

# AM/NS Ports

Ref. No. APHL/ENV/MoEF&CC/EC-2014/2023-24(1)

To

The Inspector General, Forests  
Scientist – "C"

Integrated Regional Office, Aranya Bhawan,  
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Date: 24<sup>th</sup> November 2023

Subject: Submission of Half Yearly Compliance Report for the EC & CRZ Clearance granted for "Expansion of Port Facilities at Hazira, Gujarat". Compliance Period – April 2023 to September 2023 for year 2023-24.

Reference: EC & CRZ Clearance Letter issued by the Ministry of Environment, Forests and Climate Change (MoEF&CC) vide F.No. 11-46/2011-IA.III dated 6<sup>th</sup> May 2014.

Dear Sir,

We are hereby submitting the Half Yearly Compliance Report of the EC & CRZ Clearance granted for "Expansion of Port Facilities" at Hazira, Gujarat, received vide F.No. 11-46/2011-IA.III dated 6<sup>th</sup> May 2014. This compliance status is from April 2023 to September 2023. Also, a copy of this report has been marked to the E-Mail ID of your good office.

This is for your kind perusal and records.

Thanking You,

Yours' Faithfully

For, AMNS Ports Hazira Limited (formerly known as, ESSAR Bulk Terminal Limited)

Capt. Rituparn Raghuvanshi  
Head – Ports, Hazira, AMNS Ports Hazira Limited



Encl:

1. Half Yearly Compliance Report. Compliance Period – APR'23 to SEP'23
2. Annexure 1 to Annexure 6,

CC:

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## AMNS Ports Hazira Limited

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CIN U13100GJ2004PLC043477

**SMARTER  
STEELS  
BRIGHTER  
FUTURES**

Half Yearly Compliance Report  
 Period: April 2023 to September 2023  
 Year 2023-24

File No.: F.No. 11-46/2011-IA.III

EC Details: *Environment and CRZ Clearance for Expansion of Port Facility at Hazira, Surat, Gujarat,*

Date of Issue: 6<sup>th</sup> May 2014

A	Specific Conditions					
S.No	Condition	Compliance Status				
i)	<p>“Consent for establishment” 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.</p>	<p><b>Complied.</b>                      For this project, first Consent to Establishment (CTE) was granted vide Letter No. GPCB/CCA-SRT 1189(2)/ID_22972/135405, CTE No. 48131 dated 23/01/2013 from the Gujarat Pollution Control Board (GPCB) which was valid till 16/01/2017. A copy of the same has been submitted to the Regional Office (RO), Ministry of Environment, Forests and Climate Change (MoEF&amp;CC), Bhopal, along with the six-monthly compliance report submitted vide Letter No. EBTL/ENV/COMP-MOEF/2015/1<sup>st</sup> dated 29<sup>th</sup> June 2015.                      Amendment to first CTE was received vide Letter No. GPCB/CCA-SRT-1189(3)/ID-22972/422702 dated 12/09/2017 with CTE No. 48131 valid up to 16/01/2020. The same has been submitted to the RO, MoEF&amp;CC, Bhopal along with the six-monthly compliance report submitted for period of April 2017 to September 2017.</p>				
ii)	<p>Project proponent shall appoint a consultant to look after and advice on the transportation of dangerous chemicals.</p>	<p><b>Complied.</b>                      As per the proposal, the Liquid Cargo Terminal (LCT), is proposed to handle bunker fuel, naptha and other petrochemical products. We have appointed DNV to conduct risk assessment study for handling these liquid cargos. DNV has submitted the report which states that:</p> <ol style="list-style-type: none"> <li>1. The maximum Location Specific Individual Risk (LSIR) in the terminal is <math>10^{-4}</math> per year which covers the whole storage terminal,</li> <li>2. The workers spending all their working time at the facility experiences the maximum Individual Risk Per Annum (IRPA) of <math>5.07 \text{ E-}5</math> per year which comes under ALARP region,</li> <li>3. The societal risk is in ALARP region for low fatality whereas it is in acceptable zone for higher level of fatality.</li> </ol> <p>Although, the individual and societal risk levels are found in ALARP region, following preventive measures are proposed in the report to further lower the Risk Levels:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Status as of Now</th> </tr> </thead> <tbody> <tr> <td>Fire and Smoke Detector at</td> <td>Will be included in designing of Liquid Berth and will be installed during the construction phase itself.</td> </tr> </tbody> </table>	Condition	Status as of Now	Fire and Smoke Detector at	Will be included in designing of Liquid Berth and will be installed during the construction phase itself.
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Half Yearly Compliance Report,  
Period: April 2023 to September 2023,  
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A	Specific Conditions	
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	Sensors for early detection of leakage of propylene and butadiene shall be provided at berths along with water sprinklers.	suitable locations
		Audio-Visual Public Address System to be provided Various sign boards regarding safety practices to be adopted during work are displayed on many locations within premises for existing port facilities. Awareness and warning signs are also displayed at many locations. An audio system for Public Addressing is also provided and controlled from safety office.
		Strict ignition control should be implemented within the terminal At many places "No Smoking Policy" has been provided. It is a general practice to take the necessary permit prior to doing any hot work at the premises.
		Proper Emergency Alarm System An Emergency Alarm System has been provided for the existing port facilities.
		Note: This compliance is for the existing port facilities. Berth for LCT is not commissioned yet. Apart from these, some other precautions were also advised in the report like tampering secured site, awareness about the Escape and Evacuation Policy, Mock drills etc. Currently, we are not handling liquid cargo, therefore the said sensors and early detectors of leakage systems along with water sprinklers will be provided before the start of liquid cargo handling.
iii)	Project proponent shall ensure proper flushing/free flow of tidal water to the mangroves.	Complied. Although the mangrove area is naturally being flushed by the tidal water, hume pipes have also been provided so that the tidal water can reach the mangroves without any obstruction.
iv)	Project proponent shall submit once in 12 months the latest satellite imagery to MoEF to ensure that mangroves are remains fully intact. Any shrinkage in mangrove area noticed either in satellite imaginary or during site visit, shall be taken as violation.	Noted and being complied on Regular Basis. We have appointed M/s. Gujarat Institute of Desert Ecology (GUIDE), Bhuj to conduct mapping of the designated mangrove area through satellite imagery. Report for FY 2022-23 is attached as Annexure 1 with this report.
	The project Proponent shall get third party inspection	Complied. As per the Circular No. GPCB/EA-326/422737 dated 12 <sup>th</sup> September 2017; Schedule-1 Auditor appointed by Gujarat





Half Yearly Compliance Report,  
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A		Specific Conditions
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	carried out once in a year preferably by NEERI to ensure compliance of all the Environmental Clearance (EC) conditions.	Pollution Control Board (GPCB) conduct annual environment audit, reports of which are submitted to GPCB and uploaded on their web portal. Audit report for FY 2021-22 is submitted vide Letter No. EBTL/ENV/GPCB-HO/EAR/2022-23 on 27 <sup>th</sup> June 2023. Please refer Annexure-2 for the inward proof along with summarized version of the audit report. Also, M/s. Kadam Environment Consultants, a MoEF&CC accredited Environmental Consultant has been appointed and carried out inspection of environmental conditions and the report has been submitted along with the half yearly EC Compliance report for the period of April 2022 to September 2022.
vi)	There shall be no encroachment of project activities in the mangrove area.  The various referral distances / latitudes / longitudes as indicated in the enclosed map (Annexure-II) shall be maintained for the conservation of this mangrove area within the port limit.	Complied. Project activities are being carried out by taking care of the condition that none of the activity (construction or operational) cause any kind of encroachment to the existing mangrove area.  During the mangrove mapping study for FY 2022-23, Annexure-II was also considered by M/s. GUIDE. The report states that "referral distances indicated are maintained for conservation of this mangrove area".
vii)	Stock yard on northern side (Hazira Village side) shall be provided with bund and wind screen of at least 15m height with well-designed water supply fogging arrangement along with three rows of trees in canopy formation.	Complying. Commissioning of wind fence with 15 m height is under progress. 
viii)		A 10 m thick greenbelt with 3 rows plantation all along the boundary including the northern side of stock yard which is now fully developed and maintained. Noted and will be Complied.





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	The height of coal stack yard shall be at least 2 feet below the height of wind curtain.	The construction of wind fence is in progress. Upon the construction of wind fencing is completed, it will be ensured that height of coal stack should be well below the height of the wind fence.
ix)	Greenbelt shall be provided all along stack yard and in the premises.	Complied. A 10 m thick greenbelt with 3-rows plantation has been developed all along the boundary of the port and stack yard.
x)	The existing coal conveyor from berth to stock yard shall be closed with cover since the present water spray appears to be inadequate.	<p>Noted and Complied. Bulk material is being handled by means of closed conveyor system only. Transfer junctions are also provided with closed canopy to reduce the fugitive dust generation right from the source.</p>  <p style="text-align: center;"><b>Canopy provided at the transfer junction</b></p> <p>Also, as per the observation made in Point No. (x), frequency of water sprinkling (by means of mobile water tankers) on internal roads as well as on the stack area has been increased. Apart from that we have provided a 22 m high sprinkling system / fogging system to reduce the suspended dust particles.</p> 
xi)		Noted and Complied.



A	Specific Conditions	
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	The transportation in the proposed facility shall be in closed conveyor only.	Wherever possible, the transportation of bulk material is being carried out by the means of closed conveyor only.
xii)	Natural drainage system shall be maintained so that there is free flow to the existing mangroves. Mangrove plantation in 500 ha of land in consultation with GEC/Forest department, Government of Gujarat.	<p><b>Noted and Complied.</b></p> <p>Natural drainage system has been maintained in order to ensure the free flow to the existing mangrove area. Since year 2008 to 2013, around 500 ha of mangrove plantation has been carried out at Dandi village, taluka Olpad, Ankalav village at taluka Hansot and Asarsa, taluka Jambusar in consultation with Gujarat Ecological Commission (GEC) and Saline Area Vitalization Enterprises Limited (SAVE).</p> <p>Against the stipulated 500 ha of this EC &amp; CRZ Clearance, 100 ha of mangrove plantation has been carried out by M/s. SARVA Services and M/s. SAVE between 2020 to 2022. The plantation was carried out in Suva and Nada villages of Vagra and Jambusar talukas, District Bharuch, Gujarat which is now in maintenance phase.</p> <p>In addition to these, a work order has been issued to M/s. SARVA Services in October 2022 for another 50-ha mangrove plantation in intertidal mudflat area of village Nada, taluka Jambusar of Bharuch District. The plantation work is in progress.</p>
xiii)	There shall be no disposal of wastes in to the coastal areas.	<p><b>Noted and Continuously Complying.</b></p> <p>Trade effluent is nil.</p> <p>A 40 KLD sewage treatment plant has been provided for the treatment of sewage and domestic waste.</p> <p>Solid waste is being collected, segregated and being sent to municipal solid waste site. Hazardous waste is being kept in designated hazardous waste storage area from where it has been sent to GPCB approved re-refiner/recycler for final disposal / treatment. Thus, there is no disposal of waste in coastal area.</p>
xiv)	Hazardous chemicals except the permissible Petroleum products shall not be stored with in CRZ area. All the construction, storage shall be as per the CRZ Notification'2011.	<p><b>Noted and Agreed.</b></p> <p>Any hazardous chemicals except the permissible petroleum products are not stored within CRZ area. All the construction, storage will only be as per the CRZ Notification'2011 and its amendments.</p>
xv)	All the conditions/recommendations stipulated by Gujarat Coastal Zone Management Authority vide their letter no	<p><b>Noted and being complied.</b></p> <p>We are complying with the condition mentioned in the letter issued by GCZMA vide Letter No. ENV-10-2011-877 E dated 01-06-2013.</p>





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A	Specific Conditions	
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	ENV-10-2011-877 E dated 01-06-2013 shall be complied with.	<ul style="list-style-type: none"> <li>• All the activities (construction and operational) were carried out as per the conditions of CRZ Notification and its amendments,</li> <li>• Activities have been carried out in a way so that their will not be any hindrance to the natural drainage and free flushing of mangrove area. Please refer to Specific Condition No. (iii), of this report. Apart from that it is also ensured that there should not be any waste disposal in coastal areas and there should not be any ground water withdrawal from the same.</li> <li>• Since year 2008 to 2013, around 500 ha of mangrove plantation has been carried out at Dandi village, taluka Olpad, Ankalav village at taluka Hansot and Asarsa, taluka Jambusar in consultation with Gujarat Ecological Commission (GEC) and Saline Area Vitalization Enterprises Limited (SAVE).</li> <li>• Against the stipulated 500 ha of this EC &amp; CRZ Clearance, 100 ha of mangrove plantation has been carried out by M/s. SARVA Services and M/s. SAVE between 2020 to 2022. The plantation was carried out in Suva and Nada villages of Vagra and Jambusar talukas, District Bharuch, Gujarat which is now in maintenance phase,</li> <li>• In addition to these, a work order has been issued to M/s. SARVA Services in October 2022 for another 50-ha mangrove plantation in intertidal mudflat area of village Nada, taluka Jambusar of Bharuch District. Plantation work is in progress.</li> <li>• Conveyor system as well as the transfer points are of closed type only,</li> <li>• We have taken all the necessary permission like construction approval from GMB which was received vide Letter No. GMB/N/PVT-1/836/289 dated 30<sup>th</sup> September 2015. CTE from GPCB received vide Letter No. GPCB/CCA-SRT 1189(2)/ID_22972/135405, CTE No. 48131 dated 23/01/2013. Approval for Diesel Storage was granted vides Letter No. A/P/HQ/GJ/15/5714(P340804) dated 01/09/2014,</li> <li>• Conditions mentioned in the EIA conducted by WAPCOS are complying. Please refer to Specific Point No. (xix), of this report for details.</li> </ul> <p>A detailed compliance report of the recommendation letter is attached as Annexure 3 along with this report.</p>
xvi)	Oil spill contingency plan shall be put in place.	<p><b>Complied.</b></p> <p>An Oil Spill Contingency Plan (OSCP) last updated in December 2016 is in place. Starting with a brief on port facilities. This plan will provide a view of risks that can be countered. It also details the equipment held by the port facility, the management responses &amp; strategies to be</p>



A	Specific Conditions	
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		followed during emergencies, communications points, and the procedures to be taken into consideration.
xvii)	Hydrocarbon monitors with provision for alarms set at specific concentrations shall be installed at strategic locations on the berth and around storage tanks as per ISGOTT and OISD.	<b>Noted and will be complied.</b> Hydrocarbon monitors with provision of alarm set will be provided as per the ISGOTT and OISD standards before the commencement of liquid terminal.
xviii)	On site Emergency Management plan shall be put in place.	<b>Complied.</b> An emergency response plan in compliance with BS 45001:2018 Occupational Health and Safety Management System Standard Clause 8.2 is in place.
xix)	All the recommendation of the EMP, Risk assessment and DMP shall be complied with letter and spirit.	<b>Noted and being complied.</b> Compliance to the Recommendations of EMP is mentioned below: <ol style="list-style-type: none"> <li>1. Greenbelt has been developed along the port boundary with 3-rows plantation. Another 6-rows thick greenbelt has been developed covering the stack area,</li> <li>2. For fugitive dust emissions control, sprinkling system has been provided in hoppers, conveyor belt interchange points within the cranes,</li> <li>3. Mobile water tankers are deployed for water sprinkling at roads,</li> <li>4. Operational 40 KLD sewage treatment plant,</li> <li>5. Membership of GPCB approved re-refiner/recycler has been taken for handling of Hazardous waste,</li> <li>6. Oil spill contingency plan is in place. Equipment for control of oil spill like oil boom, skimmers, shore boom are available to treat any emergency,</li> <li>7. Fire-fighting equipment are in place. Fire water line with hydrants at appropriate locations has been provided at berth. Fire extinguishers are also provided at appropriate locations,</li> <li>8. Monitoring of air, water, noise and marine parameters has been conducted as per the environmental monitoring programme,</li> <li>9. Full time environment engineer working at manager level reporting to the Head-Ports.</li> </ol> <b>Recommendations of Risk Assessment</b> Risk assessment for the proposed liquid berth has been conducted by DNV and the report has been submitted. Construction of liquid terminal is not yet started; therefore, the recommendation made by DNV will be implemented from the designing phase only. Emergency Response Plan / Disaster Management Plan is in place. It contains the details of team which deals with





