministry's letter dated 3.04.2014 addressed to Government of Gujarat to initiate legal action for the violation, also directed that the Ministry to complete the process of EC within eight weeks.

9. M/s APSEZ Ltd. has stated that the Board resolved that since the matter is sub-judice before the Hon'ble Supreme Court of India, will fully abide by the outcome of the decision of the Hon'ble Supreme Court.

10. In view of the above and to comply with the orders of Hon'ble Courts, Ministry hereby accords necessary Environment Clearance for proposed Multi- Product SEZ in an area of 6641.2784 ha and CRZ clearance for desalination, seawater intake, outfall facility and pipeline for as per the provisions of Environmental Impact Assessment Notification – 2006 and its subsequent amendments and Coastal Regulation Zone Notification, 2011, subject to strict compliance of the terms and conditions as follows:

11. PART A - SPECIFIC CONDITIONS

- (i) *PP shall abide by the final order/decision of Hon'ble Supreme Court in SLP (Civil) no. 1526/2014 and connected matters.*
- (ii) *Properly conserve the creeks, river and the mangroves area in the area.*
- (iii) *Ensure that mouths of all the creeks are kept open to ensure flushing of the creeks.*
- (iv) *Bring the creeks to the condition as was seen in the satellite map of 2005 which will be a "reference" satellite map and a copy of which shall be sent to you separately.*
- (v) *Submit once in a year latest satellite map which can be compared with the reference satellite map of 2005 to ensure that no modification in the creeks, rivers, mangroves and mouth of creeks have taken place.*
- (vi) *Any direction issued by the MoEF with respect to the report submitted by Ms Sunita Narain Committee shall be complied with by the Proponent as applicable.*
- (vii) *At its cost get Inspection study done once in a year by the organizations like NEERI or any organization approved by this Ministry to - (i) ensure compliance of all the EC conditions (ii) development of SEZ meeting of the environment norms, and (iii) advise any mid-term correction that can be introduced depending on the recommendation of the independent Third Party.*



- (viii) "Consent for Establishment" for the SEZ shall be obtained from Gujarat Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.
- (ix) PP shall get detailed bathymetry done for all the creeks and rivers within Port and SEZ areas along with mapping of co-ordinates, running length, HTL, CRZ boundary, mangrove areas including buffer zone through NCSCM / NIOT. PP shall also get prepared a detailed action plan for conservation and protection of creeks/ mangrove area etc through NCSCM / NIOT and submit the same to GCZMA for their examination and recommendation. GCZMA will submit its recommendations to MoEF for approval.
- (x) PP shall demarcate the CRZ area on land with GPS coordinates in consultation with GCZMA/ the agency which has done the HTL/LTL demarcation for the area. There shall be no allotment of plot/s in CRZ area to industries. No industrial activity within CRZ area except the port and harbor & the foreshore facilities shall be allowed as committed
- (xi) Till the approval of action plan for conservation and protection of creeks/ mangrove area, the CRZ area within SEZ shall be demarcated as "No Development Zone". PP shall not allow/ undertake any development in CRZ area of SEZ.
- (xii) The implementation of action plan approved by the MoEF shall be monitored by the NCSCM/ NIOT. Compliance with action plan shall be submitted to GCZMA and to MoEF, RO. at Bhopal along with six monthly monitoring report.
- (xiii) PP shall earmark separate budget for the implementation of the above action plan. The details of the expenditure shall be submitted to GCZMA and to MoEF, RO. at Bhopal along with six monthly monitoring report.
- (xiv) All the industry in SEZ shall be connected through impervious drainage lines to the STP/ CETP for the discharge of their sewage or industrial effluent. There shall not be any discharge to creeks / rivers. PP shall be accountable for implementing this condition and necessary clause shall be incorporated in the MoU while allotting the plot to the individual industries
- (xv) PP shall not carry out any river course modification.
- (xvi) The individual industrial units shall obtain prior EC under EIA Notification, 2006 as applicable.
- (xvii) Proponent shall identify 200 ha of land for mangrove plantation as per the condition laid by SEAC.
- (xviii) 50 meter buffer from the existing mangrove area should be provided for any developmental activity,

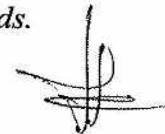


- (xix) *Proponent shall develop the green belt with 3 layers of canopy all along the periphery.*
- (xx) *All the recommendation of the EMP shall be complied with in letter and spirit. All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF-RO.*
- (xxi) *There shall be no disturbance to the sand dunes. The pipelines shall be laid using advanced method viz. Horizontal Directional Drilling (HDD) so as to avoid disturbance to the sand dunes/ creeks/ mangroves.*

PART – B. GENERAL CONDITIONS

Construction Phase.

- (i) *Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.*
- (ii) *A First Aid Room will be provided in the project both during construction and operation of the project.*
- (iii) *All the topsoil excavated during construction activities should be stored for use in horticulture/landscape development within the project site.*
- (iv) *Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed, taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.*
- (v) *Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.*
- (vi) *Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.*
- (vii) *Any hazardous waste generated during construction phase should be disposed off as per applicable rules and norms with necessary approvals of the Gujarat Pollution Control Board.*
- (viii) *The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.*



- (ix) *The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.*
- (x) *Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.*
- (xi) *Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/GPCB.*
- (xii) *Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003. (The above condition is applicable only if the project site is located within 100 Kms of Thermal Power Stations).*
- (xiii) *Ready mixed concrete must be used in building construction.*
- (xiv) *Storm water control and its re-use should be regulated as per CGWB and BIS standards for various applications.*
- (xv) *Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other referred best practices.*
- (xvi) *Permission to draw ground water shall be obtained from the competent Authority prior to construction/operation of the project.*
- (xvii) *Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.*
- (xviii) *Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.*
- (xix) *Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.*
- (xx) *Roof should meet prescriptive requirements as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirements.*
- (xxi) *Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all airconditioned spaces while it is aspirational for non-airconditioned spaces by use of appropriate thermal insulation material to fulfil these requirement.*



- (xxii) *The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipments, etc. as per National Building Code including protection measures from lightning etc.*
- (xxiii) *Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.*
- (xxiv) *Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it is found that construction of the project has been started without obtaining environmental clearance.*

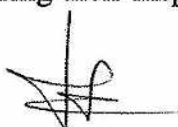
Operation Phase

- (i) *The PP while issuing the allotment letter to individual member units shall specifically mention the allowable maximum quantity of water usage and effluent generated by each member unit.*
- (ii) *The PP shall establish an environmental monitoring cell with all the potential polluting units as members to review the environmental monitoring data and suggest improvements.*
- (iii) *Treated affluent emanating from STP shall be recycled/reused to the maximum extent possible. Treatment of 100% grey water by decentralised treatment should be done. Discharge of unused treated affluent shall conform to the norms and standards of the Pollution Control Board. Necessary measures should be made to mitigate the odour problem from STP.*
- (iv) *The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry / inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.*
- (v) *Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operational phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Low sulphur diesel should be used. The location of the DG sets may be decided in consultation with the Gujarat Pollution Control Board.*
- (vi) *Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.*
- (vii) *Green belt of adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.*



- (viii) *Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.*
- (ix) *Rain water harvesting for roof run- off and surface run- off, as plan submitted should be implemented.*
- (x) *The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.*
- (xi) *Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.*
- (xii) *A Report on the energy conservation measures conforming to energy conservation norms finalised by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R & D Factors etc and submitted to the Ministry along with six monthly monitoring report.*
- (xiii) *Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be an integral part of the project design and should be in place before project commissioning. Used CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/ rules of the regulatory authority to avoid mercury contamination. Solar panels may be used to the extent possible.*
- (xiv) *Adequate measures should be taken to prevent odour problems from solid waste processing plant and STP.*
- (xv) *The buildings should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.*
- (xvi) *The environmental safeguards contained in the EIA Report should be implemented in letter and spirit.*
- (xvii) *Adequate drinking water facility be provided.*
- (xviii) *Incremental pollution loads on the ambient air quality, noise and water quality should be periodically monitored after commissioning of the project.*
- (xix) *Application of solar energy should be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid system or fully solar system for portion of the apartments should be provided.*
- (xx) *Ozone depleting substance (Regulation & Control) Rules should be followed while designing the air conditioning system of the project.*

12. Officials from the Regional Office of MOEF, Bhopal who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents / data by the project proponents during their inspection. A complete set of all the



documents submitted to MoEF should be forwarded to the CCF, Regional office of MOEF, Bhopal

13. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.

14. The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

15. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

16. These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

17. The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Clearance and copies of clearance letters are available with the Gujarat Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at <http://www.envfor.nic.in>. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhopal.

18. Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

19. "Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010".

20. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

21. The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.



22. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

23. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF by e-mail.


(Lalit Kapur)
Director (IA-III)

Copy to:

1. The Principal Secretary, Forest and Environment Department, Block no. 14/ 8 floor Sachivalaya, Gandhinagar – 382 010 Gujarat.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, Delhi – 110 032.
3. The Member Secretary, Gujarat Coastal Zone Management Authority & Director,(Environment) Forests & Environment Department, Block No. 14, 8th Floor, Sachivalaya, GandhiNagar-382.
4. The Chief Conservator of Forests, Ministry of Environment and Forests, Regional Office, Western Region, Kendriya Paryavaran Bhavan, Link Road No. 3, Ravishankar Nagar, Bhopal – 462016 (M.P.)
5. The Member Secretary, Gujarat State Pollution Control Board, Paryavaran Bhawan , Sector 10-A, Gandhi Nagar 382043, Gujarat
6. Director (EI), Ministry of Environment and Forests.
7. Guard File.
8. Monitoring File.

(Lalit Kapur)
Director (IA-III)

Annexure–11

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

POST BAG NO:1, VILLAGE:DHURUB

TAL: MUNDRA,KUTCH

MUNDRA 370421 GUJARAT,INDIA

Phone:02838-271181-186 Fax:02838-255460

E-Mail:purchase@adani.com

PURC/F/012

To, NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT ANNA UNIVERSITY , KODAL BUILDING,GUINDY, CHENNAI,TAMIL NADU -CHENNAI-600040 TAMIL NADU,INDIA, Phone :044-22300108 Mobile:098849 82410 Fax :044-22200158 Email :finance@ncscm.org Vendor Code : 650200 Kind Attn: MR.SAMAL	SO No 5700189248 SO Date 29.08.2016 Proj/CC Code & Name B-0247
Vendor Excise & Tax Reg. Details VAT / TIN No CST No Excise ECC No Service Tax Reg. No AABAN2289ASD001 Tan No. Pan No. AABAN2289A Import Export Code	Our Excise & Tax Registration Details VAT No & Date 24073400493 CST No & Date 24573400493 Excise ECC No NOT APPLICABLE Range AR-VIII Division SERVICE TAX DIVISION-II Commissionerate SERVICE TAX, AHMEDABAD Service Tax Reg. No AAACG7917KSD002 WEF: TIN No 24073400493 LST No 24073400493 PAN No AAACG7917K TAN No AHMG00515E Import Export Code 800009665 CIN L63090GJ1998PLC034182 Our Contact Details Buyer: Ramesh Maheshwari Phone: 99252-23654 E-Mail: ramesh.maheshwari@adani.com

Dear Sir,

We are pleased to issue this Service Order for the scope of work mentioned below, subject to the terms and conditions contained herein and in the annexure/s to this SO. Any annexure to this Service Order shall form integral part of the SO and in case there is any contradiction in the different documents with regard to any provision, the order of precedence shall be as mentioned in General terms & conditions.

Scope of Work

PREPARATION OF COMPREHENSIVE AND INTEGRATED CONSERVATION PLAN FOR THE APSEZ AREA INCLUDING DETAILED BETHYMETRY STUDY AND PROTECTION OF CREEKS / MANGROVE AREA INCLUDING BUFFER ZONE, MAPPING OF CO-ORDINATES, RUNNING LENGTH, HTL AND CRZ BOUNDARY.

Service Order Currency RUPEE

Price & Conditions (Priced BOQ attached for breakup)

	Currency	Amount
For ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED		For NATIONAL CENTRE FOR SUSTAINABLE,

Authorised Signatory

Reg.Office: POST BAG NO:1, VILL:DHURUB TAL: MUNDRA MUNDRA-370421 Phone: Fax:

Admin.Office:'Adani House', Nr. Mithakhali Circle, Navrangpura, Ahmedabad Phone: Fax:

Date:06.09.2016 Time :17:19:30

Page 1-of- 3

	Currency	Amount
SERVICE ORDER PRICE INCLUDING DISCOUNT	INR	31550000.00
SERVICE TAX	INR	4417000.00
SWACHHA BHARAT CESS	INR	157750.00
KRISHI KALYAN CESS	INR	157750.00
Total Service Order Price :		36,282,500.00

In Words, RUPEE THREE CRORE SIXTY TWO LAKH EIGHTY TWO THOUSAND FIVE HUNDRED ONLY

Taxes & Duties :
15% EXTRA
Commencement Date 01.04.2016 Completion Date 31.03.2018

Terms & Conditions:

Payment Terms: (A111) Advance Payment immediate due
90% Advance payment along with Contract & Balance 10% Payment will be made within 07 days after submission of Final report and certified bill at site.

Delivery destination
APSEZL-MUNDRA

Transportation
In Contractor scope.

LD Clause
NA

Retention Clause
NA

Bank Guarantee
NA

Taxes & Duties
15% EXTRA

Special Terms & Conditions
(1) The various item rates indicated in the BOQ shall remain firm for the entire currency of execution of the SO and no escalation, of whatsoever nature, shall be payable on the same. However, the quantities indicated in the BOQ are approximate and the same may vary to any extent and accordingly the SO Price also may vary. Further, the SO Price is inclusive of all taxes and duties, except Service Tax , as applicable, which will be paid extra, on submission of documents by Vendor to Buyer.

(2) Service Order number and corresponding Item Number shall be indicated in all correspondences concerning the Service Order. All the correspondences shall be addressed to the:

(Buyer's Authorised Signatory)

(Vendor's/Service Provider's
Authorised Signatory & Stamp)

PROJECT MANAGER : Shalin Shah
Cell No.:-+91 90999 38893
Email:- Shalinm.Shah@adani.com

(3) This Service Order is issued to you in duplicate. You are requested to return the duplicate copy along with its annexures, duly signed and stamped on each page of the same as a token of your unconditional acceptance of the Service Order.

(4) Send your order confirmation within 2 working days by mail/fax/courier to
Commercial Purchase.
Adani Ports and Special Economic Zone Limited.
Adani House,1st Floor,
Post Bag No. 1, Navinal Island,
Mundra-Kutch-370421, Gujarat.

