adani

Ref: NMIAL/MOEF/GEN/0339

20th June 2023

Regional Officer (WCZ),
Integrated Regional Office (IRO)
Ministry of Environment, Forest & Climate Change (MoEFCC),
Ground Floor, East Wing, New Secretariat Building,
Civil Lines, Nagpur-440001
Email - apccfcentral-ngp-mef@gov.in

Subject: – Submission of Half Yearly Compliance Report (Oct 2022 - Mar 2023) for Environmental and CRZ Clearance in respect of proposed Navi Mumbai International Airport reg.

Reference: - 1) Environmental Clearance and CRZ Clearance for on-going project granted No. 21-60/2021-IA-III dated: 28.11.2021

Sir,

We have been trying to upload half yearly report on Parivesh – II website without success for last few days. After logging into the Parivesh site and selecting the options of "Upload the compliance", site is showing error message saying that the site "environmentalclearance.nic.in" has been unexpectedly closed due to connection error. We have reported the issue to Parivesh coordinator.

Therefore, we are submitting herewith the half yearly Environmental Compliance Status report for the period 1st October 2022 to 31st March 2023 for proposed establishment of green field international airport at Navi Mumbai as per the following:

1. Data Sheet
2. Clause wise EC Compliance Report for the period of Oct 2022- Mar-2023 with annexures
3. Environmental Monitoring Report Oct 22- Mar 2023.

Thanking you

Yours faithfully,

For **Navi Mumbai International Airport Pvt. Ltd.**

Charudatta Deshmukh
Joint President & Head - Planning & Design

Navi Mumbai International Airport Pvt Ltd
11th Floor, V Times Square, Plot no 3,
Sector 15, CBD Belapur,
Navi Mumbai – 400 614
Maharashtra, India

Tel +91 22 6851 9500

CIN - U45200MH2007PTC169174

Registered office: CSMI Airport, 1st Floor, Terminal 1B, Santacruz (E), Mumbai 400 099, India. T +91 22 6685 0900 / 6685 0901

adani

Copy to: 1) The Vice Chairman & Managing Director, City & Industrial Development Corporation of Maharashtra Ltd. (CIDCO), CIDCO Bhavan, CBD Belapur, Navi Mumbai- 400614 for information and necessary action.

2) The Member Secretary, Maharashtra Pollution Control Board, 3rd Floor, Kalpataru Point, Sion, Mumbai – 400 022.

3) The Zonal Officer, Central Pollution Control Board, Parivesh Bhavan, Opp. VNC ward office No. 1:0, Subhanpura, Vadodara – 390023.

4) The Chairman, Maharashtra Coastal Zone Management Authority, Room No. 217, Mantralaya (Annex Building), Mumbai – 400 032.

5) Monitoring Cell, MoEF&CC, Indira Paryavaran Bhavan, Jor Bagh Road, New Delhi – 3.

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Half Yearly Compliance Report of Environmental & CRZ Clearance

For Ongoing project For Establishment of Greenfield Airport

Navi Mumbai International Airport (NMIA)

At Panvel, Dist. Raigad, Maharashtra

Submitted to:

Integrated Regional Office (IRO),
Ministry of Environment, Forest & Climate Change (MoEF&CC), Nagpur.

Central Pollution Control Board, New Delhi.

Maharashtra Pollution Control Board, Mumbai

Submitted By:
Navi Mumbai International Airport Pvt Ltd. (NMIAL)

For

Period of October 2022 to March 2023

Index

Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Regional Office (West Central Zone), Nagpur
Monitoring Report
Part – I
DATA SHEET

1st October 2022 to 31st Mar 2023

1.	Project type: River-valley/ Mining/Industry/Thermal/ Nuclear/Other (Specify)	Other- Infrastructure, Greenfield International Airport at Navi Mumbai
2.	Name of the Project Proponent	Navi Mumbai International Airport Pvt. Ltd (NMIAL)
3.	Clearance letter (s)/OM No. And Date	Earlier EC and CRZ clearance granted to CIDCO as Nodal agency appointed by Government of Maharashtra as under: 1 EC received vide F. No. 10-53/2009-I.A.III dtd. 22.11.10 valid up to 21.11.2017 2 Extension of validity received vide F. No. 10-53/2009-IA.III dt 20.12.17 up to 21.11.2020. EC transferred from CIDCO to NMIAL (Navi Mumbai International Airport Pvt. Ltd) by MoEFCC vide F. No. 10-53/2009-IA-III dtd. 17.08.2020 with same validity. Validity extended vide S. O. No. 4254 (E) dt 27.11.20 upto 21st May 2021 for all projects due to COVID pandemic by MOEFCC. CRZ recommendation received from Environment & Climate Change Department, Govt. of Maharashtra vide Letter No. CRZ 2021/CR 156/TC 4 Dated – 27.09.2021. Environmental Clearance and CRZ Clearance for on-going project granted by MOEFCC vide No. 21-60/2021-IA-III dated: 28.11.2021 valid up to 27.11.2028
4.	Location: a) District (s)	Raigad
	b) State (s)	Maharashtra
	c) Location	Taluka Panvel