A	Specific Conditions	
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	<p>All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to MoEF along with half yearly compliance report to MoEF – RO.</p>	<p>emergency / disaster, roles and responsibilities of team members and management in case of any emergency / disaster, reporting mechanism within plant and to external agencies, important contact numbers to be called in case of emergency, details of escape plan, etc. In case of any emergency, the Incident Observer (Site In-charge) immediately communicates the incident to the Head Action Team (Fire and Safety, Medical, Designated Employees), Head Security and Incident Controller. Incident Controller (IC) accesses the emergency and will communicate the same to the Site Main Controller on immediate basis. IC at site analyses the situation and takes control to deal with the emergency.</p> <p>The said matrix for the mitigation measures and their implementation status are presented in Annexure 4 of this report.</p>
xx)	<p>The port shall ensure that the ship under operation follows the MARPOL convention regarding discharge or spillage of any toxic, hazardous or polluting material like ballast water, oily water or sludge, sewage, garbage, etc. The emission of NOx and SOx shall remain within the permissible limits.</p>	<p><b>Noted and being complied.</b></p> <p>We ensure that the ship under operation follows the MARPOL convention regarding discharge or spillage of any toxic, hazardous or polluting material like ballast water, oily water or sludge, sewage, garbage, etc. Facilitation of discharge of sludge, sewage and garbage generated at ships is being carried out by calling GPCB approved vendors. Ship's generated waste is discharged directly into approved vendor's trucks, and it is disposed of as per established environment and government norms. Vendors are responsible for disposal of waste as per the norms. Presently the port is not handling any noxious or hazardous cargo.</p> <p>Regarding the air pollution, below practices are followed to ensure that NOx and SOx emissions are well below the permissible limits:</p> <ol style="list-style-type: none"> <li>1. Pre-screening of ships is done for physical suitability and validity of statutory certificates prior it arrives our terminal,</li> <li>2. International Air Pollution Prevention (IAPP) Certificate of ships is checked for its validity, if not valid ship is rejected by terminal,</li> <li>3. Once vessel arrives at port, random visual checks are carried out by marine officers for any discolored or black smoke coming from ship's funnel. If observed, physical verification is being carried out by the terminal representative.</li> </ol>



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xxi)	The hazardous wastes generated shall be collected and disposed as per rules. Disposable wastes shall be sent to authorized TSDF, MoU in this regard shall be submitted to the RO, MOEF along with six monthly monitoring reports.	<p><b>Complied.</b>                      The hazardous waste is being collected and stored in designated hazardous waste storage area and is taken by Gujarat Pollution Control Board approved re-recycler/ re-processor.</p>					
xxii)	The dredging materials shall be utilized for reclamation and excess shall be disposed at the site identified by CWPRS.	<p><b>Noted and being Complied.</b>                      Reclamation is carried out only by the dredging material and the excess of the same is being disposed on the site specified by CWPRS vide their Technical Report No. 4907 submitted in December 2011.</p>					
xxiii)	A study to determine the reasons for increase in cancer patient in the vicinity shall be carried out.	<p><b>Noted.</b>                      Community Medicine Department of Government Medical College, Surat has carried out study on "Status of Cancer Diseases in the Vicinity of Port Facility, Hazira" during March 2016 to May 2016 and submitted the report.                      It is reported that total prevalence of cancer among surveyed population is 3.63 per 1000 population per 10 years. More than two-third cancer cases were found in the age group of 35-64 years which comprised of only one quarter of the surveyed population. Also, majority of the cancers found were of oral cavity, tongue, oesophagus, oropharynx and pharynx unspecified. It is also reported that among the cancer patients' tobacco smoking was the most common addition. No cases of cancer were observed in the age group 0-14 years which accounts for 15.47 % of surveyed population.</p>					
xxiv)	A separate Environment monitoring cell shall be set up especially for this plant and details shall be submitted to the Ministry prior to the commencement of operation.	<p><b>Complied.</b>                      We have a full-fledged Health, Safety and Environment (HSE) team working at the port. Details were already provided to the ministry with earlier submitted compliance reports. Environment monitoring cell is taken care by environment engineer reporting to the Head – Ports.</p>					
xxv)	Controlled cutter suction dredging shall be used along with the enclosure to contain the turbidity.	<p><b>Noted and being complied.</b>                      Controlled cutter suction dredger is being used for the dredging activities.</p>					
xxvi)	The responses/commitments made during public hearing	<p><b>Being complied.</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Compliance Status</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		Condition	Compliance Status		
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	shall be complied with letter and spirit.	Preference to Locals in employment.	In terms of employment, locals (based on their skills) from Hazira and other nearby villages are given priority. Currently, approximately 250-300 numbers of locals have been appointed by the port facility and the same practice will be followed.
		Essar should contribute to the growth of Hazira Village through CSR.	Emphasizing Socio-Economic Development, CSR activities are mainly focused on Infrastructure Development, Education, Health and Sanitation, Vocational Trainings in study area.
		Trucks and Trailers of Hazira people should be used in Essar while awarding contracts	For any contractual work, first preference will always be given to the villagers in the nearby area. At present, around 60% of the transportation contacts are given to locals.
		EBTL project effect Fishermen. What plans for them?	There is no restriction to anyone for fishing in the area. Moreover, this area declared as No Fishing Zone by Gujarat Maritime Board (GMB).
		Essar should inform the pros and cons of the project to the people of Hazira	Public Hearing was conducted during the EIA Study of the project.
		There should be a disaster management plan, fire station, hospital and escape route	Disaster Management Plan / Emergency Response Plan is in place. We have a dedicated department to firefighting. An operational Occupation Health Center (OHC) is present in port premises. Apart from that, a full-fledged Hospital is present in the township close to the port.



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		<p>The industry should be established at few km away from village. Hazira village is surrounded by industries.</p> <p>This is a port facility that needs waterfront area. Moreover, the project site is around 1 km from the nearest village.</p>
		<p>When ports like Adani, Essar would be implemented, pressure on the roads would increase which is dangerous for the local people.</p> <p>Port is connected to NH-6, constructed by NHAI and is prepared by considering the existing traffic road.</p>
		<p>State &amp; Central Laws should be strictly followed at Essar Bulk Terminal Hazira.</p> <p>Noted and being followed.</p>
		<p>Diseases like cancer are increasing day by day in nearby villages. The future of Hazira would be handicapped like that of Hiroshima and Nagasaki</p> <p>Community Medicine Department of Government Medical College, Surat has carried out study on "Status of Cancer Diseases in the Vicinity of Port Facility, Hazira" during March 2016 to May 2016 and submitted the report. Majority of the cancers found were of oral cavity, tongue, oesophagus, oropharynx and pharynx unspecified. It is also reported that among the cancer patients' tobacco smoking was the most common addiction.</p>
		<p>Due to developments along Tapi estuary and reclamation the flooding of Surat during monsoon would increase</p> <p>Before the start of port activities, CWPRS conducted number of mathematical model studies and concludes that there would not be any adverse impact on flushing of rainwater through mouth of Tapi as the mouth is 10 km wide and that significant deepening of the channel would assist in draining flood water to the sea more efficiently.</p>





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		Besides the expansion is parallel to the flow of Tapi River which will not obstruct the flow.
xxvii)	CSR activities shall cover the villages within 10 km radius. CSR for fisherman shall be carried out as committed.	Complying
xxviii )	There shall be no ground water drawl within CRZ area.	Noted and Complied. There is no ground water withdrawal from CRZ area.
xxix)	Sewage shall be treated and the Treatment facility shall be provided in accordance with the Coastal Regulation Zone Notification 2011. The disposal of treated water shall confirm the regulation of State Pollution Control Board.	Complied.
xxx)	Solid waste management shall be as per Municipal Solid (Management and Handling) Rules'2000.	Noted and complied. Solid waste generated in port is segregated, stored and then sent to municipal solid waste disposal site, Construction and demolition (C&D) waste as and when generated is stored in our own premises and disposed as per the Construction and Demolition Waste Management Rules, 2016. No disposal of C&D waste in coastal areas. At any point of operations throwing, burying or burning of solid waste will not be envisaged.
xxxi)	The Project shall be executed in such a manner that there shall not be any disturbance to the fishing activity.	Agreed. The navigation channel of Tapi estuary has been declared as no fishing zone by Gujarat Maritime Board (GMB). However, artisanal fishermen are never obstructed to do fishing and they continue.
xxxii)	It shall be ensured that there is no displacement of people, houses or fishing activity as a result of the project	Not applicable.
xxxiii)	No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	Noted and agreed. No construction works other than those permitted in Coastal Regulation Zone Notification will be carried out in Coastal Regulation Zone area.



Half Yearly Compliance Report,  
Period: April 2023 to September 2023,  
EC Details: F.No. 11-46/2011-IA.III dated 06/05/2014

A		Specific Conditions	
S.No	Condition	Compliance Status	
xxxiv)	The project proponent shall set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of senior executive.	Complied. We have a separate environment cell, with a full-time manager level person having master's degree in Environment Process & Design, working under the Head - Ports. Environment Cell is responsible for effective implementation of environmental safeguards in port premises.	
xxxv)	The funds earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.	Noted and agreed. Expenditure details on environmental parameters for year April 2023 to September 2023 is as follows:	
		Particular	Expenditure
		Dust Control and Horticulture (Water Taker)	11,70,488/-
		Greenbelt Development	10,47,246/-
		Monitoring of Environmental Parameters	2,81,162/-
		Mangrove Plantation & Mangrove Mapping	7,65,500/-
		STP	5,15,460/-
		Total	37,79,856/-
B		General Conditions	
1	Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality	Being complied. To eliminate / minimize dispersion of sediment during piling activities, "Bored cast in-situ" piling technique is being used in the project.	
2	Full support should be extended to the officers of this Ministry's Regional Office at Bhopal and the officers of the Central and State Pollution Control Boards by the project proponents during their inspection for monitoring purposes, by furnishing full details and action plans including the action taken reports in respect of mitigative measures and other environmental protection activities.	Complied.	





Half Yearly Compliance Report,  
 Period: April 2023 to September 2023,  
 EC Details: F.No. 11-46/2011-IA.III dated 06/05/2014

A		Specific Conditions
S.No	Condition	Compliance Status
3	The six-monthly reports shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bhopal regarding the implementation of the stipulated conditions.	Complied regularly.
4	Ministry of Environment or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environmental and the same shall be complied with.	Noted and Agreed.
5	The Ministry reserves the right to revoke this clearance, if any of the conditions stipulated are not complied with to the satisfaction of the Ministry.	Noted and Agreed.
6	In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment and Forests.	Noted and Agreed.
7	The project proponents should 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	<p><b>Noted</b></p> <p>Till date 1100 m multipurpose berth, part of 4800 m of water front has been completed. The project expenditure is done through the internal accruals of the company and no fresh loan is taken. Consent to Establish for the same has been granted on 23.01.2013 vide CTE No. 48131 which was amended and received vide Letter No. GPCB/CCA-SRT-1189(3)/ID-22972/422702 dated 12/0/2017. Land Development work started on 30.09.2015 and is in progress. Combined Consent and Authorization (CCA), for the said project was received vide Letter No. GPCB/CCA-SRT-1189(3)/ID_22972/349978 dated 23.03.2016 which was valid till 29.07.2020, which is further extended till year 2025 vide consent order No. AWH-109664 dated 09.10.2020. Pursuant to the takeover by AMNS Ports Hazira Limited, revised CCA with name change has been received vide letter No. GPCB/CCA-SRT-1189(3)/ID_22972/747314 dated 12.07.2023 (Ref. Annexure 5).</p> <p>Regular update of the progress has been informed to the Ministry by submission of our Half yearly Compliance Reports.</p>

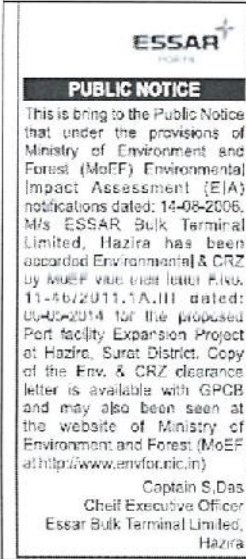
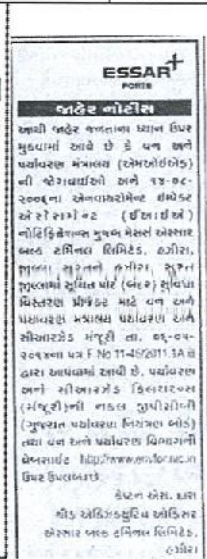


Half Yearly Compliance Report,  
 Period: April 2023 to September 2023,  
 EC Details: F.No. 11-46/2011-IA.III dated 06/05/2014

A		Specific Conditions
S.No	Condition	Compliance Status
8	A copy of the clearance letter will be marked to the concerned panchayat/local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.	Complied. Letter along with a copy of Clearance Letter was submitted to the Gram Panchyat, Hazira on 16/05/2014.
9	The Gujarat Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industries Centre and Collector's office/Tehsildar's office for 30 days.	Complied by GPCB.
10	These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 2006, including the amendments and rules made thereafter.	Noted & Agreed.
11	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	Complied. Approval for Diesel Storage has been received from the good office of Chief Controller of Explosive vides Letter No. A/P/HQ/GJ/15/5714(P340804) dated 01/09/2014 and is valid for 10 years.





A	Specific Conditions			
S.No	Condition	Compliance Status		
12	<p>The project proponent should advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned informing that the project has been accorded environmental clearance and copies of clearance letters are available with GPCB and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://www.envfor.nic.in">http://www.envfor.nic.in</a>. The advertisement should be made within 7 days from the date of issue of the clearance letter and a copy of the same should be forwarded to the Regional Office of this Ministry at Bhopal.</p>	<p>Complied.</p> <p>Advertisement has been given in two newspapers on 13/05/2014. The same has been communicated to the MoEF&amp;CC, Bhopal on 22/07/2014 and the copy of the same submitted vide our EC compliance report dated 29/06/2015.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">English – Western Express</td> <td style="width: 50%; text-align: center;">Gujarati – Gujarat Samachar</td> </tr> </table> <div style="display: flex; justify-content: space-around;">   </div>	English – Western Express	Gujarati – Gujarat Samachar
English – Western Express	Gujarati – Gujarat Samachar			
13	<p>This clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.</p>	Noted and agreed.		
14	<p>Any appeal against this Environmental Clearance shall lie with the National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997</p>	Noted. There was no complaint for this Environment Clearance within the stipulated time.		
15	<p>Status of compliance to the various stipulated environmental conditions and environmental safeguards will be uploaded</p>	Complying.		



Half Yearly Compliance Report,  
Period: April 2023 to September 2023,  
EC Details: F.No. 11-46/2011-IA.III dated 06/05/2014

A	Specific Conditions	
S.No	Condition	Compliance Status
	by the project proponent in its website.	
16	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/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.	Copy of clearance letter was submitted to Gram Panchyat Office. Also, the issues raised during PH were addressed in the final EIA report and was submitted to the MoEF&CC. Copy of EC and CRZ Clearance has been uploaded in company's website.
17	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.	<b>Complying on regular basis.</b> Status of compliance for the stipulated EC Conditions in terms of six-monthly compliance reports are being uploaded in the company's website of regular basis. As per the OM dated 14 <sup>th</sup> June 2022, issued by the MoEF&CC, we are now uploading the status of the compliance of the stipulated EC Conditions on the module available on PARIVESH. In addition to these, we are also intimate and submit the said reports to the good offices of IRO-MoEF&CC, Gandhinagar, GPCB-HO Gandhinagar and GPCB-RO Surat and forwarding the physical copies as well.
18	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.	<b>Complying on regular basis.</b> As per the OM dated 14 <sup>th</sup> June 2022, issued by the MoEF&CC, we are now uploading the status of the compliance of the stipulated EC Conditions on the module available on PARIVESH. In addition to these, we are also intimate and submit the said reports to the good offices of IRO-MoEF&CC, Gandhinagar, GPCB-HO Gandhinagar and GPCB-RO Surat and forwarding the physical copies as well.
19	The environmental statement for each financial year ending 31 <sup>st</sup> 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	<b>Complied.</b> Environment Statement (Form-V) is being regularly submitted to the good office of Gujarat Pollution Control Board (GPCB). For the year 2022-23 the Statement has been submitted vide Letter No. EBTL/ENV/GPCB/Form-V/2022-23 dated 20 <sup>th</sup> September 2022. Please refer to Annexure-6.