(5) OBLIGATIONS OF THE CONTRACTOR: -

01. The contractor will provide trained and qualified staff as per requirement of company and approval. The working area would be the entire port and outside port area, as per requirement.

02. In the event of any injury or death in the course of duty the Company shall not be liable to any compensation. It will be the obligation of the contractor to provide medical assistance and compensation, if any.

03. No employee will leave the location of his duty without properly being relieved.

04. The Contractor will ensure that the employees must maintain high standard of discipline, They have also to perform duty at their allocated places and follow all the instruction of shift in charge.

05. The Contractor will meet all statutory obligations like PF, Gratuity, Bonus, Group Insurance etc. for which the Company will not pay any additional amount other than agreed to.

06. All provisions with regards to working hours and other provisions of standing orders, where the provisions of the Industrial Employer (standing order) Act, 1948 are applicable in respect of contract.

07. In case of loss or damage any materials/tools issued to employees, the cost of same shall be deducted from your monthly RA bills.

08. All water power, accommodation for labour and staff, site office required for execution of job are to be arranged by contractor only.

09. Proper care to be taken to preserve the marine environment.

10. Contractor shall arrange suitable insurance policy at his cost to cover his workman, equipment, machinery etc.

11. All Terms and Condition as per signed contract Agreement between APSEZL and NCSCM, Chennai

Annexures

Annexure - 1 (Price Schedule/BOQ)

Annexure - 2 (GTC)

(Buyer's Authorised Signatory)

**(Vendor's/Service Provider's
Authorised Signatory & Stamp)**

ANNEXURE I
Bill of Quantity (BOQ)

Serial No.	Service Code/Description	UOM	Quantity	Rate	Amount
10.	320004858 CONSULTANCY SERVICES PREPARATION OF COMPREHENSIVE AND INTEGRATED CONSERVATION PLAN FOR THE APSEZ AREA INCLUDING DETAILED BETHYMETRY STUDY AND PROTECTION OF CREEKS / MANGROVE AREA INCLUDING BUFFER ZONE, MAPPING OF CO-ORDINATES, RUNNING LENGTH, HTL AND CRZ BOUNDARY.	LUMP SUM	1.000	31550000.00	31550000.00
				Subtotal :	31,550,000.00
				Total Amount	31,550,000.00

in Words, RUPEE THREE CRORE FIFTEEN LAKH FIFTY THOUSAND ONLY

Free Issue Material List

Material No	Material Description	UOM	Quantity
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(Buyer's Authorised Signatory)

(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE I(A)
Detailed Service Item Descriptions

10. BETHYMETRY STUDY OF APSEZ.	
Service Code	
Service Item Description	

10. 320004858

(Buyer's Authorised Signatory)

**(Vendor's/Service Provider's
Authorised Signatory & Stamp)**

Annexure-12

04.06.2018

To,
Director (Environment) & Member Secretary,
Gujarat Coastal Zone Management Authority,
Sachivalaya,
Gandhi Nagar

Subject: Submission of final report on comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks in and around APSEZ, Mundra, Gujarat.

Reference:

- (1) EC and CRZ clearance of Multi-product SEZ at Mundra vide MoEF&CC letter F. No. 10-138/2008-IA-III dated 15.07.2014
- (2) MoEF&CC order vide F. No. 10-47/2008-IA-III dated 18.09.2015
- (3) Submission of NCSCM's proposal and scope of work vide our letter dated 25.04.2016

Dear Sir,

In view of compliance with the directions issued by MoEF&CC, the scope of work of NCSCM was discussed during 28th meeting of GCZMA held on 22.04.2016. The discussed scope of work was submitted to GCZMA vide our letter dated 25.04.2016.

In view of the above, NCSCM commenced the studies covering the following directions mentioned in references above.

- *Bocha island, ecologically sensitive geomorphological features and areas in the island and creeks around the island will be declared as conservation zone action plan for its conservation must be prepared. M/s. APSEZ should provide necessary financial assistance for this purpose.*
- *A Comprehensive and integrated conservation plan including detailed bathymetry study and protection of creeks/mangrove area including buffer zone, mapping of co-ordinates, running length, HTL, CRZ boundary will be put in place. The plan will take note of all the conditions of approvals granted to all the project proponents in this area, e.g., the reported case of disappearance of mangroves near Navinal creek. The preservation of entire area to maintain the fragile ecological condition will be a part of the plan in relation to the creeks, mangrove conservation and conservation of Bocha Island up to Baradimata and others.*

Adani Ports and Special Economic Zone Ltd
Adani House
Nr Mithakhali Circle, Navrangpura
Ahmedabad 380 009
Gujarat, India
CIN: L63090GJ1998PLC034182

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21/6/18
ગુજરાત સરકારના અધિકારી
રજીસ્ટ્રી શાખા
સેન અને પર્યાવરણ વિભાગ
સચિવાલય, ગાંધીનગર

Registered Office: Adani House, Nr Mithakhali Circle, Navrangpura, Ahmedabad 380 009, Gujarat, India

- 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.

During the course of the study, APSEZ has submitted two reports regarding progress of the study to all concerned authorities as part of the six monthly compliance reports. MoEF&CC vide their letter dated 23.08.2016 requested to submit an updated status of the directions (reference - 2). In reply, APSEZ submitted the requisite information with the progress report of the ongoing studies vide letter dated 10.09.2016. In continuation to the same, following site visits were carried out for verification of compliance status. During the said visits, the progress reports submitted were discussed with the concerned authorities present.

- A joint site visit (MoEF&CC, RO, Bhopal, GCZMA and GPCB, RO, Gandhidham) was carried out during 21 - 22.12.2016.
- Site visit of Regional Officer, MoEF&CC, Bhopal was carried out during 02 - 03.05.2018.

In continuation to our earlier submissions, we would like to inform you that the stated study is now completed (including preparation of the conservation plan) and the report prepared by NCSCM is enclosed for your consideration.

It may be noted that demarcation of HTL and CRZ areas of the entire coast of Gujarat (including the APSEZ area) is being carried out by NCSCM. NCSCM has already prepared the draft maps. Once the maps are finalized, they will be submitted to GCZMA and MoEF&CC as part of the requirements.

Thank you
Yours sincerely,



Shalin Shah
Head - Environment

✓ Copy to: Director (Infra II committee), MoEF&CC (IA/II section), Indira Paryavaran Bhavan, Jor bagh road, Aliganj, NewDelhi

06/11/2018
Section
जलवायु परिवर्तन प्रभाग
Environment, Forests & Climate Change
Govt. of India
भवन/Indira Paryavaran Bhavan
जलवायु परिवर्तन/ Jorbagh Road, Aliganj
नई दिल्ली/New Delhi-110003

Annexure-13

04.01.2019

To

Director (Environment) & Member Secretary
Gujarat Coastal Zone Management Authority
Sachivalaya
Gandhinagar

Subject: Comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks for Mundra.

Reference:

- (1) EC and CRZ clearance of Multi-product SEZ at Mundra vide MoEF&CC letter F. No 10-135/2008-IA-III dated 15.07.2014
- (2) MoEF&CC order vide F. No 10-47/2008-IA-III dtd 18.09.2015
- (3) Submission of NCSCM's proposal and scope of work vide our letter dtd. 25.04.2016
- (4) Submission of final report on Comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks at Mundra vide our letter dtd. 04.06.2018

Dear Sir

Vide above references, we would hereby like to submit that, APSEZL has already completed the report preparation on Comprehensive and integrated plan for preservation and conservation of mangroves and associated creeks at Mundra, inline to the compliance with direction issued by MoEF&CC and the scope of work submitted to GCZMA. Report has already been submitted vide our earlier letter dated 30th April 2018 for consideration.

In view of above, it is kindly requested to inform us for further necessary actions, if any to be taken by APSEZ.

Thank you

Yours sincerely

Clerk.
Forests & Environment Deptt.
Block No. 14, 2nd Floor
New Sachivalaya, Gandhinagar

Shalin Shah

Head - Environment

Annexure-14



PCB ID: 17739

APSEZ/EnvCell/2019-20/034

Date: 30.08.2019

To,
Regional Officer,
Regional Office (East – Kutch),
Gujarat Pollution Control Board,
Gandhidham – 370201.

Subject: Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference: GPCB Inspection letter dated 27.08.2019, PCB ID: 17739 (Annexure – A)

Dear Sir,

With reference to the above mentioned subject and references, APSEZ is submitting the compliance details of your instruction are as below:

Our Reply against your Instruction:

- ✓ Tank wise liquid cargo stock within storage terminal as on 27th Aug, 2019 is enclosed as **Annexure – B.**
- ✓ Category wise hazardous waste stock as on 27th Aug, 2019 is enclosed as **Annexure – C.**

APSEZ is submitting the compliances regularly and hope the above mentioned submission is in line with requirement.

Thanking you,
For, **Adani Ports and Special Economic Zone Limited**

Authorised Signatory

Copy to:

Unit Head (Kutch Unit),
Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector – 10A,
Gandhinagar – 382010.

Received
Gujarat Pollution Control Board
Regional Office
Kutch (East)

Adani Ports and Special Economic Zone Ltd
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Mundra, Kutch 370 421
Gujarat, India

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adani

PCB ID: 17739

APSEZ/EnvCell/2019-20/034

Date: 30.08.2019

To,

Regional Officer,
Regional Office (East – Kutch),
Gujarat Pollution Control Board,
Gandhidham – 370201.

Subject: Submission of compliance to observation/suggestion/instruction made by GPCB officials during inspection.

Reference: GPCB Inspection letter dated 27.08.2019, PCB ID: 17739 (**Annexure – A**)

Dear Sir,

With reference to the above mentioned subject and references, APSEZ is submitting the compliance details of your instruction are as below:

Our Reply against your Instruction:

- ✓ Tank wise liquid cargo stock within storage terminal as on 27th Aug, 2019 is enclosed as **Annexure – B**.
- ✓ Category wise hazardous waste stock as on 27th Aug, 2019 is enclosed as **Annexure – C**.

APSEZ is submitting the compliances regularly and hope the above mentioned submission is in line with requirement.

Thanking you,

For, **Adani Ports and Special Economic Zone Limited**

S. S. S. S.

Authorised Signatory

Copy to:

Unit Head (Kutch Unit),
Gujarat Pollution Control Board,
Paryavaran Bhavan, Sector – 10A,
Gandhinagar – 382010.

PK
12/9/19
Gujarat Pollution Control Board
Sector No. 10 A,
Gandhinagar - 382 010

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ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પ્રાદેશિક કચેરી : કચ્છ (પૂર્વ)

દિનદયાલ પોર્ટ ટ્રસ્ટનું વહીવટ મકાન રૂમ નં. ૨૧૫, ૨૧૬, ૨૧૭, બીજો માળ,
સેક્ટર નં. ૮, ગાંધીધામ-૩૭૦૨૦૧, કચ્છ. ફોન : ૦૨૮૩૬-૨૩૦૮૨૮

તપાસ માટે દાખલ થવાની સૂચના (નોટીસ)

પાણી અધિનિયમ ૧૯૭૪ ની કલમ - ૨૩, હવા અધિનિયમ ૧૯૮૧ ની કલમ - ૨૪ અને પર્યાવરણ (સુરક્ષા) અધિનિયમ - ૧૯૮૬ની કલમ-૧૦ હેઠળ બાયોમેડિકલ-વેસ્ટ નિયમ-૨૦૧૬ હેઠળ અમોને મળેલ સત્તાની રૂએ અમો નીચે સહી કરનાર અમોને જરૂરી લાગે તેની સહાય લઈને તમામ સમયે નીચેના હેતુઓ માટે આપની જગ્યામાં દાખલ થવાનો અને તપાસ કરવાનો અધિકાર ધરાવીએ છીએ.

- (૧) અમોને સોંપેલા રાજ્ય બોર્ડ/કેન્દ્ર સરકારના કાર્ય બજાવવાના હેતુ માટે
- (૨) આવા કોઈ કાર્યો બજાવવાના છે કે કેમ અને તેમ હોય તો કઈ રીતે બજાવવાના છે અથવા આ અધિનિયમ અથવા તે હેઠળ કરેલા નિયમોની અથવા આ અધિનિયમ હેઠળ બજાવેલી કોઈ નોટીસની, કરેલા કોઈ દુકમની, આદેશની અથવા આપેલા કોઈ અધિકાર પત્રની કોઈ જોગવાઈનું પાલન કરવામાં આવી રહ્યું છે કે પાલન કરવામાં આવ્યું છે કે કેમ તે નક્કી કરવાના હેતુ માટે.
- (૩) કોઈ સાધન સામગ્રી, ઔદ્યોગિક પ્લાન્ટ રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય કોઈ મહત્વની વસ્તુની તપાસ કરવા અને તેની કસોટી કરવાના હેતુ માટે અથવા જે જગ્યામાં તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલા નિયમો મુજબ કોઈ ગુનો કરવામાં આવ્યો છે, અથવા થવાની તૈયારીમાં છે, તેવી કોઈ જગ્યાની ઝડતી લેવા માટે અને તેને એમ માનવાને કારણ હોય કે આ કાયદા કે તે હેઠળ કરેલ નિયમો હેઠળ કરેલ શિક્ષાપાત્ર કોઈ ગુનો કર્યાનો પુરાવો, તેવા સાધન સામગ્રી ઔદ્યોગિક પ્લાન્ટ, રેકર્ડ, રજીસ્ટર, દસ્તાવેજ અથવા અન્ય મહત્વની વસ્તુ કબજે લેવા માટે અમે નીચે જણાવેલ સમયે દાખલ થઈએ છીએ.

ઉદ્યોગ/.....માં દાખલ થવાનો સમય : સવારના / સાંજના.....તા. ૨૪/૦૮/૨૦૧૭
અમારી સાથે સહાય માટે નીચેની વ્યક્તિઓ પણ છે.

૧. R. J. Acharya - DPE
૨. H. R. Parmar - DPE
૩. 1

પ્રતિ,

PCBID-17439

Atomi Ponds R.S.E. Ltd;
P.M. Ponds R.S.E. Ltd - Regional
IS. Ponds R.S.E. Ltd - Regional
નકલ મળેલ છે.

આ સૂચના (નોટીસ) મેળવનારની સહી

(Atomi Ponds R.S.E. Ltd)
Head - Environment

સહી :

અધિકારીનું નામ : R. B. Chaudhary

હોદ્દો :

R.O.



ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ

પ્રાદેશિક કચેરી : કચ્છ (પૂર્વ)

ફિન્ટયાલ પોર્ટ ટ્રસ્ટનું વહીવટ મકાન રૂમ નં. ૨૧૫, ૨૧૬, ૨૧૭ માળ,
સેક્ટર નં. ૮, ગાંધીધામ-૩૭૦૨૦૧, કચ્છ, ફોન : ૦૨૮૩૬-૨૩૦૮૨૮

પ્રતિ,

Adani Ports & AP SEZ Ltd.

Plot no:- 169/P; at Navinval

Island, Tq-Mandla, Dist:-Kutch

તારીખ : 27-05-2019

જીપીસીની આઈડી : 17739

ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડના અધિકારીઓ દ્વારા આપના એકમની આજરોજ જુદા જુદા પર્યાવરણીય નિયમોને આધિન સ્થળ મુલાકાત લેવામાં આવેલ. આપના એકમના સ્થળ મુલાકાત દરમિયાન કરેલ અવલોકનો, આપે આપેલ માહિતી / દસ્તાવેજો અને પર્યાવરણીય નિયમોની જોગવાઈ આધીન, આપને નીચે મુજબ સુચનાઓ આપવામાં આવે છે જેની પૂર્તતા / સ્પષ્ટતા અંગેનો અહેવાલ (કોમ્પ્લાયન્સ રીપોર્ટ) આ આદેશ મળ્યાની તારીખથી કામકાજના દિવસ- ૩ માં લેખીત/એક્ઝિએન/ઇલેક્ટ્રોનિક માધ્યમ મારફતે બોર્ડની વડી કચેરી ગુજરાત પ્રદુષણ નિયંત્રણ બોર્ડ, પર્યાવરણ ભવન, સેક્ટર ૧૦-એ, ગાંધીનગર-૩૮૨૦૧૦ ને આ કચેરીની જાણ હેઠળ અચૂક મોકલી આવવો.

- ① Liquid Storage terminal જાં ડાકના material Stock tank vide 205 ક્રમાં તમામ categories નો Hazardous waste ના Stock ની રીપર રજુ કરવી.

એકમના પ્રતિનિધિનું નામ અને હોદ્દો

(Mr. Sumit Patelwal)

Head - Environment

(H.R. Parmar)

APE

(CR. J. Acharya)

CR. J. Acharya

AEE

(K.B. Chandhary)

K.B. Chandhary

R.O

ANNEXURE - B

SN	Tank No.	Existing / Previous Product	Existing stock in MT
1	T-1	CRUDE SOYABEAN OIL	2109.498
2	T-2	CRUDE SOYABEAN OIL	1478.132
3	T-3	PALM KERNEL FATY ACID DISTILLATE	263.077
4	T-4	ALPHAPLUS C-20/24	184.457
5	T-5	HEAVY WHITE OIL	1687.96
6	T-6	CRUDE GLYCERINE	2186.872
7	T-7	F. O.	830.785
8	T-8	F. O.	211.995
9	T-9	CRUDE SUNFLOWER OIL	1288.105
10	T-10	ALPHAPLUS (R) 1-DODECENE	757.819
11	T-11	CRUDE SUNFLOWER OIL	1250.775
12	T-12	CRUDE GLYCERINE	797.272
13	T-13	OLEFINS(C13+ALL ISOMERS)ALPHAPLUS (R)C24-28	848.251
14	T-14	DENATURED ETHYL ALCOHOL	1102.048
15	T-15	LINEAR ALKYL BENZENE	1045.641
16	T-16	CRUDE SOYABEAN OIL	600.042
17	T-17	DENATURED ETHYL ALCOHOL	0.1
18	T-18	DENATURED ETHYL ALCOHOL	Nil
19	T-19	DENATURED ETHYL ALCOHOL	755.556
20	T-20	PETROLEUM HYDROCARBON PLUS	699.97
21	T-21	DENATURED ETHYL ALCOHOL	760.98
22	T-22	DENATURED ETHYL ALCOHOL	754.582
23	T-23	DENATURED ETHYL ALCOHOL	84.201
24	T-24	LINEAR ALKYL BENZENE	28.645
25	T-25	DENATURED ETHYL ALCOHOL	1118.079
26	T-26	VINYL ACETATE MONOMER	473.042
27	T-27	PETROLEUM HYDROCARBON SOLVENT	759.71
28	T-28	ACETIC ACID	Nil
29	T-29	ACETIC ACID	Nil
30	T-30	METHANOL	721.123
31	T-31	METHANOL	Nil
32	T-32	DENATURED ETHYL ALCOHOL	Nil
33	T-33	DENATURED ETHYL ALCOHOL	758.863
34	T-34	METHANOL	2202.179
35	T-35	LINEAR ALKYL BENZENE	1005.495
36	T-36	DENATURED ETHYL ALCOHOL	746.676
37	T-37	DENATURED ETHYL ALCOHOL	Nil
38	T-38	PETROLEUM HYDROCARBON SOLVENT	145.34
39	T-39	ACETIC ANHYDRIDE	994.91
40	T-40	ACETIC ACID	46.517
41	T-41	CARBON BLACK FEED STOCK	89.407
42	T-42	CARBON BLACK FEED STOCK	108.497
43	T-43	CARBON BLACK FEED STOCK	78.167
44	T-44	CARBON BLACK FEED STOCK	3969.538
45	T-45	CRUDE GLYCERINE	5434.791
46	T-51	DENATURED ETHYL ALCOHOL	3795.873
47	T-52	DENATURED ETHYL ALCOHOL	3808.276
48	T-53	DIETHYLENE GLYCOL	1753.342
49	T-54	DENATURED ETHYL ALCOHOL	3808.187
50	T-55	DENATURED ETHYL ALCOHOL	3666.574
51	T-56	DENATURED ETHYL ALCOHOL	3789.477
52	T-57	CRUDE SUNFLOWER OIL	4464.542
53	T-58	CRUDE SOYABEAN OIL	2585.861
54	T-59	CRUDE SOYABEAN OIL	217.812
55	T-60	CRUDE PALM STEARIN	4083.556
56	T-61	RBD PALM STEARIN	3773.897
57	T-62	CRUDE PALM OIL	82.44
58	T-63	CRUDE SUNFLOWER OIL	4396.703
59	T-64	CRUDE SOYABEAN OIL	Nil
60	T-65	CRUDE SUNFLOWER OIL	4382.376
61	T-66	CRUDE SOYABEAN OIL	4441.261
62	T-67	CRUDE PALM STEARIN	4081.051
63	T-68	CRUDE PALM STEARIN	3957.749

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SN	Tank No.	Existing / Previous Product	Existing stock in MT
64	T-69	CRUDE SOYABEAN OIL	4388.316
65	T-70	CRUDE SOYABEAN OIL	750.883
66	T-71	CRUDE SOYABEAN OIL	0.046
67	T-72	FATTY ACID C1618 UNDISTILLED	3155.932
q	T-73	CRUDE PALM KERNEL OIL	4248.324
69	T-74	CRUDE SUNFLOWER OIL	4430.727
70	T-75	FATTY ACID C1618 UNDISTILLED	177.396
71	T-76	CRUDE SOYABEAN OIL	14071.563
72	T-77	CRUDE SOYABEAN OIL	12037.572
73	T-101	GAS OIL (HSD)	6641.515
74	T-102	DENATURED ETHYL ALCOHOL	12015.588
75	T-103	NAPHTHA	3850.37
76	T-104	SUPERIOR KEROSENE OIL	2601.796
77	T-105	CARBON BLACK FEED STOCK	3591.307
78	T-106	F. O.	Nil
79	T-107	F. O.	3734.832
80	T-108	F. O.	9298.044
81	T-113	METHANOL	1445.182
82	T-114	DENATURED ETHYL ALCOHOL	3798.384
83	T-115	METHYL TERTIARY BUTYL ETHER	3443.2
84	T-116	DENATURED ETHYL ALCOHOL	3552.196
85	T-117	CAUSTIC SODA LIQUID	4493.478
86	T-118	DENATURED ETHYL ALCOHOL	3481.691
87	T-119	METHYL TERTIARY BUTYL ETHER	3109.97
88	T-120	METHANOL	2448.584
89	T-121	NAPHTHA	1107.949
90	T-122	METHANOL	2431.346
91	T-123	METHANOL	2282.432
92	T-124	DENATURED ETHYL ALCOHOL	714.938
93	T-125	DENATURED ETHYL ALCOHOL	2444.56
94	T-126	DENATURED ETHYL ALCOHOL	873.589
95	T-127	DENATURED ETHYL ALCOHOL	Nil
96	T-128	DENATURED ETHYL ALCOHOL	2508.219
97	T-201	BITUMEN	2595.95
98	T-202	BITUMEN	2293.09
99	T-203	BITUMEN	Nil
100	T-204	BITUMEN	2806.7
		TOTAL	226293.743

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ANNEXURE – C

Sr. No.	Type of Hazardous Waste	Sch / Cat.	Approx. Stock Quantity in MT As on 27.08.2019
1	Used/Spent Oil	Sch-I/5.1	75.0
2	ETP Sludge	Sch-I/35.3	2.0
3	Sludge & Filters contaminated with oil	Sch-I/3.3	2.0
4	Waste Residue Containing Oil / Oily Rags	Sch-I/33.2	3.0
5	Pig Waste	Sch-I/3.1	0.9
6	Tank Bottom sludge	Sch-I/3.2	1.8
7	Discarded containers/ barrels	Sch-I/33.3	2.5
8	Asbestos Waste	Sch-I/15.2	Nil
9	Glass wool Waste (Thermal Insulation Material)	Sch-II/C-9	Nil
10	Downgrade Chemicals	Sch-I/20.2	Nil
11	Waste Oil	Sch-I/5.2	Nil
12	Expired Paint Material	Sch-I/21.1	0.2

Annexure-15

Expense Details for Fisherfolk Amenities work in different core areas

Sr.	Details	2016-17	2017-18	2018-19	Oct - 2019	TOTAL	AMT IN LACS
Expenditure Details (Amount in Rs.)							
1	Vidya Deep Yojana	2069300	193000	2087000	545000	4894300	48.94
2	Vidya Sahay Yojana	552580	495000	691000	707630	2446210	24.46
3	Adani Vidya Mandir – Shaping Lives	4200000	4030000	3472000	6434020	18136020	181.36
4	SENIOR CITIZEN HEALTH CARD	0	8430000	1750000	0	10180000	101.80
5	FINANCIAL SUPPORT TO POOR PATIENTS	4439507	1275000	813000	411576	6939083	69.39
6	Machhimar Kaushalya Vardhan Yojana	188708	200000	397000	0	785708	7.86
7	Machhimar Sadhan Sahay Yojana	0	0	315000	200000	515000	5.15
8	Machhimar Awas Yojana	4592106	1165000	0	1155000	6912106	69.12
9	Machhimar Shudhh Jal Yojana	2236050	2700000	2038000	621000	7595050	75.95
10	Sughad Yojana	1367300	170000	0	0	1537300	15.37
11	Machhimar Akshay kiran Yojana	860850	100000	68000	0	1028850	10.29
12	Machhimar Suraksha Yojana			0	0	0	0.00
13	Machhimar Ajivika Uparjan Yojana-Mangroves plantation	1558800	500000	1382000	1231000	4671800	46.72
14	Bandar Svachhata Yojana	106400	50000	0	0	156400	1.56
15	Cricket league and Cycle Marathon	432000	657119	638000	610800	2337919	23.38
16	Sports Material For Children & Youth at Vasahats	197797	0	0	0	197797	1.98
17	New Pilot Initiative for Polyculture	398240	160000	0	0	558240	5.58
18	New Pilot Initiative for Cage farming Asian Seabass & Lobster	864000	660000	0	0	1524000	15.24
19	Sea Weed Culture Project	0	0	0	76000	76000	0.76
		24063638	20785119	13651000	11992026	70491783	704.92

Annexure-16

રૂઢ: ઁ.પી.ઁસઈ.ઁડ.ઁલ/કોપો.ઁફે./ઁરપરા/૧૨૨ હે.

તા. ૯/૮/૨૦૧૨.

પ્રેતિ,
ઁગ્ર સઁચિવશ્રી,
મહેસુલ વિભાગ,
સચિવાલય, ગાંધીનગર.

સરકારશ્રી
મહેસુલ વિભાગ
ગાંધીનગર
૧૨૨-૬૫-૬૦

વિષય: સ્પેશલ ઇકોનોમીક ઝોનના હેતુ માટે મોજે ઁરપરા, તા. મુન્દ્રા, જિ. કચ્છના સવે નંબર ૬૮૯ પૈકી દરીયાઈ વિસ્તારની હે. ૧૨૨-૬૫-૬૦ ચો.મી. ઁનસવેડ જમીનની MPSEZL ની માંગણી સામે સરકારશ્રી દવારા ઁગાઉ MPSEZL ને ફાળવેલ ગૌચર જમીનનો ઁદલો-ઁદલો કરવા બાબત.

- સંદર્ભ: ૧. ઁમોઁ કલેક્ટરશ્રી, કચ્છ સમક્ષ કરેલ ઁરજ તા. ૭/૧૦/૨૦૦૬.
૨. કલેક્ટરશ્રી, કચ્છના હુકમ નં. લેન્ડ/૫/ઉઘોગ/વશી/૫૮૯૧/૨૦૦૬, તા. ૧૮/૧૦/૨૦૦૬.
૩. કલેક્ટરશ્રી, કચ્છના હુકમ નં. લેન્ડ/૫/ઉઘોગ/વશી/૫૬૯૧/૨૦૦૬૭ તા. ૧૯/૧૧/૨૦૦૭.

મે. સાહેબશ્રી,
સવિનય ઉપરોક્ત વિષયે જણાવવાનું કે સંદર્ભ-૨ ઁને ૩ માં દર્શાવેલ કલેક્ટરશ્રી, કચ્છના હુકમથી સરકારશ્રી દવારા મુન્દ્રા તાલુકાના મોજે ઁરપરાની ઁનુક્રમે ૬૮૯ પૈકીની દરીયાઈ વિસ્તારની ઁનસવેડ ૯૨-૨૭-૧૬ હેક્ટર જમીન તથા ૪૦૨-૨૪-૦૨ હેક્ટર ગૌચરની જમીન ઁદાણી પોટસે ઁન્ડ ઁસ.ઈ.ઁડ. લી. (APSEZL) (ઁગાઉનું નામ મુન્દ્રા પોટે ઁન્ડ સ્પેશલ ઇકોનોમીક ઝોન લી.) ને ઁસ.ઈ.ઁડ. ના હેતુ માટે ફાળવવામાં ઁવેલ છે.