	d) Latitude/Longitude	Longitude - 73° 04' 12.95" E Latitude - 18° 59' 39.78" N
5.	Address for correspondence a) Address of the Concerned Project Chief Engineer (With Pin Code and telephone/telex/fax numbers)	**Mr. Charudatta Deshmukh,** **Joint President & Head - Planning and Design** Navi Mumbai International Airport (P) Limited (NMIAL), 11th Floor, V Times Square Building, Plot No 03, Sector 15, CBD Belapur, Navi Mumbai 400614 **Tel** 022-68519500 **Email**: Charudatta.Deshmukh@adani.com
6.	Salient features a) Of the project	Proposed project is for establishment of International Airport on a site of area 1160 Ha. Airport is designed to accommodate the aircraft (A-380 and equivalent) compatible to ICAO Standard of aerodrome 4-F. The ultimate passenger capacity of airport will be 60 MPPA and cargo capacity of 1.5 MTPA. Airport will have two parallel independent runways for simultaneous and independent operation with the provision of full-length parallel taxi ways along runways. The length of runway is of 3700 m x 45 m with Runway End Safety Area (RESA) of 240 m x 150 m. Central Terminal Complex (CTC) comprising of three terminal buildings catering to domestic and international passengers and ATC Tower, Cargo terminal building of domestic and international Cargo. Fuel tank farm for Aviation Turbine Fuel (ATF). Facilities such as Multi Level Parking, GSE storage area, ATC Tower, airport ground lighting, airport lighting, apron, GSE maintenance, hangars along with other allied facilities etc. The project activities during construction phase to be done by NMIAL are land development by cutting of balance portion of hill and filling from + 5.5m AMSL to average +8.5m AMSL. • Phase- I & II BUA (20 MPPA)- 6,27,335.678 m^2. • Total BUA Area (60 MPPA)- 14,13,069.178 m^2.

<table>
<tr><td></td><td></td><td>• Project Cost (Phase-I & II) – Rs 19,646 Crores
• Total Project Cost- Rs 41,302 Crores.</td></tr>
<tr><td></td><td>b) Of the Environmental management plans</td><td>NMIAL is planned to be a resource efficient & Green airport. Environment Management Plan at construction and operations phase includes the following:
• Incorporation of LEED requirements at the design stage
• Noise and dust pollution minimization during construction phase,
• Carbon neutrality followed by Net Zero emission commitments
• Zero Sewage Discharge
• Rainwater Harvesting Ponds
• Generation and Utilization of Solar Power
• Energy Optimization
• Waste Re-cycling
• Natural Day Lighting
• Plantation & Landscape</td></tr>
<tr><td>7.</td><td>Breakup of the project area

a) Submergence area forest and non-forest</td><td>a) Not Applicable</td></tr>
<tr><td></td><td>b) Others</td><td>Airside Area- 942.25 Ha.
Landside area- 217.75 Ha
Total Area – 1160 Ha
<table><tr><th>Land use</th><th>Area (Ha)</th></tr><tr><td>Facilities, pavements, building and structures</td><td>605.47</td></tr><tr><td>Green/open spaces</td><td>384.90</td></tr><tr><td>Transportation roads, parking, metro</td><td>139.32</td></tr><tr><td>Utilities</td><td>10.12</td></tr><tr><td>Drains</td><td>20.19</td></tr><tr><td>Total</td><td>1160.00</td></tr></table>
Permission for Removal of Mangroves (Order from Hon’ble Bombay High Court) Notice of Motion No. 419 of 2011 in PIL No. 87of 2006 dated 29th Oct 2013.