A	Specific Conditions	
S.No	Condition	Compliance Status
	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.	

For, AMNS Ports Hazira Limited (FKA, Essar Bulk Terminal Limited)

Capt. Rituparn Raghuvanshi  
Head – Ports, Hazira,  
AMNS Ports Hazira Limited  
27<sup>th</sup> KM, Surat-Hazira Road,  
Village Hazira, Choryasi taluka,  
Surat – 394 270  
Gujarat.



# Final Report for Mangrove Mapping through Satellite Imagery



*Environment Clearance Details: F.No. 11-46/2011-IA.III*

*Issued date: 6<sup>th</sup> May 2014*

*Condition No. (iv)*

Submitted to:

AMNS Ports Hazira Limited

27<sup>th</sup> KM Surat-Hazira Road, Village Hazira, Tal. Choryasi, Dist. Surat,  
Gujarat – 394 270

Submitted by:



**Gujarat Institute of Desert Ecology**

**P.O. Box No. 83, Mundra Road,**

**Bhuj, Kachchh-370001, Gujarat**

**[www.gujaratdesertecology.com](http://www.gujaratdesertecology.com)**

**Year 2022-23**



## **Project Personnel**

**Project Coordinator**

**Dr. V. Vijay Kumar, Director**

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**Mr. Arjan Rabari, JRF**

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# 1. INTRODUCTION

## **Introduction**

The mangroves were primarily used by the coastal community for their day-to-day requirements such as for firewood, fodder, barks for tannin extraction, fruits, and young shoots as vegetables, medicines, and timber. Mangroves discharge several ecological services for the productivity of the coastal environment besides protecting from natural calamities such as tsunamis and cyclones, etc. The long coastlines with mangrove vegetation play an immense role in protecting the coastal biodiversity. The mangrove ecosystem in the Indian Ocean covers 47% world's mangrove area, with 85% world's mangrove species from different habitats having an essential role in the coastal biodiversity of 30 countries that bordered along the Indian Ocean. As many as 55 mangrove species belonging to 22 genera and 18 families have been recorded in the Indian Ocean (Kathiresan and Rajendran, 2005). India's mangroves can be broadly categorised into deltaic, backwater-estuarine, and insular types according to Thom's classification of estuary habitats. Deltaic mangroves are found along the east coast within the deltas of the major rivers and their estuarine environments of India's east and west coasts and in the backwaters, creeks, and neritic inlets of these areas. The insular type of mangrove is found in the Andaman and Nicobar Islands (Kathiresan and Rajendran, 2005).

India with a long coastline of about 7516.6 km, including the island territories has a mangrove cover of about 6,749 km<sup>2</sup>, the fourth largest mangrove area in the world (Naskar and Mandal, 1999). However, a recent assessment shows that India has a total mangrove cover of only 4,992 km<sup>2</sup> ("FSI" 2021). There is an increase of 17km<sup>2</sup> compared to the previous assessment of 2019, and the highest increase was observed in Odisha along the east coast (Bay of Bengal). The mangrove habitats of India (69°-89.5°E longitude and 7°-23°N latitude) comprise of three distinct zones: east coast habitats having a coastline of about 2700 km facing the Bay of Bengal, west coast habitats with a



coastline of about 3000 km, facing the Arabian Sea, and Island Territories with about 1816.6 km coastline. As per the India State of Forest Survey (2021), the state of West Bengal has the maximum cover (2114 Km<sup>2</sup>), followed by Gujarat (1175 Km<sup>2</sup>) and the Andaman and Nicobar Islands (616 Km<sup>2</sup>).

## **1.1. Gujarat**

Gujarat has the second largest mangrove cover in the country after West Bengal. According to the ISFR (India State of Forest Report), 2021, entire Gujarat has 23.53% of the country's mangroves, which constitutes 1,175 km<sup>2</sup>, of which covers 169 km<sup>2</sup> of moderately dense, with the canopy density ranged between 40% and 70%. The remaining 1,006 km<sup>2</sup> area is open sparse mangrove with 10-40% canopy density. Gujarat has the longest coastline among Indian coastal and maritime states, reported to have 15 mangrove species viz., *Acanthus illicifolius*, *Aegiceras corniculatum*, *Avicennia alba*, *Avicennia marina*, *Avicennia officinalis*, *Bruguiera cylindrica*, *Bruguiera gymnorrhiza*, *Ceriops decandra*, *Ceriops tagal*, *Excoecaria agallocha*, *Kandeliacandel*, *Lumnitzera racemosa*, *Rhizophora apiculata*, *Rhizophora mucronata* and *Sonneratia apetala* (Singh, 2020).

### **1.1.1. Gulf of Khambhat**

The Gulf of Khambhat is in the northern part of the Arabian sea has a width of 80 km at the mouth and funnels down to 25 km over the longitudinal reach of 140 km. Entire banks surrounding the Gulf are bordered by large tidal flats nested into numerous tidal creeks. The major rivers/rivulets such as; Ambika, Purna, Kim, Tapti, Narmada, Mahi, Sabarmati and Dhadhar discharge into the Gulf. Mal Bank is a prominent sand shoal present in the northern part of the Gulf while the middle part of the Gulf is deeper with depths ranging up to 30 m. The seabed in most of the Gulf remains in a quasi-steady state and it moves as sand bars with tides. Many offshore oil, gas, and chemical terminals exist and new installations are planned between Hazira and Dahej on the eastern part of the Gulf. On the other hand, the tidal amplitude in the Gulf remains the largest along the Indian coast with spring tidal ranges of around 9 m and resulting in strong currents. Due to strong flood and ebb tidal currents, the water remains always turbid with high





bed and suspended sediment loads. Studies on the sand waves in the Gulf of Khambhat suggest the formation under high-energy hydrodynamic conditions associated with the large tidal waves (Vora *et al.*, 1980), with the finer sediments concentrated at the crests, are derived from the coarse sediments supplied by the Narmada and Tapti rivers.

Along the coastline of the Gulf of Khambhat, the distribution of mangrove cover is around 134 km<sup>2</sup> constituting 11.4% of mangroves of Gujarat (1175 km<sup>2</sup>) as per the latest report of FSI 2021. The major distribution of mangrove patches is observed in the districts of Bharuch (45.38 km<sup>2</sup>), and Surat (19.32 km<sup>2</sup>), mainly located at the river mouths and along with the creek systems. A total of 12 true mangrove species have been recorded from 19 Taluka of the Gulf of Khambhat by the Gujarat Ecology Commission (2009). Surat district has a mangrove cover of 19.32 km<sup>2</sup> distributed in different small patches comprising moderately dense and open mangroves including Hazira as per the latest report of FSI 2021. The total mangrove cover of the Surat accounts for just 1.6 percent of the total mangroves of the Gujarat.

**Table 1.1: District wise Mangrove Area in Gujarat State**

S. No	District	Very Dense Mangroves	Moderately Dense Mangrove	Open Mangrove	Total	Change w.r.t. 2019 Assessment
1	Ahmedabad	0	0.71	25.67	26.38	-4.67
2	Amreli	0	0.00	2.61	2.61	0.24
3	Anand	0	0.00	5.72	5.72	-1.56
4	Bharuch	0	13.33	32.05	45.38	0.94
5	Bhavnagar	0	5.84	15.23	21.07	-0.56
6	Jamnagar	0	28.06	203.20	231.26	1.76
7	Junagadh	0	0.00	3.91	3.91	0.58
8	Kachchh	0	116.14	682.60	798.74	3.97
9	Navsari	0	0.00	11.15	11.15	-1.82
10	Porbandar	0	0.00	1.00	1.00	0.00
11	Rajkot	0	0.90	2.63	3.53	0.00
12	Surat	0	3.87	15.45	19.32	-0.95
13	Vadodara	0	0.00	2.98	2.98	-0.02
14	Valsad	0	0.00	2.02	2.02	-0.14
	<b>Total</b>	<b>0</b>	<b>168.85</b>	<b>1006.22</b>	<b>1175.07</b>	<b>-2.20</b>

Areas are in Sq. km.

Source: India State of Forest Report, 2021



- **AMNS Ports Hazira Limited (APHL)**

AMNS Ports Hazira Limited (Formerly known as Essar Bulk Terminal Limited) is the SPV operating all-weather deep draft jetties at the mouth of River Tapi in Hazira, Gujarat. The SPV operates 1650 m (550 m + 1100 m) long deep draft captive jetties at Hazira. Round the clock dredging operations ensure bigger size vessels can berth at the captive jetties. 550 m jetty is already mechanized with ship unloaders and conveyor belts connected to storage yards. The handling capacity of the jetties shall be enhanced in upcoming years due to the mechanization of 1100 m deep draft captive jetty.

The captive jetties were allotted by Gujarat Maritime Board (authority responsible for development of non-major ports in Gujarat) for handling captive cargo of the Steel plant. The captive jetties function under the administrative control of Magdalla group of ports with Port Officer, Magdalla acting as a Conservator.

APHL has a mechanized facility for handling bulk cargo which ensures faster cargo unloading and quicker turnaround of vessels.

- **Location**

APHL is located on the West Coast of India located at 21°05'48" N and 72°39'27" E near the Gulf of Khambat. The terminal is in the Tapi River Estuarine, connected to the high seas of the Gulf of Khambat by a navigation channel well marked by buoys and beacons.

- **Navigation channel & Turning circle:**

Navigational Channel is ~8.8 km long with turning circle of 600 m diameter.

- **Connectivity:** Road: APHL is connected to NH8 at Navi Pardi junction by a north corridor. Of the 46 km length, 26 km is being developed by the Government of Gujarat as an escape corridor to the Hazira peninsula while the remaining 20 km is the existing State Highway. A south corridor which is the NH6 connects the port to NH8 at Palsana junction.

Rail: There is no direct rail connectivity to APHL. KRIBHCO has a private siding from the Mumbai-Delhi railway line which is located 20 km away from the port. Surat is an important railway station 40 km from the port and is on the broad-gauge route that





connects Mumbai to Delhi. This route is double-tracked, and completely electrified and the tracks are designed to handle faster trains.

- **Marine infrastructure**

AMNS Ports Hazira Limited has six deep draft berths to handle the bulk vessel and general cargo vessels. The total berth length is 1,650 m marked by beacons and buoys, the channel has a bottom-width of 300 m and a turning radius of 600 m diameter along the berth. The terminal can accommodate partially loaded Capsize vessels and fully loaded minicape vessels (105,000 DWT) along with supramax and Panamax vessels. The Supramax vessels equipped with ship gears are handled on the general cargo berths.

## **1.2. Origin of the Study**

The natural mangrove patch is located in the vicinity of APHL, towards the western side of the Tapi estuary. To ensure the ecological health status of this mangrove stand, the Ministry of Environment, Forests and Climate Change (MoEF&CC) through the Environment Clearance issued vide File No. 11-46/2011-IA.III dated 6<sup>th</sup> May 2014, has directed AMNS Ports Hazira Limited (formerly known as, Essar Bulk Terminal Limited) to study the mangrove area through satellite imagery on a yearly basis. In addition, conservation of this ecosystem by formulating management plans for the mangroves through scientific investigation. Therefore, APHL has approached M/s. Gujarat Institute of Desert Ecology (GUIDE) to study the long-term temporal mangrove cover changes in the surroundings of APHL through satellite imagery (LISS-IV). The present report mainly emphasises the status of mangrove cover changes and ecological significance in the vicinity of the APHL.



### **1.3. Objectives of the Study**

1. The specific objective of this study is to map the current extent of mangroves in the specified in the surroundings of AMNS Ports Hazira Ltd. facilities at Hazira and its time series (yearly) changes, if any, through GIS and RS.
2. Monitoring of mangroves in the surroundings of the AMNS Ports Hazira Ltd. area at Hazira through periodic (annual) assessment of the vegetation structure like density, growth, regeneration, and recruitment capacity.
3. Formulating an appropriate management measure based on the results for the sustained wellbeing and conservation of mangroves in the industrial vicinity of AMNS Ports Hazira Ltd., Hazira.
4. Pertaining LISS-IV (MSS) ortho rectified imagery data based on pre-monsoon periods are required use for mangrove mapping study.



## 2. STUDY AREA

### 2.1. Location

The study area is located on the bank of Tapi estuary on Kadiya Bet in the Gulf of Khambhat. The Gulf of Khambhat is located at the south to the north position of the Arabian Sea on the western side of India in the Saurashtra Peninsula. Gujarat coast experiences one of the highest tidal amplitudes; the highest anywhere along the Indian coast (Figure 2.1). Due to its funnel shape and the semi-enclosed nature at the head, the tidal height increases tremendously upstream. The highest spring tide recorded in Gulf is 12.5 m, which is the second-highest tidal amplitude anywhere in the world. This high tidal amplitude, particularly in the upper Gulf has a huge intertidal extent of about 1.5 to 5 km, probably the widest along the Indian coast. The long-shore currents utilizing low waves dominate the open coasts along the Arabian Sea. Nevertheless, due to exceptionally strong flood and ebb tides, powerful tidal currents with a speed of 3 to 4 knots dominate the flow. The maximum velocities of 6 knots associated with high wave energy occur during mid-tide.

The study site falls under the extent of co-ordinates; (1) 21° 04' 19" N, 72°32' 45" E; (2) 21° 04' 11" N, 72° 39' 11" E; (3) 21° 04' 11" N, 72° 39' 18 "E; (4) 21° 04' 13 "N, 72° 39' 17 "E; (5) 21° 04' 11" N, 72° 39' 16" E; (6) 21° 04'14" N, 72° 39' 15" E; (7) 21° 04' 17" N, 72° 39' 0.9" E; (8) 21° 04' 17" N, 72° 39' 06" E; (9) 21° 04' 11" N, 72° 39' 16" E; (10) 21° 04' 17" N, 72° 39' 09" E; (11) 21° 04' 15" N, 72° 39' 07" E; (12) 21° 04' 05" N, 72° 39' 01" E; (13) 21° 04' 18" N, 72° 39' 03" E and (14) 21° 04' 22" N, 72° 39' 02" E, which is located in the vicinity of AM/NS Ports Hazira Ltd., Hazira and the details are given in Figure 2.1. It encompasses an approximate study area of 110.5 ha, in which three prominent mangrove patches are located within these coordinates.