સરકારશ્રી દવારા ઁમોને ઁસ.ઈ.ઁડ. માટે ફાળવેલ ઉક્ત જમીનોમાં ઁકસુત્રતા જાળવવા તથા મોજે ટુંડા ખાતેના પાવર પ્રોજેક્ટ ઁને ઁસ.ઈ.ઁડ.ની તમામ જમીનોને મુન્દ્રા પોટે ઁને ઁદીપુર તરફ પસાર થતા રેલ-રોડ, યુટીલીટી કોરીડોરથી જોડવા માટે વચ્ચે ઁવતી મોજે ઁરપરાના સવે નંબર ૬૮૯ પૈકીની દરીયાઈ વિસ્તારની ૨૧૪-૯૨-૭૬ હેક્ટર (૫૩૧-૨૩ ઁકર) ઁનસવેડ જમીન ઁસ.ઈ.ઁડ ના હેતુ માટે ફાળવવા ઁમોઁ સંદર્ભ-૧ માં દર્શાવેલ પત્રથી કલેક્ટરશ્રી, કચ્છ સમક્ષ દરખાસ્ત કરેલ.

ઁમારી ઉક્ત દરખાસ્ત પૈકી સરકારશ્રી દવારા સંદર્ભ-૨ માં દર્શાવેલ કલેક્ટરશ્રી, કચ્છના હુકમથી ઁમોને ૯૨-૨૭-૧૬ હેક્ટર જમીન ઁસ. ઇ.ઁડ માટે ફાળવેલ હતી. ત્યારબાદ, બાકી રહેતી ૧૨૨-૬૫-૬૦ હેક્ટર જમીન ઁસ.ઈ.ઁડ. માટે ફાળવવા ઁંગે ઁમોઁ વારંવાર સરકારશ્રી સમક્ષ વિનંતી કરેલ છે પરંતુ સરકારશ્રી દવારા ઁજ સુધી ઁ બાબતે જરૂરી નિર્ણય થયેલ નથી.

.૨.

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ઉપરાંત, સરકારશ્રી દ્વારા સંદર્ભ-૩ મા દર્શાવેલ કલેક્ટરશ્રી, કચ્છના હુકમથી અમોને મોજે ઝરપરા ખાતે ફાળવેલ સર્વે નંબર ૬૮૯/૭, ૬૮૯/૨૯, ૬૮૯/૩૦, વિગેરે પૈકીની કુલ ૪૦૨-૨૪-૦૨ હેક્ટર ગૌચર જમીન કે જેમાં ગ્રામજનો દ્વારા થતા સતત વાંધા, વિરોધ અને કોટે રેફરન્સને કારણે સરકારશ્રી દ્વારા સદર જમીનની ફાળવણી થયાને આવે પાંચ વર્ષનો સમય પસાર થયા પછી પણ તેમાં એસ.ઈ.એડ. પ્રોજેક્ટ અંતર્ગત જરૂરી ડેવલપમેન્ટ થઈ શકેલ નથી. વળી, આપને વિદીત છે તેમ, ગ્રામજનો દ્વારા સદર જમીનો પ્રોજેક્ટના ડેવલપમેન્ટમાંથી છોડી દેવા અમારી/સરકારશ્રી સામે વારંવાર રજુઆતો ચાલુ રાખેલ છે.

ઉક્ત સંજોગોમાં એસ.ઈ.એડ. માં સ્થપાયેલ રેલ-રોડ, યુટીલીટી કોરીડોરથી સમગ્ર વિસ્તારને જોડવા માટે ખુબ જ જરૂરી એવી મોજે ઝરપરા, તા. મુન્દ્રા, જિ. કચ્છના સર્વે નંબર ૬૮૯ પૈકીની દરીયાઈ વિસ્તારની છે. ૧૨૨-૬૫-૬૦ ચો.મી. અનસર્વેડ જમીનની અમારી માંગણી સામે સરકારશ્રી દ્વારા અમોને એસ.ઈ.એડ. ના હેતુ માટે અગાઉ ફાળવેલ મોજે ઝરપરાના સીમતળમાં આવેલ ગામતળથી નજીકના સર્વે નંબરો જેવા કે ૬૮૯/૩૬, ૬૮૯/૪૭, ૬૮૯/૪૮, વિગેરે પૈકીની ગૌચર જમીનમાંથી છે. ૧૨૨-૬૫-૬૦ ચો.મી. જમીન સ્વેચ્છાએ ગામના ગૌચર વિકાસ માટે સરકારશ્રીને પરત કરવા આયોજન કરેલ છે જેથી ગ્રામજનો દ્વારા થતા વિરોધને નિવારી એસ.ઈ.એડ. પ્રોજેક્ટ અંતર્ગત જરૂરી ડેવલપમેન્ટ થઈ શકે.

આમ, એસ.ઈ.એડ. પ્રોજેક્ટના ડેવલપમેન્ટ અને મોજે ઝરપરાના ગ્રામજનોની માંગણી ધ્યાને લઈ APSEZL (અગાઉનું નામ MPSEZL) ની એસ.ઈ.એડ.ની જમીનમાંથી આ સાથે સામેલ નકશામાં Proposed land to be given back થી દર્શાવેલ છે. ૧૨૨-૬૫-૬૦ ચો.મી. ગૌચર પૈકીની જમીન કમી કરી તેની સામે અદલા-બદલાના ધોરણે મોજે ઝરપરા, તા. મુન્દ્રા, જિ. કચ્છના સર્વે નંબર ૬૮૯ પૈકીની નકશામાં Proposed land to be received થી દર્શાવેલ*દરીયાઈ વિસ્તારની છે. ૧૨૨-૬૫-૬૦ ચો.મી. અનસર્વેડ જમીનની અમારી માંગણી અંગે યોગ્ય નિર્ણય થવા અને તે મુજબનાં ઘટીત આદેશ થવા અમારી-આપશ્રીને વિનંતી છે.

આભારસહ...

આપનો વિશ્વાસુ



(સૌરીન શાહ)

જોઈન્ટ પ્રેસીડેન્ટ (કોર્પો.અફે.)

બિડાણ : ઉપર મુજબ.

✓ નકલ સવિનય રવાના :

કલેક્ટરશ્રી, કચ્છ-ભુજ તરફ.... જાણ તથા જરૂરી કાર્યવાહી અર્થે.

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Annexure-17

Date: 24th February, 2014

To
Director (Environment) & Member Secretary, GCZMA
Forests & Environment Department,
Government of Gujarat
Block No. 14, 8th Floor, Sachivalaya,
Gandhinagar – 382 010.

Sub: ToR for Cumulative Impact Assessment at Mundra

Ref: Your letter no. ENV-10-2013-118-E dated. 13th February, 2014

Dear Mr. Hardik Shah,

This is in reference to your letter as per above mentioned subject matter.

We hereby would like to submit Draft Terms of Reference for carrying out Cumulative Impact Assessment (CIA) at Mundra for your consideration. We request you to kindly convene a meeting at the earliest so that same can be presented, discussed and finalized.

We are also pleased to inform you that we have started procedure for identifying appropriate NABET accredited consultant to carry out required CIA studies as per the ToR which will be finalized under your guidance.

Look forward to your meeting to discuss on the subject matter.

Thanking you,

Yours faithfully,



P N Roy Chowdhury
Head - Environment

Encl: Draft Terms of Reference for CIA

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Handwritten signature and date: 24/02/14
નાયબ સેક્શન અધિકારી
રજીસ્ટ્રી શાખા
વન અને પર્યાવરણ વિભાગ
સચિવાલય, ગાંધીનગર.

**Terms of Reference for Undertaking
Cumulative Environmental Impact Assessment
Studies
of
Waterfront, SEZ and Ancillary Developments
along Mundra Coast**



Adani Ports and SEZ Ltd. (APSEZL)

1.0 Introduction

Adani Ports and Special Economic Zone Ltd. (APSEZL) is promoted by the Adani Group. Mundra Port is strategically located on the northern coast of the Gulf of Kutch on the west coast of India and provides a convenient international trade gateway to Europe, Africa, America and the Middle East. Mundra has a deep draft (12.5 meters - 17 meters) which enables large vessels like Panamax and super post-Panamax carriers to dock alongside its berth. It also has an adjoining large land area available for development, part of which is now the Mundra SEZ which proposes to attract port-led industrial development. Mundra Port is situated in Gujarat, one of India's most industrialised, investor friendly and commercially successful states.

It is one of the closest ports to the huge hinterland of northern and central India which comprises Rajasthan, Haryana, Delhi, Punjab, Jammu and Kashmir, Uttarakhand, Himachal Pradesh, Madhya Pradesh and Uttar Pradesh, accounting for about 2/3 of India's cargo. The port has excellent in-land connectivity thru rail track, road network, airport and cross country pipelines.

1.1. Characteristics of Mundra Coast

The Gulf of Kutch, which occupies an area of 7300 km², has maximum depth that varies from 20 m at the head (Kandla - Navlakhi) to 60 m in the outer regions. Mundra port is situated on northern bank of Gulf of Kutch and represents the typical environment of the northern Gulf with vast intertidal and low lying segments. The major creeks in the area are Bocha, Navinal, Baradimata, Kotdi etc which sustain stretches of mangroves. The near shore bed is sandy/silty. There is neither significant vegetation nor any habitation in the seafront area.

All along the coast, very few rivers drain into the Gulf and they carry only a small quantity of freshwater, except during the erratic monsoon. The riverbed is mostly composed of coarse sand and gravel. Due to extreme unreliability of rainfall in the region, ground water is a more reliable source of water for domestic as well as agricultural needs. However, uncontrolled and indiscriminate withdrawal of ground water has resulted in a sharp decline in water table over a period of time.

1.2. Industrial Development in Mundra Region

Northern coast of Gulf of Kutch is industrially backward as compared to Southern coast. Except lignite mines, thermal power plants, fertilizer plant and Ports i.e. Mundra and Kandla.

Old Mundra Port is a fair weather lighterage Port situated in Navinal Creek in the Gulf of Kutch on the West Coast of India. Mundra is connected to Gandhidham by road and then by National Highway. A broad gauge railway line is available from Gandhidham to Adani Port. Nearest airports are Kandla and Bhuj which are 70 km away from the port. Ashapura Minechem Ltd. has constructed private RCC Jetty of 60 meter length at Mundra Port. This wharf has commenced cargo operations.

Adani Ports and Special Economic Zone Limited (APSEZL), India's largest private port and special economic zone, was incorporated as Gujarat Adani Port Limited (GAPL) in 1998 to develop a private port at Mundra, on the west coast of India. Mundra Special Economic Zone Limited (MSEZL) was incorporated in November 2003, to set up an SEZ at Mundra. MSEZL was merged with GAPL in April 2006 and the company was renamed as Mundra Port and Special Economic Zone Limited, to reflect the nature of business. The board of MPSEZL on Nov 21, 2011 has approved a proposal to change the company's name to Adani Ports and Special Economic Zone Ltd (APSEZL).

Apart from APSEZL, several other developments also exist in hinterland. Coastal Gujarat Power Limited (CGPL) a wholly owned subsidiary of the Tata Power Company Limited and Adani Power Limited (APL) has developed thermal power project of capacity 4000 MW and 4620 MW respectively at Tunda – Vandh villages. Tank farms of HPCL and IOCL are situated on north side of existing port. Huge salt works are operational near western and eastern boundaries of WFDP. Other industries like Ashapura Garments, Oriental Carbon and Chemical, Bharat Forge and industries in Dhrub GIDC are located near northern boundary of APSEZ.

1.3. Development of Mundra Region by APSEZL

APSEZL is in the process of implementing ambitious waterfront development at Mundra, which envisages holistic Port development plan integrated with ancillary infrastructure development. This Water Front Development Project (WFDP)

includes development of four ports at different locations within the port limit of Mundra. They are known as West Port, South Port, North Port & East Port. Out of which so far substantial progress has been achieved at West Port & South Port.

West Port at present includes four berths specifically to handle coal which further feeds to the Adani Power plant and Tata Power in the Mundra. South Port at present includes four multipurpose berths and two container berths to handle different types of cargo. The master layout of Water Front Development Project is enclosed herewith for your reference.

In order to serve the need of various industries which may come up as part of Multi-product SEZ at Mundra, APSEZL envisages additional multipurpose berthing facility to serve the need of potential industries in and around the Mundra region. The proposed facilities would include berthing and backup facility for cargo operations without hindering the present commercial cargo movement from the existing port.

Mundra Thermal Power Project is located in the close vicinity of Mundra Port. The power plant is one of the coal-based power plants of Adani Power. It is the world's fifth-largest single location coal-based thermal power plant as well as India's largest operational power plant in private sector.

Any large scale infrastructure development will undoubtedly impose certain impacts on environment. In view of the above APSEZL, with their holistic approach and concern towards environmental impacts intended to conduct cumulative Environment Impact Assessment.

Chronology of developments by Adani Group, respective environment clearances and present status of developments are given in following table.

Development	Date of EC	Present Status
<i>Port</i>		
M/s. Adani Port – general cargo, LNG and chemical terminal	25 th August 1995	Fully operational
Expansion of port as GAPL – container terminal, railway line	20 th September 2000	Fully operational
SPM and crude oil terminal	21 st July 2004	Fully operational
Multipurpose Berth – Terminal 2	5 th February 2007	Fully operational
Waterfront Development Plan – west port, south port, north port and east port	12 th and 19 th January 2009	South Port and West port are partially operational. No construction is commenced in East and North Port area
<i>Power Plant</i>		
Phase I – 660 MW	29 th and 30 th November 2007	Fully operational
Phase II – 1980 MW	8 th April 2008	Fully operational
Phase III – 1980 MW	20 th May 2010	Fully operational
<i>Special Economic Zone</i>		
Air strip	30 th November 2005 – clearance from Ministry of Defence	Fully operational
Township	20 th February 2010	Partially developed and operational
CETP	20 th February 2010	Partially developed and operational
Multiproduct SEZ	4 th – 5 th June 2012 – recommended by EAC	APSEZL is yet to start infrastructure development. 20 units have come up as part of SEZ and part of them are operational as per their respective approvals.

2.0 Proposed Terms of Reference for Cumulative EIA

Following scope of work is proposed for the cumulative impact assessment based on the EIA Notification 2006, EIA manual for Port and Harbor, EIA manual for thermal projects and also various TORs issued recently for ports and harbor projects.

2.1. Compilation of EIA reports, ECs, compliance reports and additional studies

Environmental clearances, compliance reports of respective clearances and supporting documents of following developments will be compiled and reviewed.