Forest Clearance- 250.0635 Ha (Stage I and Stage II clearance obtained vide F. No. 8-95/2012-FC dated 17 December 2013 and 24 April 2017 respectively)</td></tr>
<tr><td></td><td>a. Total Plot Area</td><td>Total Plot Area 1160 Ha.</td></tr>
<tr><td></td><td>b. Built - Up Area (Including Road)</td><td>Phase- I&II BUA (20MPPA)- 6,27,335.678 m^2

Total BUA Area (60 MPPA)- 14,13,069.178 m^2</td></tr>
</table>

	c. Open Space available	Phase I & II (20 MPPA) - 2706746.829 m^2 Total Final Phase (60 MPPA) - 38,49,047.682 m^2
	d. Green Belt Area	Same as above
8.	Breakup of the project affected population with enumeration of those losing house/dwelling units only agricultural land only. Both dwelling units and agricultural land and landless laborers/ artisans:	CIDCO has provided encumbrance free Right of Way (RoW) over entire land for the airport site i.e., 1160 ha to NMIAL as per the Concession Agreement (CA).
	a) SC, ST/Adivasis	--
	b) Others	--
9.	Financial details: a) Project cost as originally planned and subsequent revised estimates and the year of price reference:	a) Total cost of the development of airport comprising of aeronautical and nonaeronautical activities works out for four Phases at FY 2020 prices as provided in EIA report of Nov. 2020 is Rs.41,302 Cr. b) Estimated cost of Construction of Phase 1 & 2 to achieve passenger handling capacity of 20 MPPA and Cargo handling capacity of 0.57 MTPA is Rs. 15,982 cr of NMIAL + Rs. 3665 cr pre-development cost incurred by CIDCO excluding R&R cost is Rs. 19,647 crores
	b) Allocation made for environmental management plans with item wise and year wise break-up.	NMIAL has allocated Rs. 291.37 Cr for EMP for Development & Operation Phase of NMIA up to final phase.
	c) Benefit cost ratio/Internal rate of return and the year of assessment	-
	d) Whether (c) includes the cost of environmental management as shown in the above	-
	e) Actual expenditure incurred on the project so far	a) Expenditure by CIDCO on pre-development works including land acquisition, rehabilitation and resettlement of project displaced persons and land development works as of March 31, 2023 as reported in the Independent Engineer's MPR for March 2023 is Rs. 5228.57 Cr out of budgeted Rs. 5478 Cr (Ref: EIA2021 Page C2-92 section 2.10.3)

		b) Expenditure by NMIAL on land development, planning & design, contractor advances, etc. till 31st March 2023: Rs. 3523.69 Cr.
	f) Actual expenditure incurred on the environmental management plans so far	Rs. 8.399 Cr incurred on EMP till 31st March 2023 out of budgeted Rs. 291.37 (Ref: EIA2021 Page C10-57 section 10.4)
10.	Forest land requirement: a) The status of approval for diversion of forest land for non-forestry use	Diversion of 250.0635 Ha of forest land was required for the project. Stage-I Forest Clearance was accorded to CIDCO vide F.No.8-95/2012-FC dt. 17.12.2013. Stage-II Forest Clearance was granted to CIDCO vide F. No. 8-95/2012-FC dt. 24.04.2017. HOFF (Head of Forest Forces, Maharashtra state, Nagpur) has visited site on 12th Dec 2018 and reviewed the compliance to Forest Clearance
	b) The status of clearing felling	Completed
	c) The status of compensatory afforestation if any	Status of Compensatory Afforestation I. 37000+ saplings have been planted under tripartite agreement between the Forest department of Maharashtra, NMIAL and an NGO at Jite village near Alibag. II. 250.0635 Ha Degraded Forest Land taken up in Alibaug, Dahanu and Shahpur Division and total of 6,70,073 trees planted through Forest Department by CIDCO. III. CIDCO has undertaken 109 Ha of compensatory mangroves plantation on NE of airport site on S. No. 27, village Kolhekhar between Jui creek and Taloja creek through the Mangrove Cell of State Forest Dept. as per the condition stipulated in the Forest Clearance. IV.HOFF (Head of Forest Forces, Maharashtra state, Nagpur) has visited site on 12th Dec 2018 and reviewed the compliance to Forest Clearance.
	d) Comments on the viability and sustainability of compensatory afforestation program in the light of actual field experience.	Plantation and protection of Mangroves over 109 ha as compensatory afforestation has been completed by Mangrove Cell on the instance of CIDCO at village Kolekhar. Thane Forest Division has certified vide letter dt 31.10.19 that out of 100,000 mangrove saplings planted at above site about 92.5 % survived