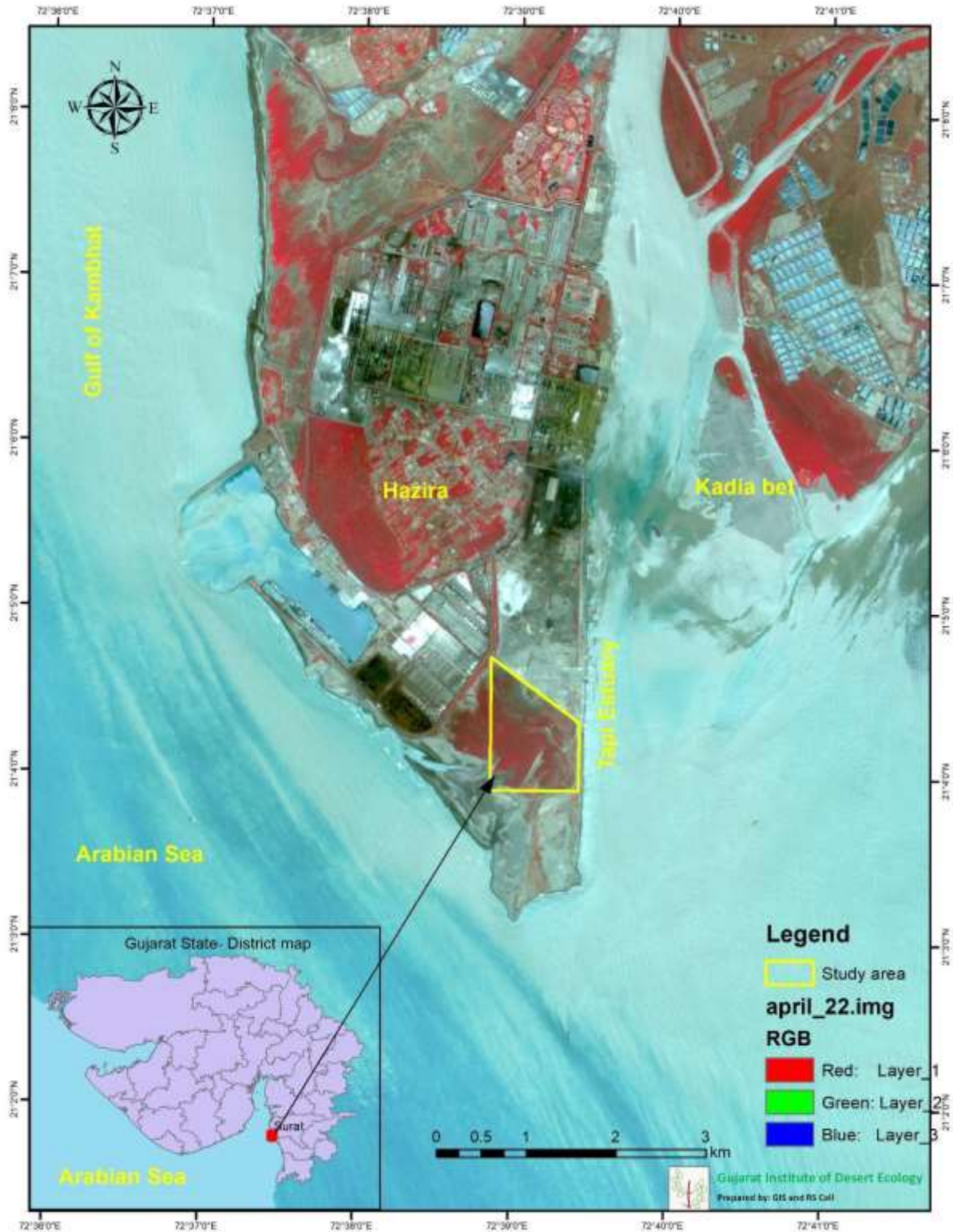


Figure 2.1: Location Map of the Study Area



## 2.2. Climate

The summer begins in early March and lasts until June. April and May are the hottest months, with the average maximum temperature being 37 °C. Monsoon begins in late June. Surat city receives about 1,200 mm of rainfall by the end of September and mid-October, while November sees the retreat of the monsoon and a return of high temperatures until late November. Winter starts in December and ends in late February, with an average mean temperature of around 23°C.

### 2.2.1. Tidal Regime

The tide in the Gulf is a mixed semi-diurnal type, with large diurnal inequality and varying amplitude, which decrease from north to south. While, the unique position of the Gulf of Khambat, the coasts experience very high tidal amplitude; probably the highest anywhere along the Indian coast. The funnel shape and the semi-enclosed nature of the Gulf lead to a tremendous increase in tidal height upstream (Gupta, 2002). The maximum spring tide recorded is 8.1m (Mitra, *et al.*, 2020c). As a result, the inter-tidal expanse is vast to the extent of 1.5 to 8 km, perhaps the widest along the Indian coast. The Hazira mangrove area has a bi-diurnal tidal regime (i.e., two ebb and flow tides per day). This was mainly due to the funnel shape of the Gulf of Khambhat coupled with the resonance effect of exceptionally high tides. Along its eastern shore, the mean spring high water range is maximum 5.7 m. The Tapi estuary experiences fairly high tidal ranges in the mouth segment due to its proximity to the Gulf of Khambhat and hence marked changes in the durations of flood and ebb phases occur as the tide progresses along the length of the estuary. During neap tide, the water level decreases from 2.3 m to 1.7 m at Hazira.

### 2.2.2. Currents

Long-shore currents with low waves dominate the open coasts of the Arabian Sea. In the Gulf, due to exceptionally high flood and ebb tides, powerful tidal currents with maximum velocities of 6 knots associated with high wave energy occur during mid-tide. Currents were predominantly tide induced with speeds up to 3.3 m/s and were north-northwest during flood tide and south-southeast during ebb tide (Kumar and Ashok Kumar, 2010). The flow adjusts its orientation with the changing direction of wind and affected by the changing seasons of the year. The turnover residence times are quite



short because of its shallow nature, large tidal amplitude, and strong tidal currents (Gupta, 2002).

The wave-current interaction process is studied by (Osuna and Monbaliu, 2004) using a coupling scheme that allows the synchronous data transfer between a wave and a tide/surge model. In most of the earlier studies, currents were up to 2 m/s (Masson, 1996) whereas in the Gulf of Khambhat, currents were more than 2 m/s and it was reported that this could be associated with the interaction between high currents and the waves (Kumar and Kumar, 2010).

### **2.2.3. Salinity**

Salinity is an indicator of the rate of freshwater inflow in the coastal waters and estuaries in particular. Normally, seawater salinity is 35–36 ppt, which may vary depending on the rate of evaporation and precipitation. Flora and fauna inhabiting the inshore and coastal waters are generally acclimatized to a certain range of salinity where they thrive. Wide changes in salinity during the monsoon can result in adoption with modification and dominance of selected species in the lower order while higher-order biota may migrate.

The estuarine salinity varies over a wide range of the annual cycle (George *et al.*, 2012). The salinity at a given location varies depending on the state and stage of the tide even during monsoons except in the inner estuary, which is fully freshwater-dominated. Due to the proximity to the river flow, the salinity variations were over a wider range in the inner estuary in the dry season.





### 3. METHODOLOGY

#### 3.1. GIS and Remote Sensing

LISS 4 Satellite imagery of pre-monsoon season procured from NRSC, Hyderabad was used for the present study. The procured imagery has a resolution of 5.8 m with UTM projection with spheroid and datum named WGS 84 in UTM zone 43 north, which will meet the requirement of estimating the areal extent of mangroves within the earmarked co-ordinates and its present status. The supervised classification method has been applied to determine the present scenario of mangrove area. The accuracy of Supervised Classification was ascertained by ground-truthing the delineated area. The details of the satellite imagery used for the study are given below.

Satellite Imagery	Year	Month	Sensor	Bands	Pixel Resolution
IRS-R2A	2022	27, April	LISS 4	3	5.8 m

##### 3.1.1. Pre-processing

Pre-processing of satellite data including geometric correction, atmospheric correction and radiometric correction, and clipping of the area has been carried out. The rectification operation aims to correct distorted images to create a more faithful representation of the original scene. It typically involves the initial processing of raw image data to correct for geometric distortions.

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

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



## **3.2. Supervised Classification**

Supervised classification can be defined normally as the process of a sample of known identity to classify pixels of unknown identity. Samples of known identity are those pixels located within training areas. Pixels located within these areas term the training samples used to guide the classification algorithm to assigning specific spectral values to appropriate information classes.

Preliminary surveys were conducted on the ground to collect training samples for different Land covers using Garmin GPS with the help of the training sample; a classification map was generated based on the maximum likelihood Supervised Classification model and NDVI (Normalized Difference Vegetation Index) using ERDAS software.

### **3.2.1. Land Cover Classification for 2022**

Land cover classifications for April, 2022 was undertaken through satellite imageries, which includes a classification of five classes; such as mangrove, water, saline soil, mudflat, and other vegetation.

## **3.3. Fieldwork work**

Field investigations and ground truthing are very important part of the project. Fieldwork helps to check and collect most of the ground information required for fine tuning the mapping. The fieldwork was conducted on 28<sup>th</sup> to 30<sup>th</sup> March 2023 for collecting ground-truthing and mangrove structure data.

A reconnaissance field survey was undertaken to get acquainted with the general patterns of the land cover of the area. Different patches of mangrove area characteristics were recorded. The variation and tonal patterns observed in the ground-truthing were recorded on the existing images (Figure 3.1). Traverses along the main roads, mangrove areas, saline areas, mudflats, and other vegetation were made for ground-truthing patterns and characters recorded in the image. The various features identified through the ground-truthing were correlated with the image element and GPS observations obtained in different quadrates will be superimposed on the satellite imageries (Figure 3.2).

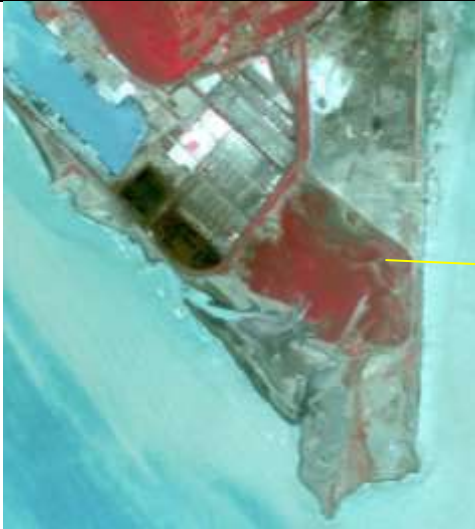




**Figure 3.1: Ground Truthing Data Collection in the Field by GPS.**



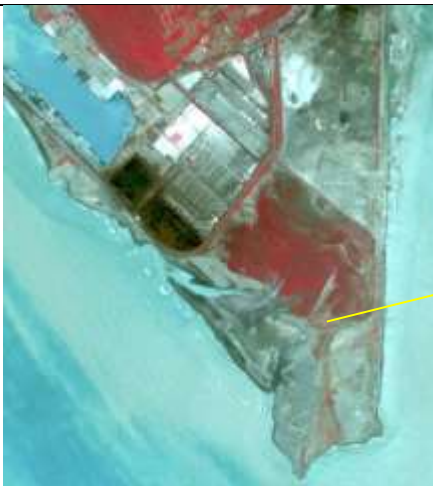
### Dense Mangrove

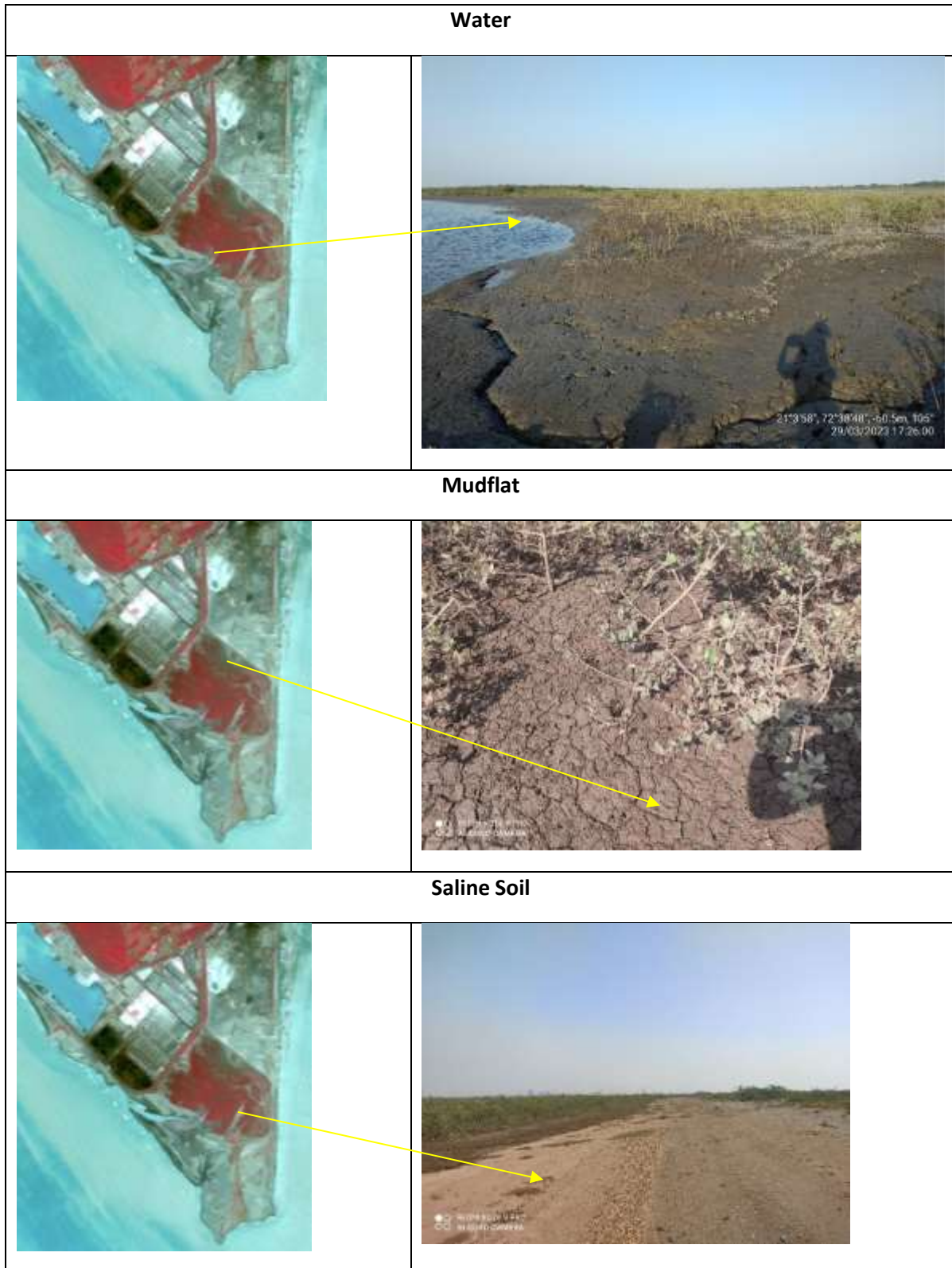


### Young Mangrove



### Other Vegetation





**Figure 3.2: Various Land-Cover Classes in The Study Area.**

### 3.4. Mangrove Data Collection

The vegetation structure of the present investigation was carried out at diverse representative sites of mangrove formations (near to Tapi estuary) within the limits of AM/NS Ports Hazira Ltd., Hazira. Mangrove vegetation characteristics spread over the AM/NS Ports Hazira Ltd. Hazira area were studied by the quadrat method (Kershaw and Wright, 1973). For the measurements of mangrove tree density, height variations, and basal area, the methodology and measurement accuracy applied was adapted by using standard methodologies (Cintron and Novelli, 1984). In this study, AM/NS Ports Hazira Ltd. mangrove formations are classified as mangrove trees and younger classes (Recruitment and Regeneration classes).

1. Plant height up to 50 cm: Regeneration class
2. Plant height from 50 to 100 cm: Recruitment class
3. Plant height from 100 cm and above: Tree class

In total, 7 random samplings were carried out in the mangrove formations of the AM/NS Ports Hazira Ltd. Hazira at different landscapes like mangrove and regeneration and recruitment patches (Figure 3.3).



**Figure 3.3: Mangrove Data Collection**

In each quadrat in the mangrove patches, Tree Height, Girth at Breast Height (GBH), Canopy Length, and Canopy Width (Figure 3.4) were measured, in which GBH of all





mature trees taller than 1 m was considered. To enumerate regeneration and recruitment classes, sub plots of 1×1 m and 2×2 m were randomly laid in all the quadrates of 10 × 10m. The regeneration class includes germinating saplings less than 50 cm in height and the recruitment class that includes well-established saplings above 50cm but less than 1m of height. The density of mature trees, regeneration, and recruitment class for each station was expressed as number per hectare (No/ha).



**Figure 3.4: Sampling Locations in the Study Area**

## 4. RESULTS

### 4.1. Land Cover Mapping

Land cover maps of the study area were prepared by using the satellite imagery (LISS-IV of April, 2022), by applying NDVI, and supervised classification methods.