- Existing port
- Waterfront development
- Special Economic Zone & its existing units
- Multipurpose Berthing Facility
- Power Plants (Adani Power & Tata Power)
- Airstrip
- Ship Recycling Facility
- Crane Roll-on Jetty near Intake Channel
- Other industries in hinterland (if available)

2.2. Review of following studies conducted by APSEZL

APSEZL have conducted many environmental studies as a part of ToR issued and EC compliance. Following studies conducted by APSEZL will be compiled and reviewed.

- Hydrodynamic modeling reports
- Shoreline changes studies
- Oil spill modeling reports
- Dredge disposal studies
- Risk assessment studies
- Success of mangrove afforestation studies
- Air quality modeling studies

2.3. Environmental Impact Assessment

Cumulative and regional level impacts of developments in Mundra region will be predicted based on review and data analysis of earlier studies. MoEF approved software tools will be used for this purpose. For study purpose, 10 Km periphery boundary of the project area will be considered.

2.3.1. Impacts on Land Environment

- Regional level impacts of infrastructure development and utilities on land, ground water, productive soil, drainage system and flooding pattern will be studied.
- Impacts due to quarrying, level raising and tree felling/plantation will be assessed.
- Salinity ingress aspect will be studied. All bore well sample results in 40 km stretch will be studied for salinity ingress.
- Leaching of chemicals will be studied to predict impacts of port activities and fly ash pond.
- Emission inventories will be developed considering emissions from ships, terrestrial vehicles, power plant emissions, natural dust and sea salt particles. Regional level air quality modeling will be carried out using approved software tools.
- Traffic survey will be conducted on weekdays and weekends.
- Noise emission modeling will be conducted over an area of 10 km radius using software models
- Change in Land Use pattern will be studied using GIS tools. Drainage pattern, soil erosion, settlements and change in vegetation will be assessed.
- Water balance of all ETPs STPs and power plants will be studied. Sewage, wastewater generation and disposal and its impacts on land environment will be studied.
- Quantitative Risk Assessment will be carried out for cargo handling, fuel storage, chemical handling and transport.
- Socioeconomic impacts will be studied to assess per capita income, change in BDL and overall health of community.
- Dredged soil management (limited to terrestrial aspects only)
- Land side chemical spills and associated impacts
- Ecological impacts during construction and operational phases

2.3.2. Impacts on Marine Environment

- Hydrodynamic modeling will be conducted on regional level (from Tunda-Vandh to Luni-Bhadreshwar) to assess impacts current/wave pattern and sediment transport.
- Shoreline changes will be studied.
- Impacts due to desalination plant and reject outfall will be studied for Temperature, Marine Biota & Fisheries point of view.
- Chemical spill and oil spill simulations will be conducted on regional level
- Sediment contamination study will be done at all dredging and dredged spoil disposal sites.
- Thermal dispersion modeling of power plant outfall will be reviewed.
- Impact on marine productivity, mangroves and fishery will be studied using scientific statistical tools.
- Regeneration of benthos at dredged and dredged spoil disposal sites will be studied.

2.3.3. Impacts on Mangroves

A comparative analysis of impacts of dredging and reclamation, thermal outfall near mangroves areas will be assessed against conservation measures and afforestation in Mundra region.

2.4. Review of MoEF Committee Report and NGT cases

- Observations made by MoEF committee on development in Mundra region will be studied.
- Mitigation and management plan will be prepared in response to committee finding
- All NGT cases if any against the development in Mundra will be reviewed and suitable management plan will be developed.

3.0. Environment Management Plan

Regional Management Plan will be developed to meet MoEF regulations and guidelines

- MARPOL regulations and implementation plan
- Air quality management plan
- Water consumption reduction and opportunities for reuse and recycle
- Wastewater treatment and recycling
- Sewage treatment
- Action plan for solid and hazardous waste generation, storage, utilization and disposal
- Dredged soil disposal and utilization for reclamation
- Risk mitigation plan and disaster Management Plan
- Biodiversity enhancement plan
- Green belt development
- Need based CSR plan based on the primary and secondary socioeconomic data
- Inputs for Adani Foundation's ongoing efforts for community development plan
- Risk analysis & management
- Disaster management plan
- HAZOP
- Natural calamities i.e. Cyclone, Tsunami, Earthquake, Fire, Floods etc.

Annexure-18



**GOVERNMENT OF GUJARAT
FORESTS & ENVIRONMENT DEPARTMENT
BLOCK NO. 14, 8TH FLOOR, SACHIVALAYA
GANDHINAGAR - 382 010.**

**HARDIK SHAH
DIRECTOR (ENVIRONMENT) &
MEMBER SECRETARY, GCZMA**

**Ph : (079) 23251062
Fax : (079) 23252156
Web: www.gczma.org
E-mail direnv@gujarat.gov.in**

Ref. No.ENV-10-2013-118-E

December 19, 2014

To,
✓ Shri P.N.Roy Chowdhury
Head-Environment
M/S Adani Port and SEZ Limited,
Adani House, Near, Mithakhali Six Roads,
Navarangpura, Ahmedabad

Sub: Approval of the TORs for Cumulative Impact Assessment studies to be undertaken by the APSEZL-regarding

Ref: (1) Letters No: F.NO.10-47/2008-IA-III dated 30th September, 2013 addressed to the Principal Secretary, Forests and Environment Department, Government of Gujarat, and Chairman, GCZMA received from the Ministry of Environment and Forests, Government of India
(2) Minutes of the meeting of 23rd GCZMA meeting

Dear Sir,

Based on various complaint/representation received about violations of the CRZ Notification 2011 and Environmental Clearances conditions by the APSEZL, the MOEF, GOI constituted a five member committee under Chairperson of Smt Sunia Narain, CSE, Delhi to make site visit and to conduct inspection and submit the report to the MOEF, GOI. The above said Committee visited the site and submitted its report to MOEF, GOI on 18-04-2013 with various recommendations.

After detailed examination of the recommendations made by the committee and response submitted by the APSEZL, the MOEF, GOI has accepted the recommendations of the Committee. Now based on the recommendations made by the Committee in its report, the MOEF, GOI vide its letter dated 30th September, 2013 has requested State Government and Gujarat Coastal Zone Management Authority to take

various actions including to guide and supervise the Cumulative Impact Assessment studies to be undertaken by the APSEZL for the project already granted so that future developments can be assessed for clearance based on cumulative impacts. Accordingly, the APSEZL was requested to submit draft TORs. The APSEZL submitted draft TORs.

The matter was discussed in the 11th and 12th Technical Committee meetings , which were held on 17-05-2014, and 21-07-2014 and the APSEZL was requested to submit details about detailed methodology to be adopted for each components to be included in CEIA alongwith locations, time frame, various models to be used for Air , water, Soil, flora , fauna and marine environment, hydrology of the area(River, Nallah etc), Biodiversity(Each parts should be elaborated) and Socioeconomic study. It was also suggested to come out with certain crucial parameter(like PHCs, DO, Heavy metals etc) to be included in the study. It would be useful to consider the impact of disposal of sewage from the Mundra Town to identify the future impacts on the region. It was also decided to call detailed draft TORs as per above discussion. The matter was discussed in the 23rd GCZMA meeting, which was held on 16-10-2014 and it was decided to approve TORs as discussed during Technical Committee's meetings.

Considering the decision of GCZMA, the State Government hereby approves TORs for Cumulative Impact Assessment studies to be undertaken by the APSEZL as follows:

Following components would be included as part of CEIA:

- Effects on ambient conditions such as the incremental contribution of pollutant emissions in an air shed
- Increases in pollutant concentrations in a water body or in the soil or sediments, or their bioaccumulation
- Reduction of water flow in a watershed due to multiple withdrawals
- Increases in sediment loads on a watershed or increased erosion.
- Interference with migratory routes or wildlife movement.

- Secondary or induced social impacts, such as in-migration, or more traffic congestion and accidents along community roadways owing to increases in transport activity in a project's area of influence.
- Coastal erosion and hydrodynamic aspects
- Disturbances to the coastal eco-system and mud-flats
- Regional ecological and biodiversity aspects
- Natural steams and storm water runoff
- Fresh water resources (quality and quantity)
- Ground water resources (quality and quantity)
- Sea water ingression and salinity issues
- Regional air quality impacts
- Regional traffic scenarios
- Solid and hazardous waste disposal aspects
- Fishing and horticulture aspects
- Socioeconomic impacts
- Studies about the biodiversity, Oil Spill, Hazardous Chemical Handling Plan, Offsite an Onsite emergency Plan shall have to be incorporated.
- Long-term Plan and Short term plan shall also be prepared.

All existing facilities developed within 10 km radius would be considered for the study.

The following areas and period for study would be considered for CEIA:

- For Air quality monitoring boundaries will be 10Km from APSEZ area.
- For Water quality monitoring boundaries will be decided after the study of watershed in the APSEZ area.
- For marine monitoring the boundaries will be 12 Nautical Miles from the APSEZ area
- For socioeconomic study administrative boundaries of Mundra Taluka, Mandvi Taluka and some villages from Anjar Taluka will be considered

- Pre development status and development till next **15 years** will be considered as part of proposed cumulative impact assessment.
- Impact scenarios after 5 years, 10 years and 15 years will be predicted.

The APSEZL has obtained several clearances based on various EIA reports prepared, which could be used for identification of future impacts based on the collection of present data and using models for prediction impacts and comparing with present data , which could established the usefulness of models to be used for future predictions of impacts.

It is also suggested to include the number of locations to be used for CEIA and Impacts on marine biota including the mangroves in the region and terrestrial flora and fauna of the region.

As a part of the Regional Economic Development, the APSEZL may include Economic and Social study, longevity etc. The Health study may include the Occupational changes /health profiles of villagers.

The APSEZL shall submit compliance report to the GCZMA/ MOEF&CC, GOI along with outcomes of all study reports with negative and positive impacts

Thanking You

Yours sincerely,



(Hardik Shah)

Annexure-19

ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

POST BAG NO:1, VILLAGE:DHRUB

TAL: MUNDRA,KUTCH

MUNDRA 370421 GUJARAT,INDIA

Phone:02838-271181-186 Fax:02838-255460

E-Mail:purchase@adani.com

PURC/F/012

To, CHOLAMANDALAM MS RISK SERVICES LTD DARE HOUSE, SECOND FLOOR , NO:2, N S C BOSE ROAD,,, -CHENNAI-600001 TAMIL NADU,INDIA, Phone :044-30445445 Mobile:91-99400-47988 Fax :044-30445550 Email :shankardr@cholams.murugappa.com Vendor Code : 207956 Kind Attn:	SO No 5700172656 SO Date 10.02.2016 Proj/CC Code & Name 2110080 APSEZ-MUND-EHS-ENVIR
Vendor Excise & Tax Reg. Details VAT / TIN No NOT APPLICABLE CST No Excise ECC No Service Tax Reg. No AABCC6610QST001 Tan No. Pan No. AABCC6610Q Import Export Code	Our Excise & Tax Registration Details VAT No & Date 24073400493 CST No & Date 24573400493 Excise ECC No NOT APPLICABLE Range AR-VIII Division SERVICE TAX DIVISION-II Commissionerate SERVICE TAX, AHMEDABAD Service Tax Reg. No AAACG7917KSD002 WEF: TIN No 24073400493 LST No 24073400493 PAN No AAACG7917K TAN No AHMG00515E Import Export Code 800009665 CIN L63090GJ1998PLC034182 Our Contact Details Buyer: Madhu Mohan Tej Teegala Phone: 07925555775 E-Mail: madhumohan.tej@adani.com

Dear Sir,

We are pleased to issue this Service Order for the scope of work mentioned below, subject to the terms and conditions contained herein and in the annexure/s to this SO. Any annexure to this Service Order shall form integral part of the SO and in case there is any contradiction in the different documents with regard to any provision, the order of precedence shall be as mentioned in General terms & conditions.

Scope of Work

The proposed cumulative environmental impact assessment study activities will be grouped into seven (7) components as stated hereunder:

Task 1: Collection of published secondary data from various government, research and Adani group studies etc

Task 2: Baseline environmental monitoring (Terrestrial and marine environment)

Task 3: Terrestrial cumulative impact modeling and predictions (Air, ground water, surface water, sea water ingress, waste disposal, ecological and socioeconomic aspects etc)

Task 4: Marine cumulative impact modeling and predictions (shoreline change,

For ADANI PORTS AND SPECIAL ECONOMIC ZONE LIMITED

For CHOLAMANDALAM MS RISK SERVICES LTD,

Authorised Signatory

Reg.Office: POST BAG NO:1, VILL:DHRUB TAL: MUNDRA MUNDRA-370421 Phone: Fax:

Admin.Office:'Adani House', Nr. Mithakhali Circle, Navrangpura, Ahmedabad Phone: Fax:

Date:24.02.2016 Time :14:24:01

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erosion/accretion, mangrove eco-system, nutrients balance & food chain impacts, silting and sedimentation, oil spill modeling, marine outfall modeling etc).
Task 5: Terrestrial cumulative area level environmental management plan
Task 6: Marine cumulative area level environmental management plan
Task 7: Integrated long term regional strategic environmental management plan.

Service Order Currency RUPEE

Price & Conditions (Priced BOQ attached for breakup)

	Currency	Amount
SERVICE ORDER PRICE INCLUDING DISCOUNT	INR	13000000.00
SERVICE TAX	INR	1820000.00
SWACHHA BHARAT CESS	INR	65000.00
Total Service Order Price :		14,885,000.00

In Words, RUPEE ONE CRORE FORTY EIGHT LAKH EIGHTY FIVE THOUSAND ONLY

Taxes & Duties :

Service Tax as per applicable rate.

Commencement Date 10.02.2016 Completion Date 09.02.2017

Milestones

Commencement Date: From the date of Service Order.

Completion Date: Entire scope of work shall be completed within 10-12 months from the commencement date.

Terms & Conditions:

Payment Terms: (Z998) See Payment Terms

As per Annexure I.

Retention Clause

NA

Bank Guarantee

NA

Taxes & Duties

Service Tax as per applicable rate.

Special Terms & Conditions

1. The project is estimated to be completed in 12 months period from the date of issue of SO.
2. In the event the project is delayed beyond 24th month from the date of commencement of the study due to some policy decision of Adani Group or due to delays in regulatory reviews, additional fee of Rs. 1 lakh per month will be charged.
3. In the event of pre-closure of the project after commencement of the baseline studies, 70% of the total project cost shall be paid.
4. Service Taxes as applicable will be charges extra.

(Buyer's Authorised Signatory)

**(Vendor's/Service Provider's
Authorised Signatory & Stamp)**

- 5. Baseline data collection shall be in the scope of M/s. Chola MS Risk Services.
- 6. Stakeholder consultations i.e. ground work, coordination & communication shall be in the scope of M/s. Chola MS Risk Services.