11.	The status of clear felling in non-forest areas (such as submergence area of reservoir, approach roads), if any with quantitative information	Total number of non-forest trees at NMIA site to be felled was 9492 out of which 7234 trees were felled by CIDCO and balance 2258 trees were felled by NMIAL after completing requisite formalities of tree survey, and permission from Tree Authority as per the Tree Act, 1975.
12.	Status of construction a) Date of commencement (Actual and/or planned)	April 2017 Pre-development works commenced by CIDCO
	b) Date of completion (Actual and/or planned)	December 2024 (Phase-I & II, 20 MPPA) (planned)
13.	Reason for the delay if the project is yet to start	Pre-development work at site commenced soon after the Forest Clearance was granted to the project. Project work could not be commenced till April 2017 pending grant of Stage II Forest Clearance for the project. Construction work commenced soon after the encumbrance free RoW on all 1160 Ha airport land was provided by CIDCO to NMIAL in June 2022.
14.	Dates of site visits	
	a) The dates on which the project was monitored by the Regional Office on previous occasions, if any	Site visit done by RO, MOEFCC on 11.11.20 for monitoring compliance of EC. Compliance Report was received from Integrated Regional Office, MoEF&CC Nagpur vide Letter No. 6-22/2010 (ENV)/ 7994 Dated 31.03.2021 for which action taken report was submitted vide NMIAL/MOEF/GEN/0069 dt 01st Oct 21 for closing the raised observations.
	b) Date of site visit for this monitoring report	MoEF&CC, Regional Office at Nagpur has not intimated date of site visit.
15.	Details of correspondence with project authorities for obtaining action plans / information on status of compliance to safeguards other than the routine letters for logistic support for site visits.	1. Action Taken Report (ATR) of Certification EC Compliance Report submitted to Regional Office Nagpur MOEF&CC dated 1st Oct 2021. 2. Certified Compliance Report Received vide letter F. No: 6-22/2010(ENV)/7994 dated 31st March 2021.

	(The first monitoring report may contain the details of all the letters issued so far, but the later reports may cover only the letters issued subsequently.)	3. RO- MOEFCC has visited NMIA site on 11th Nov 2020. 4. Letter dated 29th Oct 2020 sent to IRO, Nagpur with monitoring data sheet and additional information of project for issuance of certification of Compliance Report for NMIA 5. Request letter dated 12th Oct 2020 sent to MOEF&CC Nagpur for Issuance of Certification of Compliance Report for Navi Mumbai International Airport (NMIA). 6. Request letter dated 4th June 2020 sent to MOEF&CC Nagpur for Issuance of Certification of Compliance Report for Navi Mumbai International Airport (NMIA).

EC COMPLIANCE REPORT
(01.10.2023 to 31.03.2023)

Introduction

Environmental Clearance (EC)and CRZ Clearance was granted to NMIA project with CIDCO as project proponent, by Ministry of Environment, Forest, and Climate Change (MoEF&CC) on November 22, 2010, and Extension of Validity to EC was granted on December 20,2017. It was valid till November 2020. The MoEF&CC had extended validity of the EC accorded to NMIA project till November 21, 2021, during pandemic period.

NMIAL received transfer of EC, which was in CIDCO's name and valid till November 21, 2021, on NMIAL's name on August 17, 2020, from MOEF & CC. Fresh EC and CRZ Clearance has been granted for on-going project for 60 million Passengers Per Annum (MPPA) & Cargo capacity 1.5 MTPA, NMIA as the project proponent by MoEF&CC granted on November 28, 2021 and issued on December 01, 2021.

Present Status of completed/ on-going works are given as follows:
It comprises the following:

1. Cutting of hills at site up to +8m AMSL, and filling of site up to + 5.5m AMSL completed.
2. CIDCO has handed over 100% encumbrance free project site of 1160 Ha to NMIAL on 10th June 2022.
3. Cutting and/or transplantation of trees in non-forest area in the site as directed by Tree authority has been completed.
4. Construction of Ulwe recourse channel on the south of site completed.
5. Re-routing of High Voltage Transmission Lines from NMIA site by Tata Power and MSETCL are completed.

MOEF&CC's Environment and CRZ Clearance identification No.EC21A029MH183036 & file no 21-60/2021-IA-III dated November 28, 2021 and issued on December 01 2021.

Project is under construction. Detailed pointwise compliance report pertaining to the reporting period (Oct 2022– Mar 2023) for construction phase is given below. Compliance with operation phase conditions will be complied prior to the commissioning of the airport.

	EC & CRZ Conditions-2021	Compliance Status
A	**Specific Condition**	
i.	Conditions specified in Environmental & CRZ Clearance issued vide letter No. 10-53/2009-IA.III dated 22.11.2010 shall be strictly complied.	**Agreed to Comply:** We will abide by the conditions specified in Environmental & CRZ Clearance issued vide letter No. 10-53/2009-IA.III Dated 22.11.2010. Status of compliance is given **Annexure-I.**