#### 4.1.1. Land Cover Map in 2022

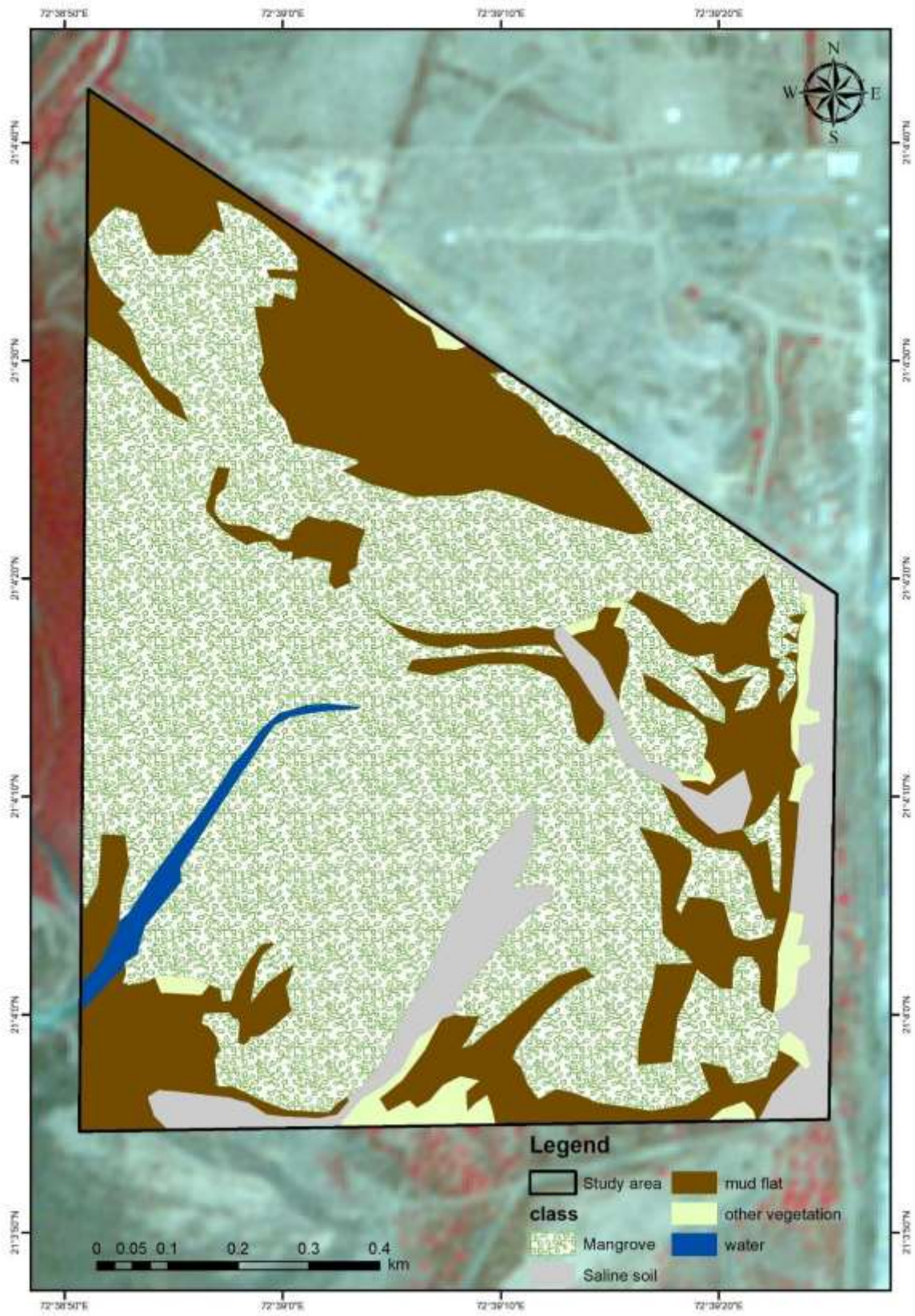
The land cover map based on supervised classification of LISS-IV of April, 2022 is given in the Table 4.1. The area under different land-cover classifications is listed in Table 4.1. The mangrove covers an area of 68.5 ha in the year 2022.

As per this April, 2022 classification (Table 1.1&Figure 4.1), different land cover categories have been estimated. In the AM/NS Ports Hazira Ltd. study area, mangrove area constitutes 62.23 %, followed by mudflats (27.09 %), saline soil (7.3%) and other vegetations (2.26%).

**Table 4.1 : Land-cover Classification at AM/NS Ports Hazira Ltd. April 2022**

No.	LULC class name	Area (ha)	Percentage
1	Mangrove	68.50	62.23
2	Mud flat	29.83	27.09
3	Other vegetation	2.49	2.26
4	Saline soil	8.06	7.32
5	water	1.21	1.10
Total		110.08	100.00

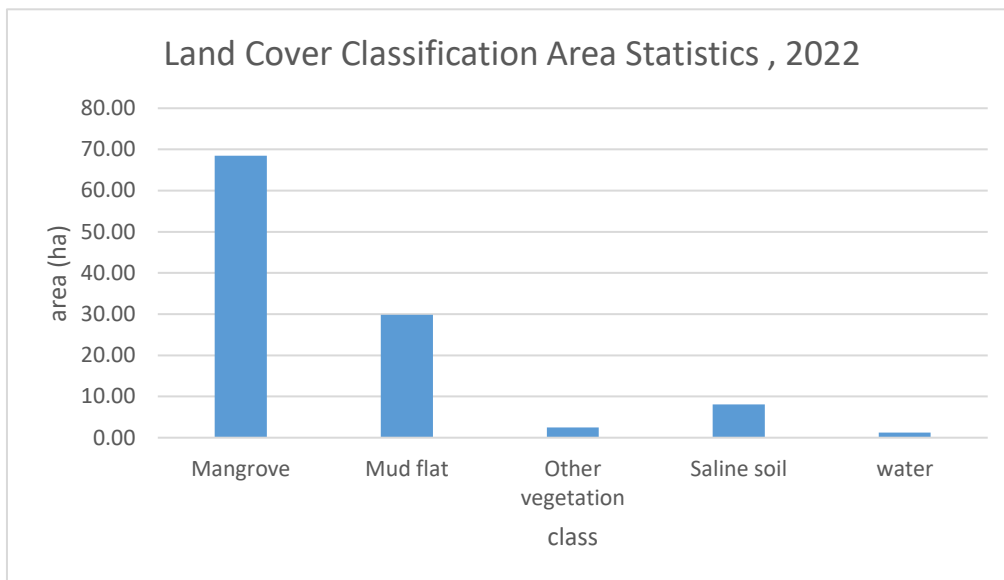




**Figure 4.1: Land Cover Classification Map of the Study Area -April 2022**







**Figure 4.2 : Area Classification Statistics during April, 2022**

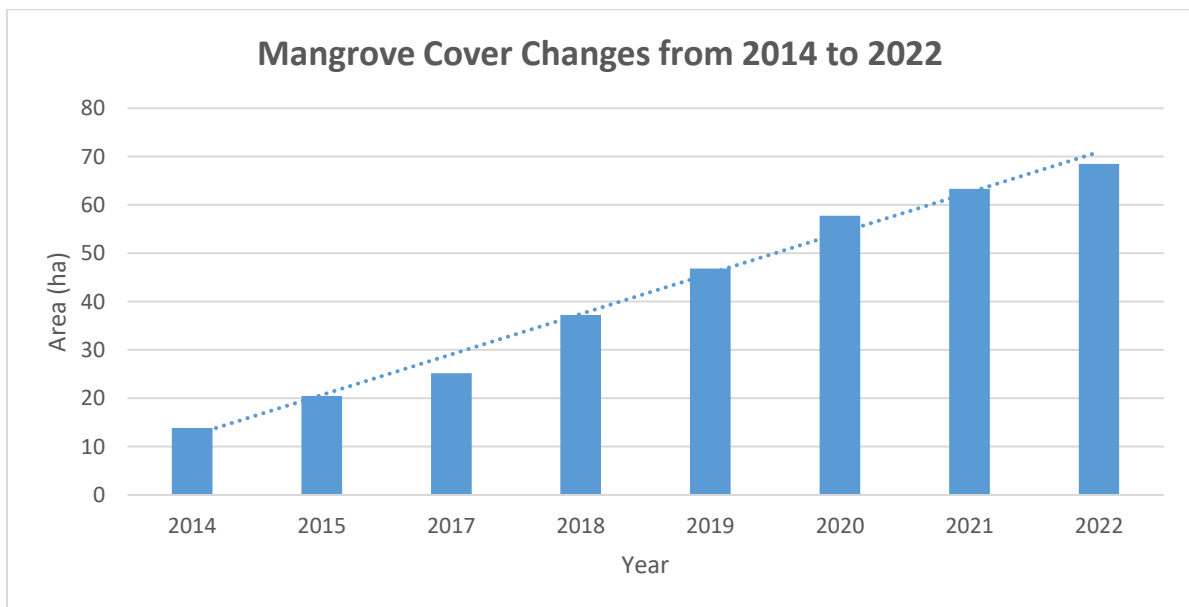
#### 4.1.2. Details of Mangrove Area (Year Wise)

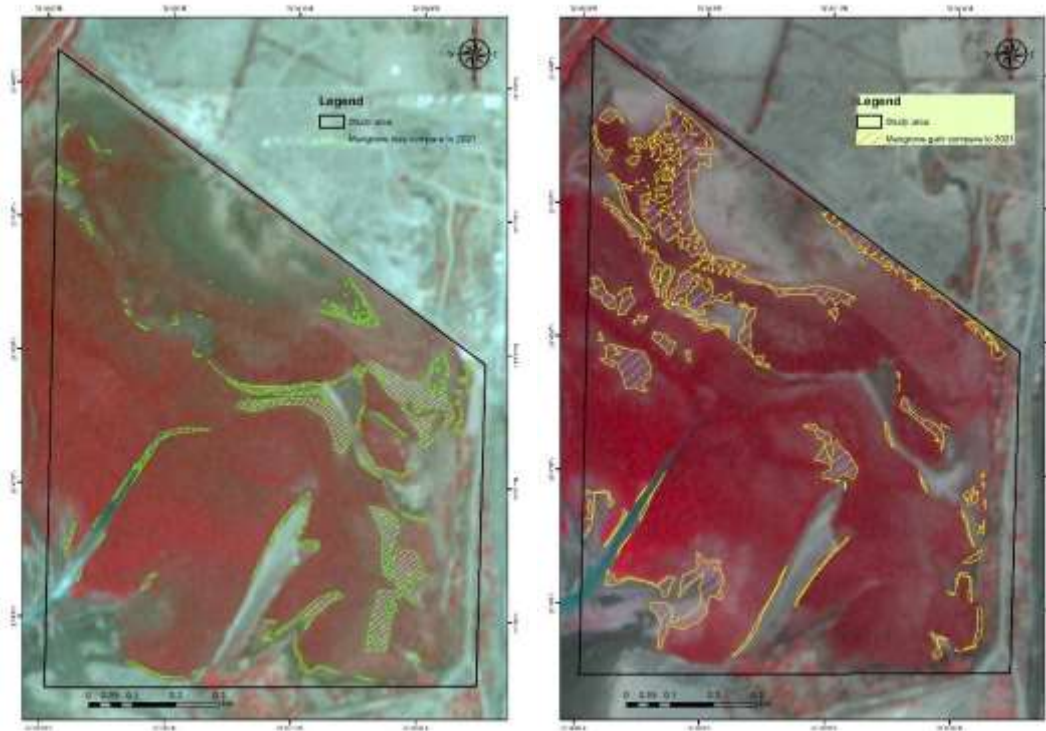
The area occupied by mangroves has been measured by Remote Sensing and GIS techniques using the satellite imagery during the pre-monsoon period. The satellite imagery coupled with surveys showed that the present mangrove area cover has increased from 13.89 ha during the year 2014 to 68.50ha in the year 2022, showing an overall increase of 54.6 during the period between 2014 and 2022 (Figure 4.3). The total mangrove cover of about 5.2 ha area has increased in 2022 compared to the previous year 2021(Figure 4.4). The overall year wise land use/land cover classification changes are shown in Figure 4.3. Mangrove area increase is predominantly due to the increase in the number of regeneration class and the growth of recruitment category of plants. The majority of the increase was observed in the southwest direction while a minor increase in the areas was noticeable in the east direction. Year-wise changes in mangrove cover has been also recorded, which showed a year wise increase in the mangrove area which is presented in the Table 4.2 and Figure 4.3. The increase was recorded high in the southwest direction while a minor increase in the area was noticed in the east direction.



**Table 4.2 : Year-Wise Mangrove Cover at AM/NS Ports Hazira Ltd.**

S. No	Year	Mangrove Cover (ha)	Yearly Increase in Mangrove Area (ha)	% Increase (Compared to Previous Year)
1	2014	13.89	0	0
2	2015	20.45	6.56	47.2
3	2017	25.18	4.73	23.1
4	2018	37.26	12.08	47.9
5	2019	46.86	11.6	31.1
6	2020	57.73	8.87	18.9
7	2021	63.30	5.57	9.6
8	2022	68.50	5.2	8.2

**Figure 4.3: Mangrove Area at AMNS Ports Hazira Ltd., Surat from 2014-2022**



a) Satellite Image of April 2021

b) Satellite Image of April 2022

Figure 4.4: Changes in the Mangrove Area from April, 2021 to April, 2022

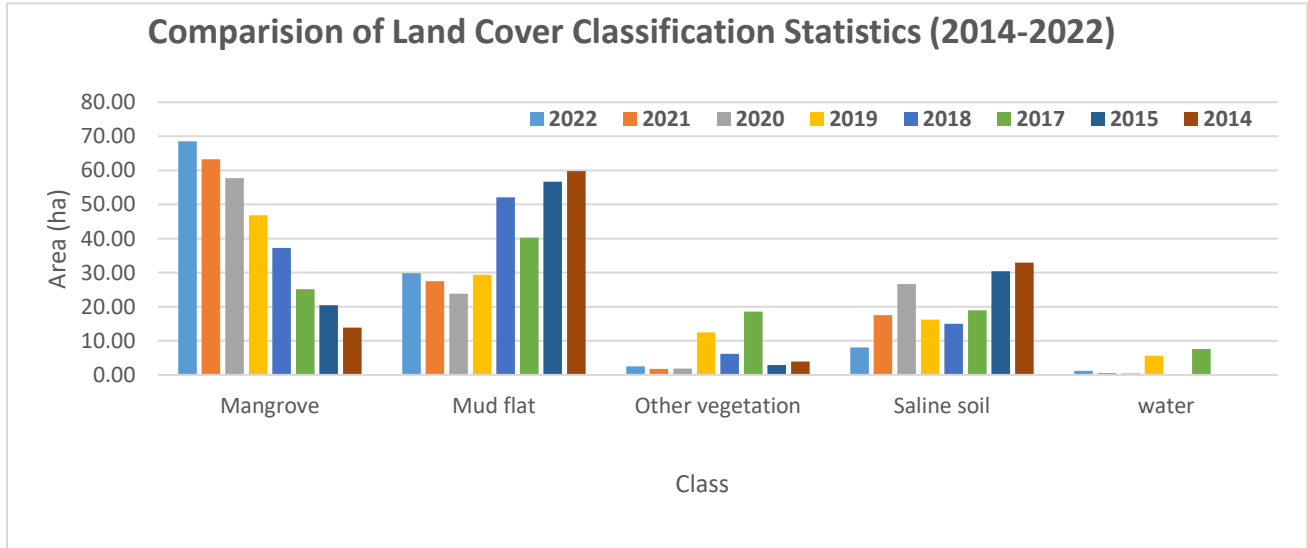


Figure 4.5: Comparison Classification of Area Statistics





## 4.2. Vegetation Structure Of Mangrove

The mangrove ecosystem, one of the most productive ecosystems provides a wide range of products such as timber, food, feed, etc, and many ecosystem services (Kumari *et al.*, 2020). It supports high levels of marine and terrestrial biodiversity (Duarte *et al.*, 2005) and has a large potential for carbon sequestration (Trettin *et al.*, 2021). Regardless of this critical role; mangroves are under severe threats from a range of causes (Hai *et al.*, 2020) and suffering from continuous degradation throughout the world in the last few years (Goldberg *et al.*, 2020). The increasing human population with industrial development and urbanization are the most important stresses on mangroves. All these stresses can alter the rate and nature of mangrove ecosystems and its functions. Although being a very important ecosystem, mangroves were treated as unwanted plants by many people due to unawareness and utilized as a source of timber, fuel wood and fodder that led to depletion of mangroves during the last two decades.

As vegetation structure of mangroves indicates its functional capacity, which has a bearing on fisheries, forestry, and global climate due to its high carbon sequestration potential. The overall vegetation structure of mangrove forest in AMNS Ports Hazira Ltd. vicinity was surveyed by the following important parameters like tree density, tree height, basal girth, and the regeneration, and recruitment represented.