Annexures

Annexure - I: Milestone Payment Schedule

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(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE I
Bill of Quantity (BOQ)

Serial No.	Service Code/Description	UOM	Quantity	Rate	Amount
10.	320004858	LUMP SUM	1.000	13000000.00	13000000.00
	CONSULTANCY SERVICES				
				Subtotal :	13,000,000.00
				Total Amount	13,000,000.00

in Words, RUPEE ONE CRORE THIRTY LAKH ONLY

Free Issue Material List

Material No	Material Description	UOM	Quantity
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(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE II

General Terms & Conditions

1. DEFINITIONS:

The following terms capitalized and used herein or any other document related to the Contract, shall have the meaning as set forth in this clause [1].

- a) "Contract Price" means the price set out in clause of contract price and includes all adjustments carried out in accordance with these Conditions.
- b) "Contractor" means the person named as the contractor in the Letter of Acceptance issued by the APSEZL unless it be repugnant to the context or meaning thereof shall include its legal successors in title.
- c) "Contractors Equipment" means the equipment, machinery, vehicles, apparatus and all other material as required by the Contractor for the execution and completion of the Work including repairing and remedying of defects. Contractor's Equipment shall exclude APSEZL's Equipment (if any) and any other thing forming a permanent part or section of the Works.
- d) "Contractors Personnel" means all employees, staff and labour of the Contractor as may be notified by the Contractor to the APSEZL.
- e) "Cost" means all expenses reasonably incurred or to be incurred by the Contractor in relation to the Work including overhead and similar charges but does not include profit
- f) "Mobilization" means transporting/establishing of sufficiently adequate infrastructure by the Contractor at port/site comprising of Contractor's Equipment, aids, tools tackles including setting comprising of Contractor Personnel, engineers, supervising personnel and an adequate strength of skilled, semi-skilled and unskilled workers, who, with the so established infrastructure shall be in a position to commence execution of Work at port/site, in accordance with the agreed quality and health, safety and environment requirements and complete the same within the Completion Time.
- g) "Owner" or "APSEZL" means the company, who has agreed the contract, incorporated under the Companies Act, 1956, which shall include its legal successors in title and permitted assignees. All rights, benefits and remedies conferred upon by this contract shall accrue and be available to and are for the express benefit of the APSEZL for which the Services are rendered.
- h) "APSEZL's Personnel" means all employees, staff and labour or representatives of the APSEZL and any other person as maybe notified to the Contractor by the APSEZL.
- i) "Person" shall mean an individual, partnership, limited partnership, corporation, business trust, Joint Stock Company, trust, unincorporated association, joint venture, Governmental Entity or other entity of whatever nature.
- j) "Subcontractor" means any person named in these Conditions or the Special Conditions as the subcontractor and unless it be repugnant to the context or meaning thereof shall include its legal successors in title.

2. INTERPRETATION:

In this Agreement, unless the context otherwise requires:

- a) Under this contract, all the communications, correspondence and all other documents should be written, prepared and supplied in English language unless otherwise specified in the contract.
- b) Words of any gender are deemed to include the other gender;
- c) The terms "hereof", "herein", "hereby", "hereto" and derivative or similar words refer to this entire agreement;
- d) References to all agreement, documents and / or any other instruments include (subject to all relevant approvals) a reference to that agreement, document or instrument as amended, supplemented renovated or assigned from time to time.
- e) Any term or expression used but not defined herein shall have the same meaning as attributed to it under applicable law;
- f) Any reference to a day, unless it is specifically mentioned in this agreement, shall mean a reference to a calendar day.
- g) Any reference to any period commencing "from" a specified day or date and "till" or "until" a specified date shall include both such days and dates.

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(Buyer's Authorised Signatory)

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ANNEXURE II
General Terms & Conditions

h) Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by APSEZL or its duly authorized representative and the Contractor or its duly authorized representative hereto.

i) Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

3. REPRESENTATIONS AND WARRANTIES :

The Contractor hereby represents and warrants to APSEZL as follows:

a) Due Organization of the Contractor.

The Contractor is a corporation duly incorporated, validly existing and in good standing under the laws of India and has all requisite corporate power and authority to own and operate its business and properties and to carry on its business as such business is now being conducted and is duly qualified to do business in all jurisdictions in connection with the performance of its obligations under the Contract.

b) Regulatory Approvals.

All Permits, authorizations by, approvals or orders by, consents of, notices to, filings with or other acts by or in respect of any Governmental Entity or any other Person required in connection with the execution, delivery and performance of the Contract by the Contractor have been obtained or shall be obtained in due course.

c) Requisite Knowledge.

The Contractor represents and warrants that it has all requisite knowledge, know-how, skill, expertise and experience to perform the Work in accordance with the terms of the Contract.

d) Work Standards

The Work shall be rendered with promptness and diligence and shall be executed in a workmanlike manner, in accordance with the Best Industry Practice prevailing in the industry and the Contract. Contractor shall use adequate numbers of qualified individuals with suitable training, education, experience, competence and skill to perform the Work.

e) Efficiency and Cost Effectiveness

Contractor shall use commercially reasonable efforts to provide the Work in the most cost-effective manner, and the required level of quality and performance.

4. SCOPE OF WORK :

In addition to the Scope of work as per Annexure # I attached herewith:

a) Scope of work

The Contractor shall perform the Work as described in this Contract. All Work provided by or for the Contractor to APSEZL shall comply with all relevant applicable Laws, Permits, Specifications, applicable standards and Best Industry Practices. The Contractor shall ensure that all the products and services will, as a minimum, meet the performance and design requirements, functionality and capability defined in the appropriate Specifications.

If any services, functions or responsibilities are not specifically described in the Contract and are an inherent, necessary part of the Work or are necessary for proper performance of the Work in accordance with the Contract they shall be deemed to be included within the scope of the Work as if such services, functions or responsibilities were specifically described in the Contract unless, such services, functions or responsibilities were mutually agreed to be specifically excluded.

b) Permits

The Contractor shall be responsible for obtaining all Permits, approvals, licenses or clearances required for the

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(Buyer's Authorised Signatory)

(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE II
General Terms & Conditions

execution and implementation of the contract and shall acquire the same in its name from all local, state or national Governmental Entities or public service undertakings that are necessary for the performance of the Contract, including, without limitation, labour licenses, visas and entry permits for the Contractor's Personnel and Subcontractor's expatriate/ personnel and licenses for all imported items, equipment, if any.

c) Records of Employment

CONTRACTOR shall maintain proper registers and records under the Factories Act, Minimum Wages Act, Contract Labour Act and for any other applicable law and is required to produce the same for inspection by any Government authorities. The registers should be available for inspection in the port/site premises. APSEZL shall be entitled at all times to carry out any check(s) or inspection(s) of Contractor's facilities, records and accounts to ensure that the provisions aforesaid are being observed by CONTRACTOR and the sub-Contractors and that the workmen are not denied the rights and benefits to which they are entitled under such provisions. Any violation shall, without prejudice to any other rights or remedies available to APSEZL, constitute a ground for termination of the Contract as specifically set forth under termination clause.

d) Contractor's Equipment

The Contractor shall be responsible for all Contractors' Equipment. The Contractor's Equipment brought on to the port / site shall be deemed to be exclusively intended for the execution of the contract. The Contractor's Equipment as well as the manpower required for completing the Works within the stipulated schedule shall be mobilised/demobilized at the port/site by the Contractor at no additional cost to APSEZL.

All Contractors' material brought in to be recorded & routed through Security entry.

The Contractor shall not be entitled to any cost, compensation or damages on account of any delay caused directly or indirectly as a result of the works being carried out by any other contractor or agencies in or around the port/site.

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Port/site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

The Contractor shall indemnify and hold APSEZL harmless against and from all damages, costs, expenses and claims (including legal fees and expenses) resulting from the use, mobilisation and/or demobilisation of the Contractor's Equipment.

e) Co-operation

The Contractor shall coordinate and plan their work and activities in mutually agreed schedule with other contractor(s) at Port/site. However, all efforts will be taken to optimise the resources of all contractors working at the Port/site.

f) Contractor's Personnel, staff and labour

i. Contractor shall assign sufficient Contractor's Personnel and labour to perform the Work and such Contractor's Personnel and labour shall possess suitable competence, ability and qualifications and shall be properly educated and trained for the Work they are to perform.

ii. If APSEZL determines that any of contractor's personnel or labour is not in the best interests of APSEZL then contractor shall replace such personnel or labour with an individual of suitable ability and qualifications, provided, that the contractor shall not effect any such replacement in violation of applicable laws. Nothing in this provision shall operate to limit Contractor's responsibility for the acts or omissions of the Contractor's Personnel. APSEZL reserves the right to restrict entry of such contractor's personnel or labour in the premises of port/site and to terminate the contract without any notice.

iii. The Contractor shall require the Contractor's Personnel, staff, labour, Subcontractors and its personnel (to the extent applicable) to comply with the terms and conditions of the Contract and shall at all times take reasonable care and precautions to prevent any unlawful, riotous or disorderly conduct by Contractor's Personnel, staff, labour, Subcontractors and their personnel at the Port/site.

iv. As a corollary of the above CONTRACTOR is debarred from / not permitted to use or deploy, for his work, manpower of some other agency/ from any other sources. If, on any day, it is found that CONTRACTOR is

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un-authorizedly using manpower from some other source CONTRACTOR shall be liable to appropriate penalty at the absolute discretion of APSEZL. Also if due to/ during such un-authorized deployment of manpower from any other sources, some untoward event such as a accidental injury etc. occurs to such manpower or any damage, injury to others because of negligent actions of such manpower, CONTRACTOR shall be fully and solely responsible for meeting out costs and consequences of the same, both statutory and others as that may occur. Besides, you may also be liable to administrative and / or legal actions as may be considered necessary under the circumstances.

v. In the event of any injury or loss of life to any of Contractor's workers/ staff due any negligence, the APSEZL will not be responsible for the same. The entire responsibility lies with CONTRACTOR. CONTRACTOR is liable to pay the total compensation and all incidental costs arising out of such incident, if any.

vi. The Contractor shall be liable and responsible for all payments to the Contractor's Personnel including salaries, wages, taxes, allowances and other benefits in accordance with the Laws and without any involvement of any middleman and that no amount by way of commission or otherwise is deducted or recovered from the wages of the workmen.

vii. In case of foreign personnel or technicians brought in by the Contractor for the execution of the contract, the Contractor shall be solely responsible for them and shall ensure compliance of all Laws with respect to the said foreign personnel or technicians including obtaining work permits, visas, arranging for accommodation, travel etc.

g) Subcontracting

i. The Contractor shall not delegate, subcontract or assign any portion of Work without the prior written approval of APSEZL, especially from the HR Department for the purposes of ensuring statutory compliance, besides commercial department and user department HOD.

ii. APSEZL's approval/consent shall not however affect the Contractor's responsibility under the Contract. APSEZL shall be provided with copies of the executed agreements. The Contractor shall select the Subcontractors in connection with the performance of the contract such that all products and services provided by any such Subcontractors meet the Specifications and all other requirements set forth in the Contract.

iii. Regardless of approval from APSEZL the subcontractor will not, under any circumstances,

ü Give rise to any claim against APSEZL.

ü Give rise to any claim by contractor against APSEZL if such subcontractor breaches its subcontract or contract with the contractor.

ü Create any contractual obligation by APSEZL to the Subcontractor.

ü In any way release the Contractor from being solely responsible to APSEZL for the Work to be performed under the Contract.

iv. The Contractor shall remain fully and primarily responsible for the performance of all acts, omissions or faults of such Subcontractors, agents and/or an employee as if they were the acts, omissions, faults of the Contractor.

v. The warranties of the Contractor set forth in the Contract will be deemed to apply to all Work performed by any Subcontractor as though the Contractor had itself performed such Work.

vi. In case any supplier and/or Subcontractor gives warranty over and above as specified in the Contract, the Contractor shall pass such additional warranty to APSEZL (Extended Warranty).

h) Emergency Work

i. If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the port/site, the Contractor shall immediately carry out such work without making demand for extra payments.

ii. If the Contractor is unable or unwilling to do such work immediately, APSEZL may do or cause such work to be done as APSEZL may determine is necessary in order to prevent damage to the port/site. In such event APSEZL shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefore. In such a case, APSEZL shall be entitled to recover the Costs incurred by APSEZL in connection therewith from the Contractor.

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ANNEXURE II
General Terms & Conditions**5. CONTRACT PRICE**

- a) The Contract Price shall be as specified in the appropriate annexure attached herewith.
- b) Unless indicated otherwise in the contract, the Contract Price shall be firm and not subject to any alteration or adjustment.
- c) The Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.
- d) Should APSEZL be required to issue any tax exemption certificate for claiming exemption by the Contractor, then the benefit obtained by the Contractor towards such taxes and duties, shall be passed on to APSEZL.

6. RISK AND RESPONSIBILITY

- a) If Contractor fails to perform the Work in accordance with the Contract, including the Specifications set forth herein, Contractor shall promptly inform, investigate and report on the causes of the problem provide an appropriate root cause analysis report of such failure, promptly initiate remedial action to correct the problem, report to the APSEZL's representatives of the status of remedial efforts being undertaken and provide APSEZL evidence that the causes of such problem have been or will be corrected on a permanent basis.
- b) If any loss or damage occurs during the time when the Contractor is responsible for the Work, the Contractor shall at its own cost and expense, rectify and remedy the damage so that the Works conform to the Contract.

Idle Charges

The Contractor shall not be entitled to any idle/downtime charges for whatsoever reason under the Contract.

7. TAXES AND DUTIES

The Parties' respective responsibilities for taxes arising under or in connection with the Contract shall be as follows:

- a) Each Party and/or Subcontractors shall be liable for any personal property or use taxes on equipment or property it owns, uses, or leases from a third party, and for taxes based on its net income or gross receipts. The Contractor shall be liable for payment of taxes on equipment leases for which Contractor and/or any Subcontractor has financial responsibility.
- b) Contractor shall be liable for all taxes paid or payable by Contractor's Personnel and/or any Subcontractor's personnel, including personal income taxes levied in the Country where the Port/site is located.
- c) The Contractor shall provide and make available to APSEZL any certificates, information regarding sales/purchases or use of equipment, materials, or services, and other exemption certificates or information reasonably requested by APSEZL.
- d) Notwithstanding anything aforesaid, Contractor shall be responsible for payment of any extra cost or expense incurred by APSEZL due to any non compliance, omission, negligence, inefficiency or default by or on behalf of the Contractor or its Subcontractors with respect to the Contractors/ Subcontractors responsibilities hereunder.
- e) The Contractor represents, warrants and covenants that it shall file appropriate tax returns, and pay applicable taxes owed arising from or related to the contract in applicable jurisdictions and shall defend, indemnify and hold the APSEZL, APSEZL's Personnel, employees and agents harmless from and against all claims, demands, suits, proceedings, damages, costs, expenses, liabilities (including, without limitation, legal fees) or causes of action brought against or incurred by APSEZL and/or APSEZL's Personnel, employees or agents.