	EC & CRZ Conditions-2021	Compliance Status
ii.	PP shall submit compliance report to IRO-MoEF&CC, Nagpur for pending compliances within 6 months.	**Complied**
iii	Where construction activity is likely to cause noise nuisance to nearby residents, restrict operation hours between 7 AM to 6 PM.	**Being Complied:** Noise making construction activities such as drilling are being carried out only during Day time between 7 AM and 6 PM. **Following measures are being taken to reduce load on Ambient Noise & Air:** ▪ The noise generating activities are being carried out only during daytime. ▪ Separate Entry & Exit for the construction vehicles has been provided. ▪ Construction vehicles are mostly within site and do not exit project site. However, vehicles if any, entering or exiting site, for that separate exit & entry have been provided.
iv	Hazard Identification and Risk Assessment for the project shall be carried out and adequate mitigation measures shall be adopted to ensure that all safety issues are addressed. The documentation shall be reviewed periodically and shall be submitted to the regional office along with six-monthly compliance report.	**Agreed to Comply:** NMIAL has engaged an EPC contractor for ongoing work. Contractor has own HSE team at site which is supervised by NMIAL site HSE Team led by GM – Safety of NMIAL. Each contractor works out an Occupational Health, and Safety Emergency plan identifying occupational safety hazards, assesses probability of occurrence of the hazard along with intensity of likely damage and how risk posed by these hazards will be mitigated. Contractor adopts following tools to identify safety measures required during ongoing work - conduct Training program - Tool Box Talks on HSE issues - Safety committees - HSE audit

	EC & CRZ Conditions-2021	Compliance Status
		- HIRA - accident investigation - Monthly & quarterly reports Similar practices are being continued during construction phase.
v	A detailed traffic management and traffic decongestion plan shall be drawn up to ensure that the current level of service of the roads within a 05 km radius of the project is maintained and improved upon after the implementation of the project. This plan should be based on cumulative impact of all development and increased habitation being carried out or proposed to be carried out by the project or other agencies in this 05 Kms radius of the site in different scenarios of space and time and the traffic management plan shall be duly validated and certified by the State Urban Development Department and the P.W.D./ competent authority for road augmentation and shall also have their consent to the implementation of components of the plan which involve the participation of these departments.	**Complied:** CIDCO, the nodal agency for Navi Mumbai International Airport has prepared "Detailed Traffic Management and Traffic Decongestion Plan for Navi Mumbai International Airport (NMIA)" in April 2020 which ensure that the current level of service of the roads within a 05 km radius of the project is maintained and improved upon after the implementation of the project. CIDCO has submitted final report for "Detailed Traffic Management and Traffic Decongestion Plan for Navi Mumbai International Airport (NMIA)" to MOEF vide letter No. CIDCO/GM(ENV&F)/NMIA/2020 /491 dated 14th July 2020. MMRDA also published "Updation of Comprehensive Transportation Study (TRANSFORM -2) for Mumbai Metropolitan Region" in year 2020 including Traffic decongestion plans and suggestions for Navi Mumbai International Airport at Regional and local level. Development of all transportation infrastructure required for NMIA (along with obtaining clearances and compliances for the same) is being done by CIDCO as per NOC for transfer of EC and CRZ clearance given by CIDCO to NMIAL vide letter No. CIDCO/T&C/CT&CP/ NMIA/1317 dt 10th Feb 2020.
vi	Solar power generation capacity of 22.14 MW shall be established as proposed.	**Agreed to Comply:** NMIA is likely to enhance solar power generation capacity to approximately 28 MW from Phase I & II (20 MPPA)

	EC & CRZ Conditions-2021	Compliance Status
		current commitment of 22.14 MW in EMP. In final phase solar power generation capacity will increase to about 36 MW
vii	Rainwater harvesting pond of 29,747 cum capacity shall be provided as proposed. Rainwater harvesting structures shall conform of CGWA designs. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Design and planning of the surface drainage includes creation of RWH ponds of requisite capacity. Necessary pre-treatment like oil water separator and silt ponds are also proposed to remove suspended matter, oil and grease.
viii	A certificate from the competent authority/ agency handling municipal solid wastes should be obtained, indicating the existing civic capacities of handling and their adequacy to cater to the M.S.W generated from project.	**Agreed to Comply:** During the reporting period, only land development and construction work is ongoing at site. EPC contractors have appointed authorized waste handlers for MSW generated at labour camp. To handle MSW at operational phase, in planning and design various strategies have been incorporated to minimize waste going to the landfill site. In addition, NMIAL has written to CIDCO vide letter dated 9th May 2022 and 23 May 2023 seeking confirmation from CIDCO regarding accepting residual MSW waste from NMIAL as per Environment approval.
ix	Fresh water requirement from local authority shall not exceed 10.61 MLD during final operational phase. As committed, no groundwater abstraction shall be done during construction as well as operation phase of the project.	**Agreed to Comply:** We will abide by the condition. The total water demand in final phase is 21.82 MLD. Of which, freshwater demand of 10.61 MLD will be sourced from CIDCO and balance 11.21 MLD will be recycled water from on – site STPs. There will be no ground water abstraction carried out during construction phase as well as operational phase of project.