### 4.2.1. Mangrove Diversity:

After Sundarbans in West Bengal state of India, the second largest mangrove cover can be found in Gujarat, however, it is totally dominated by *Avicennia marina*. Mono-floral occurrence of mangrove forests is common along the coastal belt of the Gulf of Khambhat. Mangroves in Hazira also shows mono-species formation of *Avicenna marina* mangroves. However, two more mangrove species observed in the AMNS Ports Hazira Ltd., Hazira vicinity, which is certainly very important for the area. A fully-grown matured tree of *Sonneratia apetala* and a few plants of *Acanthus illicifolius* were also observed in the study area in grooming condition during the survey (Figure 4.6).





**Figure 4.6: Mangrove Diversity in the Study Area a. *Avicennia marina*, b. *Acanthus illicifolius* and c. *Sonneratia apetala***

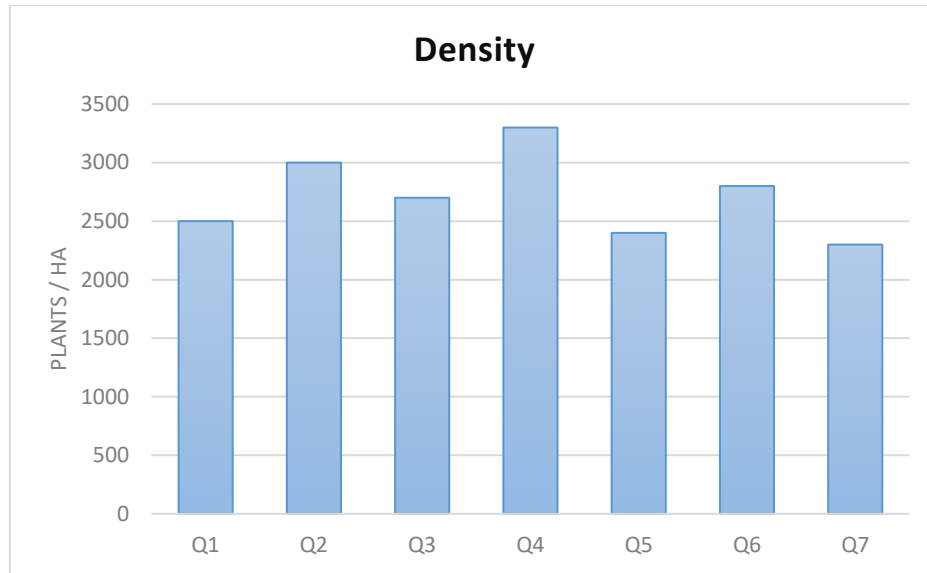
#### 4.2.2. Mangrove Density:

The overall average mature tree density (>100 cm height) was 2714 trees/ha recorded in the study area in the AMNS Ports Hazira Ltd., Hazira. The quadrat number Q-4 showed the highest density of trees (3300/ha) followed by Q-2 (3000/ha). During the present study, the lowest tree density of 2300/ha was observed at Q-7. The Q-6 shows a few well matured, fully grown trees of *A. marina* (Figure 4.8). Towards the seashore the density of mangrove is more but the mangroves are still young and growing phase although can be considered as trees. However, fully matured and older trees are present towards the northern side or opposite side to the seashore (Figure 4.7).



**Figure 4.7: Analysis of Mangrove Density by Using the Quadrant Method**

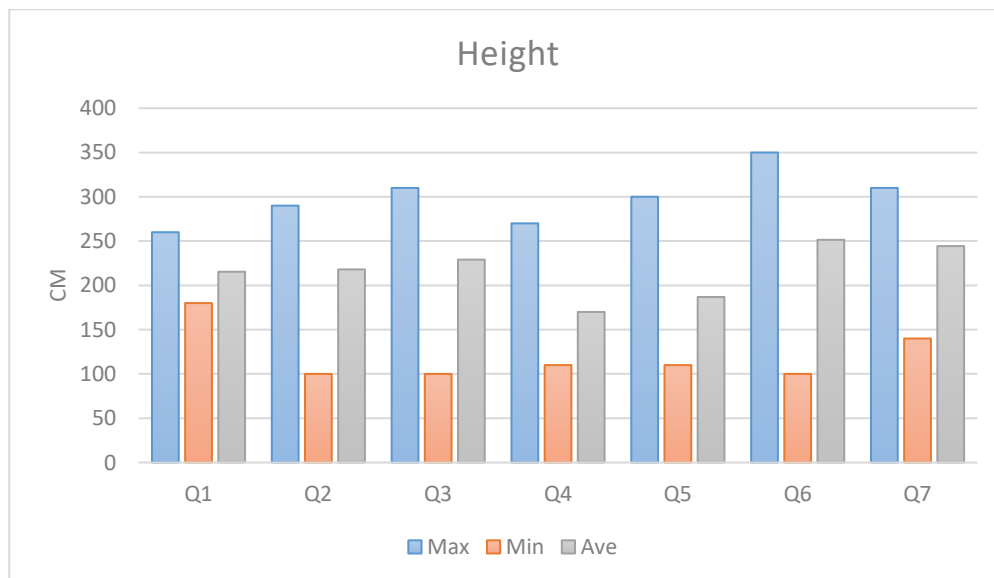




**Figure 4.8: Density of Natural Mangrove Stands at AMNS Ports Hazira Ltd.**

#### 4.2.2. Tree Height:

Plant height is one of the most important part of a coordinated suite of life-history traits. This trait is responsible for various characters of plants such as seed mass, time to reproduction, longevity and the number of seeds a plant can produce per year etc. The height of the mangrove trees in the quadrates shows the variation of hydro-edaphic conditions in the study area. The overall average height ranged from 100 cm to 350 cm in various quadrates (Figure 4.9). In the quadrate-wise study, maximum height (350 cm) was recorded at Q-6 as it contains most of the mature trees (Figure 4.10).



**Figure 4.9: Variation of Tree Height in Various Quadrates at AMNS Ports Hazira Ltd.**

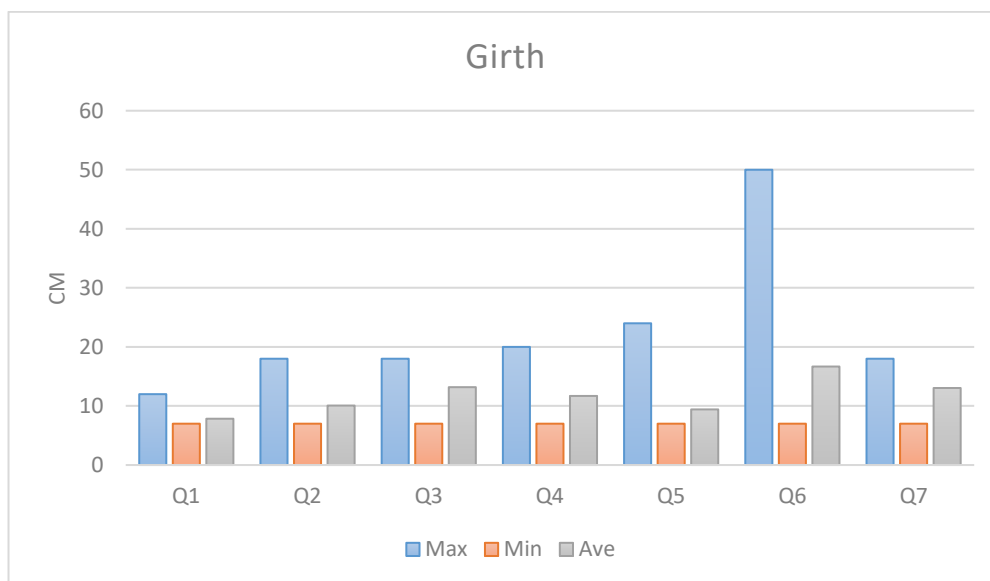




**Figure 4.10: Tree Height Measurement at AMNS Ports Hazira Ltd.**

#### 4.2.3. Basal Girth:

Tree girth value at all quadrates was measured with field measuring tape and expressed in cm (centimetre). The maximum tree girth was observed at Q-6 followed by Q-5 (Figure 4.11). The basal girth of mangrove stands ranged from 7 cm to 50 cm (Figure 4.12).



**Figure 4.11: Variation of Tree Girth in Different Quadrates at AMNS Ports Hazira Ltd.**





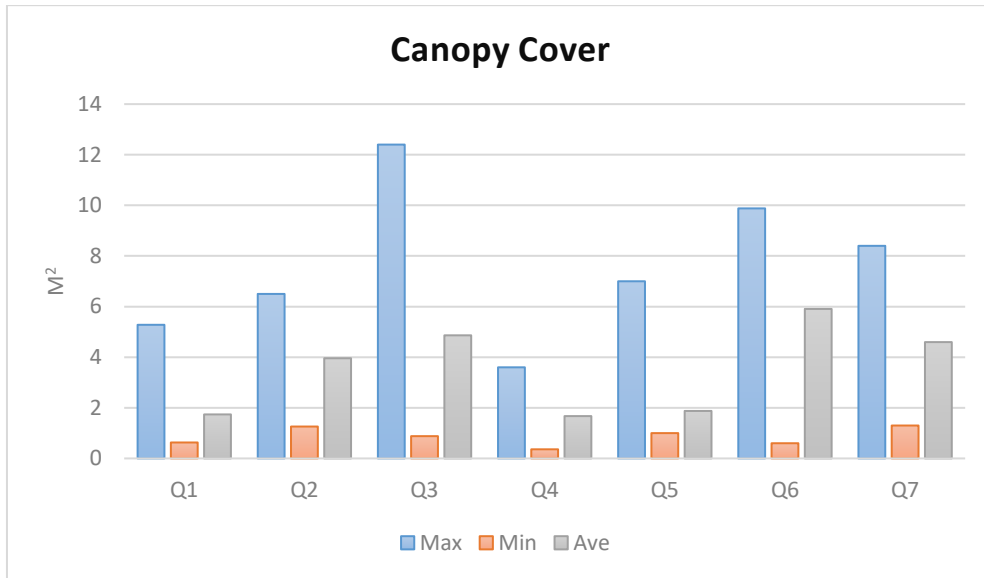
**Figure 4.12: Tree Girth Measurement at AMNS Ports Hazira Ltd.**

#### **4.2.4. Canopy Cover (m<sup>2</sup>):**

The layer formed by the tree branches and crowns generally known as canopy cover, which can help to increase the biodiversity by providing shelter to various intertidal animals. It can also defend the forest floor from heavy rainfall, also help to reduce the speed of strong wind and tidal force. The canopy cover of AMNS Ports Hazira Ltd., Hazira mangroves ranged from 0.4 m<sup>2</sup> to 12 m<sup>2</sup> (Figure 4.13). The maximum average canopy cover was observed at Q-6 followed by Q-3, and, lowest was recorded at Q-4 and Q-1 which indicates the occurrence of younger class of mangroves with high density (Figure 4.14).







**Figure 4.13: Variation of the Canopy in Different Quadrates at AMNS Ports Hazira Ltd.**



**Figure 4.14: Canopy Width Measurement at AMNS Ports Hazira Ltd.**

#### 4.2.5. Regeneration and Recruitment Class:

The average density of the regeneration class of mangroves in the sampling site (saplings with a height of <50 cm) recorded was 55,714 plants/ha and ranged from 10,000 plants/ha to 1,10,000 plants/ha (Table 4.3) and for the recruitment class mangrove, the overall average was 21,786 plants/ha, ranged from 7500 to 37,500 plants/ha. The highest regenerative plants (1,10,000 plants/ha) were recorded in Q-3, which can further be representing that ecosystem is favourable for younger class

mangrove formation. The maximum recruitment class was recorded in Q-2 (37,500 Plants/ha) which indicates the good signing of mangrove growth and increased in the density.

The density of mature trees and younger classes (recruitment and regeneration) in the AMNS Ports Hazira Ltd. vicinity showed that the area has higher regeneration potential. In this study, it can be clear that AMNS Ports Hazira Ltd. has a healthy mangrove ecosystem and that the mangrove area as well as the density will increase significantly in the near future.

**Figure Table 4.3: Density of the younger classes of mangroves at the study sites**

Quadrat No	Latitude	Longitude	Tree Density (1)	Regeneration Density (2)	Recruitment Density (3)	Ratio (1): (3)	Ratio (2): (3)
1	21° 3'57"N	72°38'59.00"E	2500	10000	17500	1: 7.0	0.6: 1
2	21° 4'3.00"N	72°39'7.00"E	3000	20000	37500	1: 12.5	0.5: 1
3	21° 4'0.00"N	72°38'54.00"E	2700	110000	15000	1: 5.6	7.3: 1
4	21° 4'1.00"N	72°39'19.00"E	3300	50000	25000	1: 7.6	2.0: 1
5	21° 4'20.00"N	72°39'22.00"E	2400	20000	7500	1: 3.1	2.7: 1
6	21° 4'11.00"N	72°39'15.00"E	2800	100000	17500	1: 6.3	5.7: 1
7	21° 4'27.00"N	72°38'54.00"E	2300	80000	32500	1: 13.5	2.5: 1
<b>Average</b>			2714.2	55714.29	21785.71		

### Important Findings:

In this study, it was found that the mangrove area has been increased by covering more recruitment and regeneration class as compared to the previous year. As the sediment loads increased with increased rate of accretion due to water currents and high tidal amplitude within the mangrove area, which elevated sediment deposit thickness leaving the top layer with fine clay particle.

### 4.3. *Potential Threats to Mangroves*

The rapid growth in the human population, industrial development and urbanization are the most important stresses on mangroves. Along with these, natural processes such as soil erosion, natural disasters, sedimentation, and poor tidal flushing due to creeks and channel blockages also exerts pressures on the mangrove ecosystems.



However, alarming pressure on the mangrove ecosystem can be the anthropogenic activities due to over exploitation, encroachment, and reclamation of mangrove areas for industrial, commercial, or residential development. These all can alter the rate and nature of mangrove ecosystems and its functions. Although being a very important ecosystem, mangroves were treated as unwanted plants by many people due to unawareness and utilized as a source of timber, fuel wood and fodder that led to depletion of mangroves during the last two decades. It is reported that deforestation is responsible for the destruction of about 44% and 26% of mangroves along the west and east coast of India, respectively (Upadhyay, *et al.*, 2002). In this background, it is crucial to create awareness among the local population about the mangrove ecosystems, its biodiversity and services to human and environment. As this ecosystem is a nursery for juvenile of various economically important fish and prawn species, conservation of mangroves can be an essential task. Mangrove ecosystems support a great amount of detritus food for a variety of young fish and shrimps (Ingole, 2005). However, in private areas, mangroves are facing several threats due to the land conversion for various activities such as aquaculture, agriculture, and various industrial developmental activities. And importantly, the reclamation of the near mangrove ecosystem is responsible for the damage to saplings and young mangrove plants.

### **Threats in General**

As it is found that the mangrove ecosystem in Hazira AM/NS Ports Hazira Ltd. is rich in the Surat district, it is necessary to protect it from various threats such as anthropogenic activities like industrial development, development of ports area and other coastal development in addition to the direct exploitation of the plants by the local community. A few major threats or pressures identified in the mangrove area of AMNS Ports Hazira Ltd. are as shown below;

i. ***Cutting:***

The well matured tree cutting is a frequent problem here. There are a few cutting remnants of stems observed during the survey. It denotes the mild to moderate cutting pressure on mangrove in this ecosystem. (Figure 4.15).





**Figure 4.15: Plants Removed and Left Dried in the Area**

#### ***ii. Non-biodegradable Debris***

Many non-biodegradable materials such as plastic bottles, bags, etc. were recorded in the debris found in mangroves of AMNS Ports Hazira Ltd. The possible sources for such debris are probably the solid waste dumped by anthropogenic activities. At the high tide level these are being deposited, trapped by the mangroves and their root system (Figure 4.16).



**Figure 4.16: Non-Biodegradable Debris at the Mangrove Area**



iii. ***Alteration in Natural Environment:***

The developmental activities in the close vicinity are clearly showing negative impacts on the present ecosystem directly or indirectly. Some of these activities can change the present geomorphology of that area. Although most of the mangrove trees in this area were healthy and thriving, a few mangrove trees were observed under stress in this area due to poor tidal flushing caused by blockage of the shallow water canals near roadside (Q-5) inside the mangrove. (Figure 4.17). These mangroves are with reduced canopy due to withering of the leaves and decay of the pneumatophores. This site at Q-5 is most important because other than *Avicennia marina* there are a few other mangrove species are present in this area.