8. TERMINATION:

- a) The APSEZL shall be at liberty to terminate this Contract without assigning any reason thereof to the CONTRACTOR in the event of following:

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- I. Material breach of any of the terms & condition of this Contract.
 - II. If Contractor Disregards or violates any material Laws, policies, Permits or clearances
 - III. If the Contractor is adjudged bankrupt or insolvent, has a receiving order issued against it, makes a general assignment for the benefit of its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
 - IV. If, by virtue of any order passed by any court of law or any other government authority, the CONTRACTOR ceases to carry out any such activity agreed under this Contract.
 - V. If CONTRACTOR fails to perform the contract to the satisfaction of APSEZL.
 - VI. If CONTRACTOR persistently fails to carry out the instructions of APSEZL.
 - VII. If the Contractor assigns subcontracts or transfers the Contract or any right or interest therein other than in accordance with the Contract.
 - VIII. If Contractor fails to pay to APSEZL any material amount due not otherwise disputed in good faith to APSEZL by the date required for such payment
 - IX. If the Contractor, in the judgment of APSEZL has engaged in fraudulent practices in competing for or in executing the Contract.
 - X. If Contractor fails to comply statutory requirements
- "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of APSEZL, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive APSEZL of the benefits of free and open competition.

- b) Upon receipt of the notice of termination under clause [8] Termination, the Contractor shall either immediately or upon the date specified in the notice of termination cease all further work, except for such work as APSEZL may specify in the notice of termination for the sole purpose of protecting that part of the Works already executed, or any work required to leave the Port/site in a clean and safe condition, remove all temporary site installations, erection / renovation / refurbishment equipment from the Port/site, repatriate the Contractor's Personnel and its Subcontractors' personnel from the Port/site, remove from the Port/site any wreckage, rubbish and debris of any kind, and terminate all subcontracts.
- c) In the event of termination of the Contract under clause [8] Termination, APSEZL shall pay to the Contractor the Contract Price, properly attributable to the parts of the Works executed by the Contractor as of the date of termination and the costs reasonably incurred by the Contractor.
- d) For any termination due to the faults of the Contractor, APSEZL reserves the right to get the balance work done by other agencies at the risk and cost of the Contractor.

9. SUSPENSION

- a) APSEZL may at any time request the Contractor by notice, to suspend performance of any or all of its obligations, with the work to be suspended and the effective date, under the Contract. The Contractor shall thereupon suspend performance of such obligation (except those obligations necessary for the care, protection, security or preservation of the Works) until ordered in writing to resume such performance by the APSEZL.
- b) If the Contractor's performance of its obligations is suspended by APSEZL for the reason of the Contractor's or Subcontractor's default or breach of the Contract, APSEZL will give notice of reasonable days, as the case may be, to the Contractor to remedy the cause of breach or default, failing which the Contract may be terminated pursuant to clause Termination [8]. During such suspension due to Contractor's breach of Contract or default, APSEZL shall be entitled to recover/claim its losses from the Contractor.
- c) During the period of suspension, the Contractor shall not remove from the Port / site any Contractor's Equipment, Plant and Equipment or machinery without the prior written consent of APSEZL.
- d) After the permission or instruction to proceed is given by APSEZL to the Contractor, the Contractor and the

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APSEZL representatives shall jointly examine the Works or the sections affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or sections which has occurred during the suspension after receiving from the APSEZL an instruction to such effect at its own cost and risk.

10. FORCE MAJEURE:

If at any time during the subsistence of this Contract, the parties of the Contract become unable to perform in whole or in part any of its obligation under this Contract due to any cause or circumstance which is beyond its reasonable control, any such failure or delay as is caused by act of sabotage, acts of God, earthquake, subsidence, flood, cyclone, tsunami, hurricane, tempests, epidemics, quarantine restriction, serious industrial disputes, strikes, lockouts, fires, explosions, shipwrecks, civil war, terrorism, act of the public enemy including but not restricted to block of passage, wars, riots, interference by military authorities, compliance with the laws, directives of orders of any law court or government authority. It will not amount to non-fulfillment of the contractual obligation and the parties shall have no right to claim damages from each other. The party affected by Force Majeure shall, within Three (3) days of the occurrence of such circumstance, communicate to the other party by telex / cable / fax or E-mail about the existence of such circumstance and in the event of termination of this circumstance, information shall similarly be given. The parties affected shall make reasonable efforts to mitigate the effect of such Force Majeure.

11. INSURANCE:

a) The CONTRACTOR shall arrange, in the joint name of APSEZL and CONTRACTOR, proper and adequate, comprehensive and full insurance coverage at its own cost for its labours, supervisors, personnel, equipments, tools, tackles, machineries etc. against all risks including but not limited to losses, theft, fire, explosions, riots, malicious damage, atmospheric disturbances, earthquake, cyclone, tsunami, hurricane, tempest, any natural calamity, transit loss / damage within Port/site area, war, act of sabotage, flood, leakage, contamination, tsunami, cyclone or any other natural calamity alongwith the third party liability coverage immediate from the time of the labours, supervisors, personnel, equipments, tools, tackles or any other property of the CONTRACTOR etc. supplied / deployed in the Port/site and until such labours, supervisors, personnel, equipments, tools etc. leaves the Port/site limits at the end of the Contract or earlier determination. Thereafter adequate insurance coverage will be at the Will of the CONTRACTOR. The CONTRACTOR shall also take adequate and all risk insurance coverage under Public Liability and third party liability insurance policy specifically while carrying out stevedoring activity as per the this Contract and / or loading, unloading or handling the cargo at Port/site. APSEZL shall take adequate insurance coverage only for its own equipments, personnel and operating installations. The CONTRACTOR shall submit the original copy of all and any insurance policy to APSEZL.

b) APSEZL shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to this clause [11]. All insurers' rights of subrogation against such co-insured for losses or claims arising out of the performance of the Contract shall be waived under such policies.

c) The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.

d) If the Contractor fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this sub-clause, APSEZL may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. APSEZL under such circumstances shall be entitled for reimbursement from the Contractor for the amount of premiums paid plus 15% towards overhead and the Contract Price shall be adjusted accordingly. Nothing in this clause limits the obligations, liabilities or responsibilities of the Contractor under the other terms of the Contract or otherwise. Any amount not insured or not recovered from the insurers shall be borne by the Contractor in accordance with these obligations,

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liabilities or responsibilities.

e) Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies affected by it pursuant to this clause and all monies payable by any insurers shall be paid to APSEZL as "Loss Payee". APSEZL shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which APSEZL's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of APSEZL.

f) Contractor shall name APSEZL as additional insured on the policy. All other insurances, where APSEZL is not named as additional insured with Contractor, the Contractor shall ensure that APSEZL obtains the benefit of such insurance policies, as Loss Payee.

g) All deductibles, exceptions and exclusions applicable to the Insurance covers shall be for the account of and be paid by the Contractor. Any breach of conditions and/or warranties of the insurance policies by Contractor and/or its Subcontractor shall also be for the account of the Contractor.

12. WAIVER

None of the provisions of this Contract shall be considered waived by APSEZL unless such waiver is reduced to writing and signed by APSEZL. Any waiver or failure by Owner / APSEZL to claim a breach of any of the provisions of this Contract shall not be deemed to be a waiver of any subsequent breach or affecting in any way the effectiveness of such provisions.

13. ENTIRE CONTRACT:

This Contract embodies the entire contract between APSEZL and the CONTRACTOR relating to the work, and the APSEZL shall not be bound by or be liable for any statement, representation, promise, inducement or understanding of any kind or nature relating to the work which is not set forth or provided for herein this Contract. Any work provided for herein which was performed or caused to be performed by APSEZL prior to the date of this Contract shall be deemed to have been performed under this Contract.

14. GOVERNING LAW:

The Contract shall be interpreted, construed and governed by the Laws of India. The courts situated at Mundra, in the State of Gujarat, India shall have exclusive jurisdiction in all matters relating to the Contract for the purpose of action and proceedings arising out of the Contract.

15. CHANGE IN LAWS AND REGULATIONS

a) If, after the Contract Date there is introduction of a new Law or a change in the existing Laws, ordinances, statutes, rules, regulations, orders or decrees (but excluding changes to tax laws where such taxes are based upon Contractor's inventory, income, profits/losses or cost of finance) which were not known or foreseeable and become effective after the Contract Date and have direct impact on Contract Price that affects the costs and expenses of the Contractor, the Contract Price shall be correspondingly changed, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract.

b) Such Change in Law provision shall be applicable only if, enacted on or prior to the expiry date of the contract.

c) If due to enactment of such Change in Law, APSEZL is entitled to recover the amount, same shall be recovered from the final due payment and if such amount exceeds the final due payment, then Contractor shall pay additional amount exceeding final payment against a claim by APSEZL.

16. CONFIDENTIALITY

a) All information including, without limitation, all oral and written information, disclosed by APSEZL, APSEZL Personnel (Disclosing Party) to the Contractor or any Person acting for and on behalf of the Contractor (Receiving Party) is deemed to be confidential, restricted and proprietary to APSEZL (hereinafter referred to as

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"Proprietary Information").

b) Except as specified in the Contract, the information supplied is required to accomplish the intent of, and in accordance with the terms of, the Contract. The Receiving Party shall provide the same care to avoid disclosure or unauthorized use of the information as it provides to protect its own similar proprietary information. All information, including all copies of such information, unless otherwise specified in writing (a) remains the property of the Disclosing Party, (b) shall be used by the Receiving Party only for the purpose for which it was intended, and (c) shall be returned to the Disclosing Party or destroyed after the Receiving Party's need for it has expired or upon request of the Disclosing Party, and, in any event, upon expiration or termination of the Contract.

c) For the purposes hereof, information does not include information that:

- i) is published or otherwise in the public domain or is properly within the legitimate possession of the Receiving Party
- ii) subsequent to disclosure to the Receiving Party is lawfully received from a third party having rights in the information without restriction of the third party's right to distribute the information and without notice of any restriction against its further disclosure;
- iii) is independently developed by the Receiving Party, by itself or through parties who have not had, either directly or indirectly, access to or knowledge of such information;
- iv) is obligated to be produced under order of a court of competent jurisdiction or other similar requirement of a Governmental Entity, provided that the Receiving Party required to disclose the information provides the Disclosing Party with prior notice of such order or requirement.

17. ASSIGNMENT

This Contract and the rights and liabilities hereunder shall bind and inure to the benefit of the respective successors of the Parties hereto. The CONTRACTOR shall not be entitled to assign or transfer any of its rights and / or liabilities hereunder to any third person, without the prior written consent of APSEZL. However, APSEZL, at any time and its sole discretion, during the subsistence of this Contract, can transfer, assign and / or appoint any other CONTRACTOR(s) for the same scope of work agreed herein this Contract, at the risk and cost of CONTRACTOR, at Adani Ports/site without obtaining any prior consent of the CONTRACTOR, if,

- a) CONTRACTOR fails to perform.
- b) CONTRACTOR fails to follow the instructions of APSEZL.

18. AMMENDMENTS / MODIFICATIONS

No modification, waiver or amendment of any term or condition of this Contract shall be effective unless and until it shall be reduced to writing and signed and executed by both the Parties hereto or their legal representatives. All legally required amendments made by consent of both the Parties will automatically become a part of this Contract.

19. PENALTY:

APSEZL reserves its rights to impose penalty on the CONTRACTOR for the following failures:

- a) Any material breach of any terms and conditions of this Contract by the CONTRACTOR or its labours, supervisors and / or personnel etc.
- b) Failure to comply with APSEZL safety and security policy.
- c) Failure to comply with APSEZL instructions.
- d) Failure to fulfill the minimum requirement of equipment / labour of the desired quality agreed under this Contract as instructed / issued by APSEZL from time to time.
- e) Failure to complete the work in allotted time either specified by railway, ship or APSEZL and / or resulting into direct loss, demurrage, penalty, the same would be recovered from the CONTRACTOR.
- f) Failure to perform the minimum as specified in this contract or as agreed between APSEZL and CONTRACTOR from time to time.

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Penalty shall be levied on the CONTRACTOR to the extent and equivalent to the loss / damage caused / suffered by APSEZL in terms of amount due to failure of the CONTRACTOR or its personnel. Any other penalty on account of failure of the CONTRACTOR shall be determined by APSEZL representative at the time of such failure/damage. APSEZL shall be at liberty and its sole discretion to deduct the amount of penalty towards losses / damages incurred or suffered from the payment of running bills to the CONTRACTOR. In case the amount of loss / damage is in excess of the running bill payable to the CONTRACTOR then APSEZL shall raise an Invoice / debit note for the balance portion of loss / damage amount to the CONTRACTOR. In case of non payment of dues within 7 (seven) days from the date of raising the invoice, the CONTRACTOR shall be liable to pay an interest on the due amount at the rate of 12% p.a.

20. ARBITRATION:

Parties to this Contract shall strive to settle dispute or difference, if any, arising out of and in relation to this Contract amicably. If Parties fail to settle the disputes amicably, the matter shall be referred to sole arbitrator appointed by the COO of APSEZL. The arbitration shall be in accordance with the provisions of Arbitration and Conciliation Act 1996. The place of arbitration shall be Mundra. The decision of the arbitrator so appointed shall be final and binding on both the parties. The CONTRACTOR shall not dispute the appointment of sole arbitrators by COO of APSEZL.

21. JURISDICTION

The courts in MUNDRA shall have jurisdiction in respect of all matters arising out of or pursuant to this Contract.

22. COMPLIANCES

CONTRACTOR shall comply with and ensure strict compliance by his/its sub-Contractors and agents of all applicable Central, State, Municipal and local laws and regulations and undertakes to indemnify APSEZL from and against all levies, damages, penalties, any payments, whatsoever, as may be imposed by reason of any breach or violation of any law, rule or regulation and against all actions, proceedings claims and demand arising there from and/or relative thereto.