	EC & CRZ Conditions-2021	Compliance Status
x	As proposed, wastewater shall be treated in onsite STPs of total 14.25 MLD capacity (during final phase). Treated water from the STP shall be recycled and reused for gardening, flushing etc. There shall be no discharge of treated water from the project as proposed.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Design and Planning of the facility has incorporated STPs of requisite capacity for Phase 1 & 2 and treated water from STPs will be used for flushing, gardening & HVAC purpose. There will be no discharge of treated water from the project.
xi	The project proponents would commission a third-party study on the implementation of conditions related to quality and quantity of recycle and reuse of treated water, efficiency of treatment systems, quality of treated water being supplied for flushing (specially the bacterial counts), comparative bacteriological studies from toilet seats using recycled treated waters and fresh waters for flushing, and quality of water being supplied through spray faucets attached to toilet seats.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition.
xii	Area for greenery shall be provided as per the details provided in the project document i.e., about 384.90 ha. will be developed as green area.	**Agreed to Comply:** Since first phase of project is under implementation and project is yet to be operational, we assure to abide by the condition, by final phase.
xiii	PP shall explore the use of non-ozone depleting substances in air conditioning systems.	**Agreed to Comply:** non-ODP refrigerant is specified for chillers & DX units (air conditioning system) to avoid depletion of ozone layer in environment. We assure to abide by the condition.
xiv	The PP shall also provide electric charging points in the parking areas for e-vehicles.	**Agreed to Comply:** NMIA master plan includes phase wise development of Multi Level Car Parking for airport users with provision of parking spaces with charging facilities. In phase I & II development of NMIA, provision is made for more than 30 parking

	EC & CRZ Conditions-2021	Compliance Status
		spaces with electric charging points.
xv	The proposed ongoing work of Navi Mumbai International Airport should be carried out strictly as per the provisions of CRZ Notification, 2011 as amended from time to time and with a commitment of protection and conservation of coastal environment.	**Agreed to Comply:** provisions of CRZ Notification will be strictly complied. Project has obtained CRZ recommendation from Environment & Climate Change Department, Govt. of Maharashtra vide letter No. CRZ 2021/CR 156/TC 4 dated 27.09.2021 on the basis of which MOEF&CC has issued CRZ clearance along with EC.
xvi	NMIA shall carry out the balance work without change in location, scope, area or capacity.	**Agreed to Comply:** NMIA will carry out development work without change in location, scope, area or capacity.
xvii	No mangrove destruction is allowed to carry out balance ongoing work of the project. There shall not be violation of the Hon'ble High Court order dated 23rd October 2013 in PIL 87/2006.	**Agreed to Comply**: We undertake that no mangrove destruction will be carried out for balance ongoing work at the project, and that there will not be violation of the Hon'ble High Court order dated 23rd October 2013 in PIL 87 /2006.
xviii	Work of diversion of Ulwe and Gadhi River is completed. NMIA shall carry out the studies pertaining hydraulic flow conditions, to understand the impact of diversion of Ulwe and Gadhi streams on Panvel Creek coastline, its coastal ecology and surrounding area/ settlements/ habitat/ social economic pattern. The hydraulic study shall also consider the anticipated impacts of climate change and sea level rise on proposed airport site and surrounding area. Hydraulic studies need to be carried out with an objective to anticipate the probable flooding situations in low lying areas and accordingly implement the possible mitigation measures.	**Complied:** It may be noted, as per CIDCO report, as submitted to MOEFCC, that: 1. CWPRS, Pune has carried out 1D, 2D mathematical & physical Model studies based on the MoEF's approved layout plan of airport covering 1160 Ha. CIDCO has designed the master drainage plan of surrounding areas by incorporating the various recommendations of CWPRS. 2. The detailed drainage plan for the airport has been prepared by the NMIAL as a part of Airport Master Plan, incorporating CWPRS recommendations and integrating with CIDCO drainage plan and abiding by the EC conditions. The storm Water from NMIA project area will be discharged in Pavel creek and Gadhi River after