**Figure 4.17: Alteration in Natural Environment in Mangrove Area**

## 5. CONCLUSION

### 5.1. Mangrove area

The period between the year 2014 to 2022 it was observed that a noticeable (yearly) increase in the mangrove cover within in the study location delineated for the present study. It is particularly very much distinct along the southwest direction than the eastern part where it is meagre. Since the shoreline bordering the stand seems to be favourable for the seeds produced by the mature class were able to be retained within the mudflats and germinated successfully in the area. Further, regular tidal water flushes in this area enhances the survival as well as recruitments. The increase in the area of mangroves was mainly due to the addition of the regeneration and recruitment classes. There is high-rate of accretion taking place in this area which also creates favourable habitat conditions for the natural propagation and growth of mangroves.





- A close observation is required for monitoring the pressures on AMNS Port Hazira Ltd. areas. Special attention needs to be given where degraded mangrove patches are observed.
- Since these areas show high and healthy natural regeneration, plantations in this area needs to be avoided. However, focus to be given to allow the natural extension of the mangroves by controlling/ maintaining the factors that affecting natural regenerations.
- The process of erosion is highest on the edges of natural mangroves (close to the waterfront) it could be controlled only by artificial coastal structures, bio-shields or through appropriate eco-engineering design in consultation with structural engineering experts. It is important to note that the type of the substratum/material used for the construction of the structure and their designs should allow the natural flushing of sea water into the mangrove areas while controlling soil erosions. This also necessitates periodical monitoring of the erosion sites by using satellite imageries for assessment of erosion levels.
- Rapid and short mangrove monitoring programs at an interval of one year are to be instituted to keep track of changes that may happen due to further construction and developmental activities. AMNS Ports Hazira Ltd. has already generated considerable primary data on mangroves through various projects. Consolidating these data is sufficient for the mangrove vegetation structure of AMNS Ports Hazira Ltd. Hazira, Special attention could be paid to documenting area-wise (dense/sparse mangroves) data on density, tree canopy, tree diameter classes, stand dynamics, etc. This baseline information and further yearly monitoring program will enable the industrial authorities on the time-series changes happening in the vegetation structure through LISS-IV satellite imagery.
- Vast extent of natural mudflats (potential area for mangrove plantation) is present that should be studied for understanding their suitability for mangrove plantation when condition and necessity arise.





- It is recommended that restoration amendments along with plantation could be suggested for future conservation activities. This restoration efforts will yield better results rather than direct plantation in the areas having scrubby/stunted stands which are facing inadequate tidal flushing. Bio-physical amendments in the form of minor creeks to enhance tidal flushing and hydroperiod regime are recommended along with de-siltation of natural creeks will enhance the growth of the scrubby patches into healthy mangrove stands and facilitates better establishment of younger classes into dense patches.

### **5.3. General Mangrove Conservation Plan:**

- Apart from the above-discussed site-specific and area-specific measures, the following are some of the conservative measures which can be implemented for proper conservation and management of Hazira mangroves
- Proper documentation of Hazira mangroves with reference to Potential Regeneration sites, areas facing natural and other threats, and areas suitable for restoration needs to be delineated. The above-mentioned areas need to be monitored for effective conservation and management.
- PRAs (Potential Regeneration Areas) should be allowed to grow naturally by enhancing protection to these areas and plantations are not much required in these areas.
- In addition to mangrove plantations, a simplified restoration or rejuvenation of mangroves will cause the ecosystem to be healthier and ecologically viable. In many instances, the restoration will yield better results than creating a new plantation.
- Developmental activities or civil works should be avoided at sites close to the mangrove ecosystem. Especially, alteration of natural habitat should not be undertaken along the buffer zone of the mangrove ecosystem.



#### 5.4. Recommendation

Based on the field visit and data analysis the following recommendations are suggested which may be useful for future plantation activities.

- In the study area, the mangrove is in good condition and showed an increasing trend every year. However, there are certain threats to mangroves. Regular surveys and continuous monitoring would be conducted to evaluate the man-induced pressures on this mangrove patch and apply suitable remedial measures to nullify the impacts.
- Nearby (Q-5), there is a small sub-creek which was observed blocked due to some anthropogenic activities (dumping of road construction material) towards road side. The mangroves present in the area were found under stress due to poor tidal flush. However, this problem can be solved by clearing the waste material from the sub-creek as soon as possible.
- GIS and RS facilities should be used as a part of regular mangrove monitoring, conservation and management efforts.
- There are a few species other than *Avicennia marina* present in the area. Efforts are required to conserve and increase the number of mangrove species in the area.
- Flushing and inundation of tides should be ensured at the plantation sites on regular basis.



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# AM/NS Ports

o/c

Ref. No. AMNS Ports/Hazira/ENV/GPCB-HO/FAR/2022-23

To:

The Member Secretary,  
Gujarat Pollution Control Board,  
Paryavaran Bhavan, Sector 10-A,  
Gandhinagar – 382 010  
Gujarat

Date: 27.06.2023

Subject: Submission of Environment Audit Report for year 2022-23

Dear Madam / Sir,

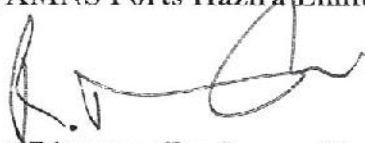
With respect to the Environment Audit Scheme introduced by Hon'ble High Court of Gujarat vide order dated 20.12.1996 later modified vide Office Order No. GPCB /EAS-C-28/301928 dated 23.01.2015; we hereby submit our **Environment Audit Report** carried out by *Man-Made Textiles Research Association (MANTRA)* under Schedule - 1. This report is for the period of 2022-23.

We are also submitting the details of payment made as a Scrutiny Fee for the audit, paid to Gujarat Pollution Control Board (GPCB).

Kindly acknowledge the same.


Thanking You

Authorized Signatory  
For, AMNS Ports Hazira Limited



Capt. Rituparn Raghuvanshi  
Head – Ports, Hazira



  
30/06/23

Gujarat Pollution Control Board  
Head Office  
Sector No.-10-A,  
Gandhinagar-382010

Encl:

1. Three sets of Environment Audit Reports,
2. Annexure 1: Details of Payment made as a Scrutiny Fee for environment audit submitted to GPCB.

CC:

1. The Regional Office, Gujarat Pollution Control Board, Surat

AMNS Ports Hazira Limited

7th Floor, Raheja Tower, C - 30, Block G, Bandra Kurla Complex, Bandra East, Mumbai - 400 051

AMNS House, AMNS Township, 27 km, Surat - Hazira Road, Hazira, Gujarat - 394 270

CIN U13100GJ2004PLC043477 / +91-226 -988 9999 / contact@amns.in / www.amns.in

SMARTER  
STEELS  
BRIGHTER  
FUTURES

## EXECUTIVE SUMMARY

Hon'ble High court of Gujarat order for the Environmental Audit Scheme dated 20th December 1996, order dated 29<sup>th</sup> June 2002 and modified vide GPCB order on 23<sup>rd</sup> January 2015, Man Made Textile Research Association (MANTRA), Surat is nominated as Auditor to carry out Environmental Audit work for the industries falling under Schedule - I category.

Gujarat Pollution Control Board has appointed Man Made Textile Research Association (MANTRA), Surat to conduct Environmental Audit **AMNS Ports Hazira Limited**, in the village limits of Hazira of Taluka Choryasi, Dist. Surat located at 27<sup>th</sup> KM, Surat - Hazira Road, Hazira-394270 and submit the report for the year April 2022 to March 2023.

## OBJECTIVES

1. To check the adequacy & efficacy of the Fugitive Dust Emissions, solid waste, ambient air, noise, health and safety systems.
2. To check various records of Environment Management System.
3. To check whether company meets with all required norms of state regulatory agency that is Gujarat Pollution Control Board regarding environmental pollution control.

## OPERATIONAL BRIEFING

The above-mentioned objectives have been fulfilled through meaningful inspection visits and precise study of its treatment system & pollution control facilities.

- 1 GPCB has appointed Man Made Textile Research Association (MANTRA), Surat to prepare Environmental Audit report for the year of April-2022 to March-2023. This report consists of concerned data for the year April-2022 to March-2023 verified by our authorized representatives.
- 2 The findings reported in this Audit report are entirely based on data furnished by the industry & data collected by the audit team during the year April-2022 to March-2023.
- 3 Thus, the findings reported in this audit report are subjected to physical surveys conducted by the audit team representatives.




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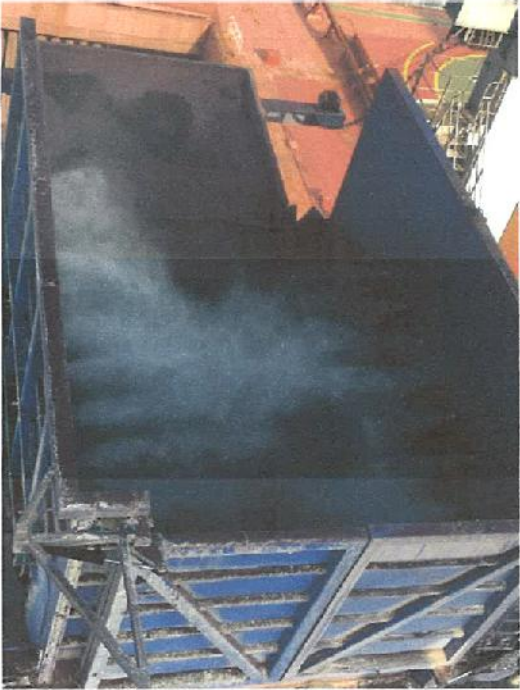
**OBSERVATIONS & RECOMMENDATIONS**

1. The industry has valid consent from the GPCB Gandhinagar. Consent order no. AWH-109664 issued dated 09/10/2020 and is valid up to 31/03/2025,
2. It is an infrastructure facility i.e. a port facility, for import of raw materials and export of finished products,
3. Industry has maintained proper records of month wise data regarding Raw Material Import, Finished Goods Export, Water Consumption (Domestic as well as Industrial), Domestic Wastewater Generation (sewage), Hazardous Waste Generation, etc.,
4. The industry is having major water usage for industrial purpose i.e. for dust suppression and Horticulture.
5. Average water consumption for industrial and domestic purpose is 221 kL/d and 10 kL/d respectively during audit period,
6. There is no trade effluent (waste water) as the industry is only an infrastructure facility. The sewage generation is around 8 kL/d, which is being treated by means of Sewage Treatment Plant (STP) within the port facility.
7. Pre-medical and periodic medical check-up of employees is being carried out by Care Nursing Home, a full-fledged hospital in AMNS Township.. Reports has been checked during the audit period and was submitted by the industry for records,
8. Industry has provided shore based power supply to Tugs during idle condition thus reducing the CO<sub>2</sub> emissions,
9. The industry has prepared Onsite Emergency Action Plan-Disaster Management Plan which has been implemented to take care of any eventualities.
10. No cases/complaints are recorded or disclosed to the auditor during the audit period,
11. The industry has established and implemented Integrated Management System comprising of Quality Management System in accordance with ISO 9001:2015, Environmental Management System in accordance with EMS: ISO 14001:2015 and Safety Management System in accordance with OHSMS 45001:2018.

**Annexure 3: Compliance Report of the Conditions mentioned in the GCZMA's recommendation letter issued dated 01/06/2013 for "Expansion of Port Facility at Hazira, Surat".**


S.No.	Condition	Compliance Status
1	The provisions of the CRZ Notification of 2011 shall be strictly adhered to by M/s. EBTL. No activity in contradiction to the provisions of the CRZ notification shall be carried out by M/s EBTL.	<b>Noted and Complying.</b>
2	Natural drainage system shall be designed in such a way that there shall be no damage to the existing mangrove patches nearby site.	<p><b>Complied.</b> The existing mangrove patch is undisturbed. Natural flushing takes place and Hume Pipes are additionally provided.</p> <p><b>Mangrove Area</b></p> 
3	The Essar Bulk Terminal Limited shall take up mangrove plantation in 500 ha of land in consultation with GEC/Forest department.	<p><b>Complied.</b> Since year 2008 to 2013, around 500 ha of mangrove plantation has been carried out at Dandi village, taluka Olpad, Ankalav village at taluka Hansot and Asarsa, taluka Jambusar in consultation with Gujarat Ecological Commission (GEC) and Saline Area Vitalization Enterprises Limited (SAVE). Against the stipulated 500 ha of this EC &amp; CRZ Clearance, 100 ha of mangrove plantation has been carried out by M/s.</p>



S.No.	Condition	Compliance Status
		<p>SARVA Services and M/s. SAVE between 2020 to 2022. The plantation was carried out in Suva and Nada villages of Vagra and Jambusar talukas, District Bharuch, Gujarat which is now in maintenance phase.</p> <p>In addition to these, a work order has been issued to M/s. SARVA Services in October 2022 for another 50-ha mangrove plantation in intertidal mudflat area of village Nada, taluka Jambusar of Bharuch District. Plantation work is in progress.</p>
4	<p>Coal, ore and other material handling shall be done through totally closed system.</p>	<p><b>Complied.</b></p> <p>The existing coal conveyor system is full covered. However, at berth area it is not possible to cover the conveyor belt as it restricts the movement of gantry cranes. Water sprinkling system has been provided in hoppers and all the transfer points to control the fugitive dust emissions during the operations.</p> <p><i>Picture of Sprinkling System working in Unloading Point</i></p> 
5	<p>All necessary permissions from different Government Departments / agencies, including GMB, shall be obtained by M/S EBTL, before commencing the activities.</p>	<p><b>Complied.</b></p> <p>All necessary permissions were taken prior to construction of activities permitted in this EC. Copies of the permissions have been submitted to the good office along with corresponding compliance reports.</p>
6		<p><b>Agreed.</b></p>

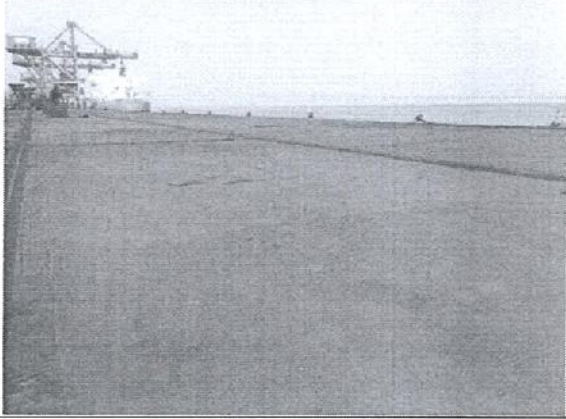




S.No.	Condition	Compliance Status
	All the recommendations and suggestions given by WAPCOS in their Environment Impact Assessment reports for conservation / protection and betterment of environment shall be implemented strictly by M/S EBTL.	
7	<p>The construction and operational activities shall be carried out in such a way that there is no negative impact on mangroves, if any, and other important coastal / marine habitats.</p> <p>The construction activity shall be carried out only under the guidance / supervision of the reputed institute / organisation.</p>	<p><b>Complied.</b> Currently we are operating 1650 m multi cargo berth which is well cleared of mangrove area. There is no intervention of construction activities on the mangrove area.</p> <p>Before the start of construction activities, studies have been carried out by reputed institute with reference to the construction.</p>
8	M/s EBTL shall strictly ensure that no rivers are blocked due to any activity at the proposed site.	<b>Noted</b>
9	The construction debris and / or any other type of waste shall not be disposed of in to the sea, creek or in the CRZ area. The debris shall be removed from the construction site immediately after construction is over.	<p><b>Noted and complied.</b> There is a general practise of collection and storage of construction and demolition waste before being disposed to municipal site by vendor. No disposal into coastal areas has been envisaged at any point of time.</p> 





S.No.	Condition	Compliance Status
		
10	<p>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 labours.</p>	<p><b>Complied.</b></p>
11	<p>M/s EBTL shall bear the cost of the external agency that may be appointed by this Department for supervision / monitoring of proposed activities and the environmental impacts of the proposed activities.</p>	<p><b>Noted and agreed.</b></p>
12	<p>The groundwater shall not be tapped within the CRZ areas by the EBTL to meet with the water requirements in any case.</p>	<p><b>Complied.</b> No ground water has been taken.</p>
13	<p>M/s EBTL shall take up massive greenbelt development activities in consultation with Forest department / GEER Foundation / Gujarat Ecology Commission. A comprehensive plan for this purpose has to be submitted to the Forest and Environment Department.</p>	<p><b>Complied.</b></p>
14	<p>The EBTL shall have to take up bio-shielding development programme as part of CSR in consultation</p>	<p><b>Complied.</b></p>



S.No.	Condition	Compliance Status
	with Forest Department/PCCF and an action plan in this regard shall have to be submitted to the MoEF-GOI and this Department.	
15	The EBTL shall have to contribute financially for taking up the socio-economic upliftment activities in this region in consultation with the Forest and Environment Department and the District Collector / District Development Officer.	<b>Complied.</b>
16	A separate budget shall be earmarked for environmental management and socio-economic activities including the greenbelt / mangrove plantation and details thereof shall be furnished to this Department as well as the MoEF, GOI. The details with respect to the expenditure from this budget head shall also be furnished along with the compliance report.	<b>Noted and being complied.</b> Details of expenditure regarding the environment management are being provided along with the half yearly compliance report of environment clearance.
17	A separate Environmental Management cell with qualified personnel shall be created for environmental monitoring and management during construction and operational phases of the project.	<b>Complied.</b> We have a dedicated Environment Cell with a full time manager level person having Master's degree in Environment Process and Design reporting to the Head - Ports. Environment Cell is responsible for effective implementation of environmental safeguards in port premises.
18	Environmental Audit report indicating the changes, if any, with respect to the baseline environmental quality in the coastal and marine environment shall be submitted every year by M/s EBTL to this department as well as to the MoEF, GOI.	<b>Complied.</b>
19	A six monthly report on compliance of the conditions mentioned in this letter shall have to be furnished by M/s EBTL on a regular basis to this Department as well as to	<b>Complied.</b>



S.No.	Condition	Compliance Status
	the Ministry of Environment and Forest, Government of India.	
20	Any other condition that may be stipulated by this Department / Ministry of Environment and Forest, Government of India from time to time for Environmental Protection / management purpose shall also have to be complied with by M/s EBTL..	Agreed.