23. LABOUR LAWS AND REGULATIONS

A. CONTRACTOR shall be responsible for strict compliance of and shall ensure strict compliance by its sub-Contractors, servants and agents of all laws, rules or regulations having the force of law affecting the relationship of employer and employee between CONTRACTOR /sub-Contractors and their respective employees and / or otherwise concerning labour, social welfare and provident fund, pension, bonus, gratuity and other benefits to employees. Without prejudice to the generality of this provision, CONTRACTOR shall comply with and ensure that sub-Contractors and other agencies employed by him comply with the provision of the payment of Wages Act 1963, Minimum Wages Act 1948, Employers Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maternity Benefit Act 1961, Employees State Insurance Act 1948, Contract Labour (Abolition & Regulation) Act 1970, Payment of Bonus Act, Gratuity Act, Factories Act and the Employees Provident Fund (& Miscellaneous Provisions) Act 1952 as amended from time to time and all rules, regulations and schemes framed there under from time to time.

B. CONTRACTOR will provide necessary safety equipment (PPE) e.g. goggles, gloves, safety shoes, gumboots, masks, apron etc. as per existing norms / factories act to its employees/ workers as and when required. For violation of safety compliances, fine would be charged @ Rs 500/- per incident.

C. CONTRACTOR shall not employ in connection with the work, any person below the age of 18 years.

D. CONTRACTOR will ensure that the work is carried out in a proper manner and no damage or loss to the plant machinery and port/site property. In case of any damage or loss APSEZL will charge as compensation for the loss so incurred.

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E. CONTRACTOR and his sub-contractors shall obtain from the authority(ies) designated in this behalf under any applicable law, rule or regulation (including but not limited to) the Factories Act and Contract Labour (Regulation & Abolition) Act 1970 (in so far as applicable) any and all such license(s), consent(s), registration(s) and/or other authorization(s) as shall from time to time be or become necessary for or relative to the execution of the work or any part or portion thereof or the storage or supply of any material(s) or otherwise in connection with the performance of the contract and shall at all times observe and ensure due observance by the sub-contractors, servants and agents of all terms and conditions of the said license(s), consent(s), regulation(s) and other authorization(s) and laws, rules and regulations applicable thereto. Without prejudice to the generality of this provision, CONTRACTOR shall obtain and ensure that his sub-contractors and other agencies employed by him on the work, obtain a valid License under the Contract Labour (Regulation & Abolition) Act 1970 and shall duly and faithfully observe and comply with the provisions of the Contract Labour (Regulation & Abolition) Central Rule 1971 and other Central and State Rules as amended from time to time and applicable to the work, and shall duly, promptly and faithfully maintain and/or provided in terms thereof or any license granted there under.

F. CONTRACTOR shall be duly registered under the Employees Provident Fund and Miscellaneous Provision Act, 1952 and the Employees State Insurance Act, 1948 (if the area is notified by the Govt. for coverage under the Act) and CONTRACTOR shall duly pay his due contributions and his employees' contribution to the Authorities prescribed under the said Acts and any Schemes framed there under in respect of all labour employed by him for the execution of the contract.

G. On receiving information of any breach, non-fulfillment and/or non-observance by CONTRACTOR and /or his authorised sub-Contractors and other agencies engaged by him in connection with the works or any of the provisions or requirements of any of the Labour Laws, rules and regulations and/or as to the inaccuracy of any of the returns or statements furnished by CONTRACTOR and/or his sub-Contractors and/or any records or accounts maintained by any of them with respect to which APSEZL as the principal employer or otherwise can have a liability, the APSEZL shall be entitled to deduct from the bills and any amounts due or becoming due to CONTRACTOR, under this contract or other contract(s) with CONTRACTOR, any sum(s) required or estimated to be required, in its judgment which shall be final and binding on CONTRACTOR, for making good or compensating for the liability or possible liability of the APSEZL by reason of the said breach, non-fulfillment or non-observance and/or inaccuracy aforesaid.

H. Nothing in the Contract Documents stated shall anyway constitute any Workman / employee of CONTRACTOR or any sub-CONTRACTOR as or to be a Workman / employee of APSEZL, or place obligation or liability in respect of any such Workman / employee upon APSEZL.

I. It is hereby made clear to CONTRACTOR that there is no residence facility in the port/site premises and none of Contractors' staff should reside in the port/site premises.

J. CONTRACTOR will not, directly or indirectly, employ workers or employees from other Contractors working for APSEZL.

K. CONTRACTOR has to comply with all Port/site Rules and Regulations instructions given by authorized officers of APSEZL.

L. The Contractor shall issue identity cards to the Contractor's Workers and each of such person shall display and wear their identity cards all throughout their presence at the site of the Company.

M. CONTRACTOR shall deposit the photo copy of following documents (duly attested) to HR Department of APSEZL every month alongwith the Bills/ Invoices :

- a. PF Challan for the preceding month
- b. wage register for the preceding month
- c. Attendance register of preceding month
- d. Policy for workmen compensation

e. If any of the aforesaid documents are not submitted by CONTRACTOR, deductions as deemed appropriate would be effected from the subsequent running bills / final bill of CONTRACTOR.

N. APSEZL reserves the right to withhold payments of CONTRACTOR in the event of your failure to comply with the labour laws and regulations.

.....
(Buyer's Authorised Signatory)

.....
(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE II

General Terms & Conditions

O. If at any time it is discovered that some of the CONTRACTOR'S employees/ workman have bad antecedents, besides advising the CONTRACTOR to immediately discontinue such labour from APSEZL. work and also not deploying them to any other group company or associate company of APSEZL., penalty as deemed suitable may also be levied on the CONTRACTOR and would be deducted from ongoing bills.

P. APSEZL reserves its right to review, edit and enlarge and / or modify these clauses as APSEZL may deem necessary to ensure fuller compliance of various matters pertaining to labour laws and regulations governing engagement of contract labour.

24. Health, Safety, Environment and Security Clause

The contractor shall comply with all Health, Safety, Environment and Security rules and regulations of APSEZL , along with appropriate health, safety, environment and statutory requirements, and safety and security activities of APSEZL, in all areas that fall within the Port, SEZ and associated working areas.

The Contractor shall be solely responsible for ensuring that the safety and security standards are maintained on Port and that the Contractor, Contractor's Personnel, staff, labour, Subcontractors and their personnel and/or any Person acting for on behalf of the Contractor complies with the applicable safety rules and standards.

Before commencing work at APSEZL, the Contractor will ensure that the personnel being deployed:

1. will be over 18 years of age
2. will have no Police Record
3. will have no record of alcohol or drug abuse
4. will have no chronic or contagious diseases
5. will be physically and mentally fit
6. will be a trained and competent person
7. will be provided with Personnel Protective Equipment (Safety Helmet, High Visibility overalls, Safety shoes, working gloves, safety goggles) as required for the work being carried out
8. will have completed the APSEZL Basic Safety Induction course.

On commencement of work, they must follow all APSEZL safety rules and regulations, traffic routings and guidelines. Personnel Protective Equipment must be worn whenever a person is in any open area of the port.

A copy of the APSEZL Contractor Safety and Security Handbook is attached to this agreement contains all the Health, Safety, Environment and Security rules and regulations to provide guidance for compliance.

Any breach of Adani Ports & SEZ Health, Safety, Environment and Security rules and regulations could result in suspension of work, statutory fines, claims for delays and damages / injury etc. and/or cancellation of the agreement.

The Contractor shall indemnify and keep APSEZL harmless against all claims, demands, actions, proceedings, etc. that may be made or initiated against APSEZL or that may be suffered by APSEZL by reason of anything done by the Contractor or its staff, pursuant to non compliance of any safety and/or security measures in execution of the Works.

25. OTHER CONDITIONS

APSEZL reserves right to divide the work between two or more Contractors solely at its discretion without any objection or hindrance from CONTRACTOR.

This contract can be terminated by either of the parties by giving 1 months notice to the other party.

Proper account for materials supplied by APSEZL shall be maintained by CONTRACTOR and a monthly report shall also be given by CONTRACTOR to APSEZL and recovery for the wastage, loss of such material would be reasonable.

26. RELATION OF PARTIES

.....
(Buyer's Authorised Signatory)

.....
(Vendor's/Service Provider's
Authorised Signatory & Stamp)

ANNEXURE II
General Terms & Conditions

- a) APSEZL and CONTRACTOR are independent parties. Nothing in this Contract shall be deemed to create a partnership, franchise, employment, or agency relationship between the parties.
- b) In case of breach of its obligations under this Contract by CONTRACTOR leading to disruption of service promised hereunder, it shall be competent for the Company to procure the service from the other Contractors and in that event CONTRACTOR shall be liable to reimburse to the Company additional Cost if any incurred on such procurement of service.
- c) APSEZL reserves the right to recover for all damages for any breach of the term and condition of the contract.

27. INDEMNIFICATION (LOSS OF DAMAGE TO PROPERTY, ACCIDENT/ INJURY TO WORKERS)

The Contractor shall defend, indemnify and hold APSEZL, APSEZL's Personnel, officers, agents and employees harmless from and against all claims, demands, suits, proceedings, damages, costs, expenses, liabilities (including, without limitation, legal fees) or causes of action (collectively, "Liabilities") brought against or incurred by APSEZL for (a) injury to Persons (including physical or mental injury, libel, slander and death) caused by (or relating to the strict liability of) the Contractor, Contractor Personnel, any Subcontractor or its or their respective officers, employees, representatives or agents, (b) loss or damage to real and tangible property, caused by (or relating to the strict liability of) the Contractor, any Subcontractor or its or their respective officers, employees, representatives or agents (c) violations of Laws, Permits, clearances, codes, ordinances or regulations by the Contractor or any Subcontractor, or (d) any other liability or loss that shall: (i) have resulted from any negligent or wilful act or omission or from the default of the Contractor, Contractor's Personnel or any Subcontractor or its or their respective officers, employees, representatives or agents in the performance of the Contract; or (ii) shall be a liability or loss for which the Contractor or any Subcontractor are legally liable.

The Contractor shall be responsible for all damages incurred by APSEZL as a result of any damage or injury caused by or resulting from the fraud, gross negligence or willful misconduct of the Contractor, Contractor's Personnel, Subcontractors or its personnel.

(Buyer's Authorised Signatory)

**(Vendor's/Service Provider's
Authorised Signatory & Stamp)**

Annexure – 20

To,
Director (Environment) & Member Secretary,
Gujarat Coastal Zone Management Authority,
Sachivalaya,
Gandhi Nagar

Subject: Submission of final report for Cumulative Impact Assessment at Mundra

Reference:

- (1) Your office letter no. ENV-10-2013-118-E dated 19.12.2014
- (2) MoEF&CC order vide F. No. 10-47/2008-IA-III dated 18.09.2015
- (3) Our submission of 1st progress report vide letter dated 10.09.2016
- (4) Our submission of 2nd progress report vide letter dated 27.07.2017

Dear Sir,

In view of compliance with the directions issued by MoEF&CC, GCZMA in its 21st meeting held on 07.02.2014 has directed APSEZ to submit Terms of Reference (ToR) to undertake a "Cumulative Impact Assessment study for the projects already granted Environmental Clearance (EC) and CRZ clearance in the region so that future developments can be assessed for providing necessary approvals at a later stage".

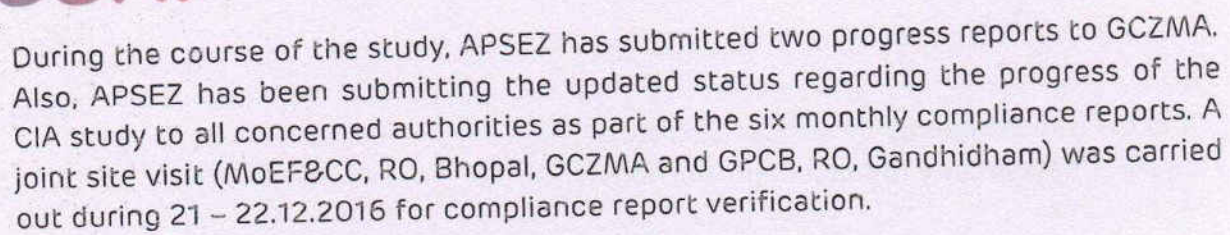
Further to the submission of ToR and subsequent discussions, GCZMA has approved ToR for undertaking Cumulative Impact Assessment (CIA) study vide letter no: ENV-10-2013-118-E dated 19.12.2014.

In view of the above, APSEZ appointed M/s. Choramandalam MS Risk Services Limited (CMSRSL) for carrying out CIA Study.


Further, an order was issued by MoEF&CC vide F. No. 10-47/2008-IA-III dated 18.09.2015, with specific directions to APSEZ. Below mentioned directions relate to the need of CIA study.

xi) A regional strategic impact assessment report with a special focus on Mundra region will also be prepared. The cost towards these studies will also be borne by PP.

x) In the subject matter of thermal power plant, the proposed regional strategic impact assessment analysis will take in to account salinity aspect along with its potential environmental impact to suggest future corrective actions as well as the guiding tool on extension and additional of the capacities.



In continuation to our earlier submissions, we would like to inform you that the CIA study is now completed (including baseline data collection, completion of all the technical studies to identify possible impacts on various environmental attributes and drafting a suitable macro level environment management plan) and the final report is enclosed for your consideration.


Shalin Shah
Head – Environment

Copy to: Sh. Kushal Vashist, Director, MoEF&CC, Indira Paryavaran Bhavan, Jor bagh road, Aliganj, NewDelhi

15/11/8
पर्यावरण विभाग, भारत सरकार
Ministry of Environment, Forests & Climate Change
भारत सरकार, भारत
इन्दिरा पार्क, जलेश्वर, दिल्ली
जोरबाग रोड, जलेश्वर, दिल्ली
नई दिल्ली/New Delhi-110003

Annexure-21

04.01.2019

To

Director (Environment) & Member Secretary
Gujarat Coastal Zone Management Authority
Sachivalaya
Gandhinagar

Subject: Cumulative Impact Assessment (CIA) report for Mundra

Reference:

- (1) Your office letter no. ENV-10-2013-118-E dated 19.12.2014
- (2) MoEF&CC order vide F. No 10-47/2008-IA-III dtd 18.09.2015
- (3) Our submission of 1st progress report vide letter dtd 10.09.2016
- (4) Our submission of 2nd progress report vide letter dtd 27.07.2017
- (5) Our submission of final report vide letter dtd 30.04.2018

Dear Sir

Vide above references, we would hereby like to submit that, APSEZL has already completed the CIA studies of Mundra region as per the approved ToR, issued by your good office vide letter dated 19th December 2014. Report has already been submitted vide our earlier letter dated 30th April 2018 for consideration.

In view of above, it is kindly requested to inform us for further necessary actions, if any to be taken by APSEZ.

Thank you

Yours sincerely


Shalin Shah

Head - Environment

Annexure-22

Organogram of Environment Management Cell, APSEZ, Mundra