	EC & CRZ Conditions-2021	Compliance Status
		settling fine particles in the silt pond proposed before outfall. 3. The Drainage Master Plan of airport is prepared for the worst conditions (highest high tide, tidal surge, maximum rainfall intensity of 148mm and simultaneous flooding in all rivers). NMIAL had engaged CWPRS to review the internal drainage system designed for the airport area to ensure its compatibility and suitability with external Drainage Master Plan of CIDCO for surrounding areas. 4. The Master plan developed by NMIA has ensured that there will be no discharge into the Ulwe recourse channel from Airport as mandated in EC.
xix	NMIA shall regularly monitor the marine water quality of the Panvel creek during construction and post construction of the project.	**Agreed to Comply:** During construction period Marine Water quality monitoring is carried out once every three months by NMIAL through MoEF&CC recognized & NABL accredited Laboratory. Monitoring will be continued during operation phase. Environmental monitoring reports for the reporting period are enclosed herewith **Annexure-II**.
xx	NMIA shall ensure that all ground service vehicles will be operated on Electric or CNG. No petrol/diesel vehicles would be allowed in the Airport Premises.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition subject to the availability of functionally suitable EVs approved by the authorities
xxi	Mangrove Park shall be developed in consultation with Mangrove Cell, on site identified by the CIDCO.	**Agreed to Comply:** All matters pertaining to development and maintenance of mangrove pockets will be in scope of CIDCO as per NOC for transfer of EC and CRZ clearance given by CIDCO to NMIAL vide letter No. CIDCO/T&C/ CT&CP/NMIA/1317 dt 10th Feb 2020.

	EC & CRZ Conditions-2021	Compliance Status
		NMIA, wide letter no. NMIAL/CIDCO/GEN/0723 dated 23 May 2023 has requested for an update from CIDCO regarding mangrove park development.
xxii	NMIA to implement environment measures such as rainwater harvesting, solar lighting, efficient solid and hazardous waste management practices. NMIA shall ensure the zero liquid discharge during construction and operation of the project.	**Agreed to Comply:** Rainwater harvesting has been planned for implementation by the final phase. Roof top solar panels will be installed in T1. Source segregated waste management system has been planned for Phase 1 & 2 (20MPPA). Requisite energy conservation and water conservation measures will be adopted. Entire quantity of treated sewage will be recycled for various purposes within the NMIA boundary thereby ensuring Zero Liquid Discharge
xxiii	NMIA during construction shall not disturb the coastal ecology comprising mangroves/mudflats present along the Panvel creek, present outside the northern boundary of the project site.	**Agreed to Comply:** During construction stage, all activities will remain within the boundary of 1160 Ha. EPC contractors through contractual terms and conditions are instructed to ensure that no area out of NMIA premises of 1160 Ha should be disturbed due to the construction activities of the contractors. Along the northern boundary, a road of 60 m width is being constructed by non-NMIA contractors for CIDCO.
xxiv	NMIA should carry out detailed study on the impact of fishing and livelihood of people depending on local fishing and take efforts to maintain the livelihood of traditional fisher folks supposed to be affected by the project directly or indirectly.	**Agreed to Comply:** NMIA construction activities are confined within the NMIA boundary, there is no work proposed in water or at waterfront, therefore there is no direct impact of NMIA project on fishing activity in surrounding water bodies. NMIA shall comply with the condition by studying the relevant data about fishermen from 9 settlements from 8 revenue villages on the NMIA site which

	EC & CRZ Conditions-2021	Compliance Status
		were resettled elsewhere by CIDCO.
xxv	Green belt area (33% of total project area) of adequate width and density with local species along the periphery of the project site shall be developed so as to provide protection against particulate matter and noise	**Agreed to Comply:** Green Area of 33% of Airport site area has been provided.
xxvi	NMIA shall set up a full-fledged in-house Environment Management Cell comprising concern experts for effective implementation of Environment Management Plan. The EM Cell shall carry out marine water quality monitoring, erosion/accretion status of the coastline along Panvel Creek, monitoring of tidal flow patterns due to diversion of Ulwe & Gadhi streams, development of mangrove park etc. and implement recommendations of the Socio-economic study as well as Disaster Management Plan.	**Agreed to Comply:** NMIA has a full-fledged in -house Environment Management Cell comprising of General Manager (Environment and Sustainability) with a site Health, Safety and Environment (HSE) Team headed by General Manager (HSE) which is part of construction vertical. General Manager – E & S reports to the Joint President (Planning and Design. Marine water quality monitoring is being carried out on quarterly basis through NABL approved laboratory and results are uploaded on NMIA web site regularly. NMIAL shall get the Erosion/ Accretion study done in due course of time. NMIAL shall implement recommendations of socio-economic study and DMP in due course of time.
xxvii	NMIA/ CIDCO to implement. the recommendations of the report on the BNHS with respect to protection/ conservation of the biodiversity around the Airport site.	**Agreed to Comply:** BNHS was appointed by CIDCO to do the Base Line Survey of Avian Fauna between 2012 to 2016. CIDCO has also signed a long-term MOU (ten-year period ending 2028) with BNHS. Aim of this decadal study is long term monitoring, conservation, and supervision of the terrestrial and water birds with reference to NMIA and associated regions and