**Authorized Signatory**

**For, AMNS Ports Hazira Limited** (formerly known as, Essar Bulk Terminal Limited)

**Capt. Rituparn Raghuvanshi**  
**Head – Ports, Hazira,**  
**AMNS Ports Hazira Limited**  
 27<sup>th</sup> KM, Surat-Hazira Road,  
 Village Hazira, Choryasi taluka,  
 Surat – 394 270  
 Gujarat.





**Annexure 4: Action plan for compliance of Environmental Management Plan recommended in the EIA Report**

S. No.	Impact identified	Environment Management Plan	Action Plan / Compliance status
<b>Construction phase</b>			
1	<p>During dredging and reclamation sedimentation could occur locally if the suspended sediment associated with the drained water settles in the channel feeding mangroves restricting the water flow in an extreme case.</p>	<ul style="list-style-type: none"> <li>• Cutter Suction Dredgers (CSD) and Trailing Suction Hopper Dredgers (TSHD) will be deployed. CSD would be used mainly within the estuary and just outside the estuary mouth for utilizing dredged material for reclamation. TSHD would be used in the sea segment of the channel.</li> <li>• The dredged material will be primarily utilised for reclamation and balance disposed at the sites approved by the Gujarat Maritime Board. Based on the modelling studies CWPRS has confirmed the stability of this site for the disposal of the dredged material.</li> <li>• The water draining from the reclamation site will be diverted away from the channel feeding the mangroves via 3 No. mud ponds to remove excess suspended solids.</li> <li>• Prior to dredging the mangrove area will be surveyed and marked on a drawing in 1:4000 scale. The monitoring of the mangrove patch will be done through satellite imageries once a year.</li> </ul>	<ul style="list-style-type: none"> <li>• We engaged Cutter Suction Dredgers (CSD) and Trailing Suction Hopper Dredgers (TSHD) for dredging operations as identified in EIA report.</li> <li>• The material dredged by CSD was being utilised for reclamation as per the plan submitted to MoEF&amp;CC whereas, the TSHD dredged material is disposed in GMB approved sites.</li> <li>• The water draining from the reclamation site was diverted away from the channel feeding the mangroves via mud ponds to remove excess suspended solids.</li> <li>• The mapping of the mangrove area through Satellite is already carried out by GUIDE the report are being submitted along with respective EC Compliance Report.</li> </ul>
2	<p>Reclamation and construction of quay can potentially modify the aquatic dynamics resulting in changes in erosion / accretion pattern in the mouth estuarine zone.</p>	<ul style="list-style-type: none"> <li>• Numerical modelling by CWPRS indicates absence of significant changes in the shoreline due to proposed constructions. Nevertheless, shoreline changes if any will be studied through satellite imageries once a year from the commencement of construction of berths.</li> <li>• If changes are found, reference will be made to CWPRS for their suggestion for mitigation measures. The recommended mitigation measures will be implemented.</li> </ul>	<p>We have not observed any shoreline changes due to our existing operations as well expansion activities. Changes if any, will be detected through satellite imagery.</p>
3	<p>There could be increase in fugitive dust emission from reclaimed area</p>	<ul style="list-style-type: none"> <li>• Frequent water sprinkling in the dried reclaimed sites will be undertaken.</li> <li>• Vehicles and construction machinery will be properly</li> </ul>	<ul style="list-style-type: none"> <li>• As suggested, we have arranged water sprinkling through mobile water tankers in the dried reclaimed sites.</li> </ul>





S. No.	Impact identified	Environment Management Plan	Action Plan / Compliance status
	<p>particularly during summer due to wind and movement of vehicles and machinery. Other impacts could be due to misuse of nearby area by workers, vehicular exhaust, discarded materials etc.</p>	<p>maintained to comply with the exhaust emission requirements. Frequent PUC monitoring will be done.</p> <ul style="list-style-type: none"> <li>The areas earmarked [50 Ha.] for greenbelt will be developed and plantation will be undertaken.</li> <li>On completion of construction, surplus materials, debris, discarded boxes, containers, drums etc will be removed from the site and disposed as per the procedure of Gujarat-Pollution Control Board</li> </ul>	<ul style="list-style-type: none"> <li>All construction vehicles complied with the exhaust emission requirements.</li> <li>Greenbelt development activities have been initiated.</li> <li>Agreed and complied.</li> </ul>
4	<p>The construction labour could mess-up the intertidal area and may even cut vegetation for firewood thereby causing local habitat degradation if proper facilities are not provided to them.</p>	<ul style="list-style-type: none"> <li>The workforce will be accommodated in the existing labour colony of Essar. The colony has drinking water and sanitation facilities.</li> <li>The workers will be provided with fuel.</li> <li>Facilities for collection and conveyance of garbage are already in place. The waste is stored segregated and then transported for disposal by authorised vendors only.</li> <li>Potable water and 10 Nos of toilets with soak pits will be made available to them at the project site as per relevant norms.</li> </ul>	<ul style="list-style-type: none"> <li>Construction camps kept well cleared of CRZ areas.</li> <li>Facilities like drinking water, sanitation provided inside the camps.</li> <li>Waste is being disposed as per the waste management plans specified by pollution control board.</li> <li>Operational 40 KLD sewage treatment plant is provided.</li> </ul>
5	<p>Noise from impact hammers, vibratory hammers, trucks, generators, compressors, pumps etc would be a source of nuisance for workers.</p>	<ul style="list-style-type: none"> <li>Noise from air compressors will be reduced by fitting exhaust mufflers and intake mufflers.</li> <li>Chassis and engine structural vibration will be dealt by isolating the engine from the chassis and by covering various sections of the engines.</li> <li>Noise levels from the drillers will be reduced by fitting exhaust mufflers and provision of damping on the steel tool.</li> <li>Exposure of workers near the high noise levels will be minimized by job rotation / automation, use of ear plugs, etc.</li> <li>The noise prone activities will be restricted to the day time.</li> </ul>	<ul style="list-style-type: none"> <li>Noise control measures suggested in the EIA report are followed.</li> </ul>



S. No.	Impact identified	Environment Management Plan	Action Plan / Compliance status
<b>Operation Phase</b>			
1	Marine water: Monitoring in dry season at 3-4 locations.	<ul style="list-style-type: none"> <li>• Physico-chemical parameters (pH, salinity, turbidity, DO).</li> <li>• Biological parameters (Mangroves, light penetration, coliform, <i>E coli</i>).</li> </ul>	<ul style="list-style-type: none"> <li>• Marine monitoring is being carried out on six monthly basis by one of the MoEF&amp;CC accredited laboratory.</li> </ul>
2		<ul style="list-style-type: none"> <li>• Physico-chemical parameters (Texture, pH).</li> </ul>	
3	Ambient air quality: Monitoring in summer, post-monsoon and winter seasons. (Twice a week for four consecutive weeks per season)	<ul style="list-style-type: none"> <li>• Parameters: SPM, RPM, SO<sub>2</sub> and NO<sub>x</sub>.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring of environmental parameters is being carried out by one of the MoEF&amp;CC accredited Laboratory.</li> </ul>
4	Noise: Monitoring during peak construction activities at construction sites	<ul style="list-style-type: none"> <li>• Equivalent noise level.</li> </ul>	







# GUJARAT POLLUTION CONTROL BOARD

PARYAVARAN BHAVAN, SECTOR 10-A,

GANDHINAGAR - 382010,

(T) 079-23232152

**“Amendment”**  
(in CCA No: AWH-109664)

NO: GPCB/CCA-SRT-1189(5)/ID\_22972/ **747314**

Date: **12/07/2023**

To,

M/s. AMNS Ports Hazira Ltd. (Old Name: Essar Bulk Terminal Ltd.)

Surat Hazira Road, Post Hazira - 394270,

Ta: Chorasi, Dist: Surat.

SUB: Amendment in the consolidated consent & Authorization of the Board.

REF: 1) CCA order No: AWH-109664, Dated: 09/10/2020 under various Environmental Acts/Rules.

2) Your CCA Amendment Application dated: 17/02/2023.

In exercise of the power conferred under section-25 of the Water (Prevention and Control of Pollution) Act-1974, under section-21 of the Air (Prevention and Control of Pollution) Act -1981 and Authorization under rule 6(2) of the Hazardous and Other Waste (Management and Transboundary) Rules, 2016 & framed under the Environment (Protection) Act-1986, The Board has granted CCA vide order No. AWH-109664 vide this office letter no: GPCB/CCA-SRT-1189(4)/ID-22972/573148 dated 12/11/2020, valid up to 31/03/2025.

The Board has right to review and amend the conditions of the said CCA order.

The said CCA order is further amended as below.

1. This order shall be read as CCA-Amendment Order No. **AWH-109664** date of issued **09/10/2020** valid up to **31/03/2025**.

(1) Land use of reclaimed 178 Ha land to the South of the mangrove patch			
Sr. No	Land use category	Type of cargo storage	Area (Ha)
1	Raw Material handling system with mechanized Yard	Coal, Coke, Flux etc.	38
2	Storage Yard for raw materials, Break Bulk Cargo and finished goods Conveyers Truck Parking	Raw Materials: Iron oxide, Coal, Coke, Flux, slag and scrap etc. Bulk Cargo: Containers, Project cargo, Machinery import/ export Finished goods: GRC Sheet/Coils, IIRC/CRC Sheet/Slabs, Plates and Pipes etc.	140 (out of 186 ha reclaimed)
3	Reclaimed land South of mangrove patch for future expansion	Undeveloped	77 ha (out of 334 ha proposed)

(2) Port Terminal with water front 4.2 Km having following facilities with Jetty length – 1.65 KM

Sr. No.	Type of Berth	Type of Cargo/activity	Total
1	Deep draft berth (DDB)	Jetty operation	550 m long
2	Container & break bulk berth	Containerized Steel & Break Bulk Products	1100 m long

(3) Navigation Channel

Dimension	Total after Extension
Length	8.8 km of 17.6 KM continues dredging process
Depth	16 m continues dredging process
Width	300-350 m

(4) Turning circles 1 Nos. of diameter 600 m each.

(5) Dredging

(i) Capital dredging up to 41 million m<sup>3</sup>

(ii) Maintenance dredging 10 million m<sup>3</sup> per Annum

(6) Type & Quantity of the cargo to be handled:

Sr. No.	Cargo handling Capacity	Total Cargo Handling Capacity
1	TEU Containers	1 Million/Annum
2	Import Bulk Cargo	32 MTPA
3	Export Cargo	9 MTPA
4	Liquid Cargo including Bunkers /Petroleum/Chemical Products	2 MTPA
5	Ship Movement	75 Nos./Month

**Subject to specific condition:**

- I. There shall be no changes in quantity of existing Water consumption, waste water generation, fuel consumption & Hazardous Waste Generation quantity due to this CCA-Amendment.
2. The rest of the conditions of the above referred CCA order No. AWH-109664 shall remain unchanged. You are directed to comply with these conditions.

For and on behalf of  
Gujarat Pollution Control Board



(M. R. Macwana)  
Unit Head, Surat



# AM/NS Ports

Ref. No. AMNS Ports/ENV/GPCB/Form-V/2022-23

22<sup>th</sup> September 2023

To,  
The Member Secretary,  
Gujarat Pollution Control Board,  
Paryavaran Bhavan, Sector 10-A,  
Gandhinagar – 382 010,  
Gujarat

Gujarat Pollution Control Board  
29/09/2023  
Head Office  
Sector No.-10-A,  
Gandhinagar-382010

**Subject:** Submission of Environmental Statement (Form-V) for FY 2022-23

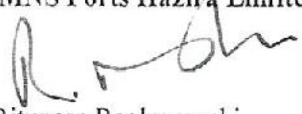
**Reference:**

1. GPCB's Login ID: 22972,
2. Company Name: AMNS Port Hazira Limited,
3. CCA No. 40300 dated 19.01.2011 renewed on 20.10.2015 with new CCA No. AWH-73836 and amended on 28.03.2016,
4. Amendment to CCA with Consent No. AWH-109664 issued dated 9<sup>th</sup> October 2020,
5. Amendment to CCA vide letter No. GPCB/CCA-3RT-1189(5)/ID\_22972/747314 dated 12<sup>th</sup> July 2023,
6. Environment Clearance received vide F.No. 11 46/2011 LA.III dated 06.05.2014

Dear Sir,

With reference to the above mentioned subject and reference, we are hereby submitting the Environmental Statement (Form-V) for the FY 2022-23. This is for your kind records. Kindly acknowledge the same.

Thanking You  
Yours' Faithfully  
For, AMNS Ports Hazira Limited,

  
Capt. Rituparn Raghuvanshi  
Head Ports – Hazira  
Encl:



1. Copy of Environment Statement - Form-V

CC:

The Unit Head - Surat,  
Gujarat Pollution Control Board,  
Sector 10-A,  
Paryavaran Bhavan,  
Gandhinagar – 381 010  
Gujarat  
[uh-gpcb-sura@gujarat.gov.in](mailto:uh-gpcb-sura@gujarat.gov.in)

The Regional Officer,  
Gujarat Pollution Control Board,  
Plot No. 11-12/2,3  
GIDC Pandesara, Surat – 394 221  
Gujarat.  
E-Mail: [ro-gpcb-sura@gujarat.gov.in](mailto:ro-gpcb-sura@gujarat.gov.in)

The Inspector General, Forests  
Scientist – “C”  
Integrated Regional Office, Aranya Bhawan,  
Nr. CH-3 Circle, Sector-10-A, Gandhinagar,  
Gujarat – 382 010  
E-Mail: [ecompliance\\_guj@gov.in](mailto:ecompliance_guj@gov.in), [iro.gandhingr-mefcc@gov.in](mailto:iro.gandhingr-mefcc@gov.in)

AMNS Ports Hazira Limited

7th Floor, Raheja Tower, C - 30, Block G, Bandra Kurla Complex, Bandra East, Mumbai - 400 051  
AMNS House, AMNS Township, 27 km, Surat - Hazira Road, Hazira, Gujarat - 394 270  
CIN U13100GJ2004PLC043477

SMARTER  
STEELS  
BRIGHTER  
FUTURES