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		implementation of Bird Threat Mitigation Plan. A meeting was held dated 20th Apr'23 between CIDCO, NMIAL & BHNS officials wherein measures to mitigate risk of bird strikes were discussed. NMIAL presented its concerns regarding some of the bird sites (NRI colony (NRI), Training Ship Chanakya (TCS) and Delhi Public School (DPS)) being located close to the airport, as they come within Inner Horizontal Surfaces (IHS) of NMIA. NMIAL has offered to assist BHNS in rest of its recommendations, other than its recommendation for NRI, TSC and DPS sites to be conserved as Water Bird Habitats. NMIAL has also informed CIDCO about the same for CIDCO's advice to BNHS.
xxviii	The Environmental and CRZ Clearance to the project is primarily under provisions of EIA Notification, 2006 and CRZ Notification, 2011. The Project Proponent is under obligation to obtain approvals/clearances under any other Acts/ Regulations or Statutes as applicable to the project.	**Complied:** NMIAL is obtaining all necessary approvals for the project for establishment of green field airport on 1160 Ha site. Similarly, CIDCO is obtaining separate approvals for associated infrastructure at area surrounding the airport.
B	**Standard Conditions:**	
I	**Statutory compliance:**	
i.	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1980, in case of the diversion of forest land for non-forest purpose involved in the project.	**Complied:** Stage-I & Stage-II forest clearance for 250.0635 Ha land has been obtained from MoEF&CC vide letter no 8-98/212-FC dated 17-12-2013 and 24.04.2017 respectively.
ii.	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.	**Complied:** Wildlife Clearance was recommended in the 29th Meeting of Standing Committee and communicated vide Minutes No.

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		P.No.6-43/2007 WL-I dt. 1st August, 2013 of Wildlife Division of Ministry of Environment & Forest, Govt. of India.
iii	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan/ Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report (in case of the presence of Schedule-I species in the study area).	**Agreed to Comply:** Discussion with wildlife conservation consultants is in progress. The study will be completed and approval from the Wildlife Warden will be obtained in due course of time post which Site-Specific Conservation Plan/ Wildlife Management Plan shall be implemented in consultation with the State Forest Department.
iv.	The project proponent shall obtain Consent to Establish/Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee,	**Complied:** NMIA has been granted CTE for Phase 1 & 2 of the project for passenger capacity of 20 MPPA & 0.57MTPA Cargo by MPCB vide letter dated June 15, 2022 (**Annexure-III**)
V.	The project proponent shall obtain the necessary permission from the Central Ground Water Authority, in case of drawl of ground water/ from the competent authority concerned in case of drawl of surface water required for the project.	**Not applicable** No ground water to be tapped during construction or operation phases. CIDCO has assured water supply for the project.
vi	Clearance from Directorate General of Civil Aviation (DGCA) and Airports Authority of India (AAI) for safety and project facilities shall be obtained.	**Agreed to Comply:** NMIAL has prepared Airport safety and security plan which are approved by DGCA, AAI, BCAS & CIDCO as per following details. 1. In-Principal Approval to NMIA Master Plan for Construction of Navi Mumbai International Greenfield Airport at Navi Mumbai by Director General of Civil Aviation (DGCA), Govt. of

	EC & CRZ Conditions-2021	Compliance Status
		India vide AV.20024/40/2003-AL dt 28th August 2018 2. In-Principal Approval to NMIA Master Plan for Construction of Navi Mumbai International Greenfield Airport at Navi Mumbai by Bureau of Civil Aviation Security (BCAS), Govt. India vide CAS-6/2018/Div-Ops-I/Navi Mumbai (E-135357) dt 28th August 2018 3. Approval of Bureau of Civil Aviation Security (BCAS), Govt. of India for construction of Terminal-1 Building on NMIA vide CAS-6/2018/Div-Ops-I/Navi Mumbai (E-135357) dt 26th July 2019. 4. Approval of BCAS GoI for Security Vetting/ Security Clearance to updated Master Plan for Phase 1 & 2 (combined) of Navi Mumbai International Airport (NMIA), vide CAS(M)-2018/DIV-II/F-97 /Navi Mumbai (E-131269) dated 02/02/2023
vii	A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project should be obtained.	**Agreed to Comply:** The energy demand is estimated under the Master Plan prepared by the NMIAL and shows that cumulative peak power demand will be 96 MVA which is much lower than the CEIA estimate of 190 MVA, by adhering to ECBC norms. The power supply requirement will be met through Maharashtra State Electricity Transmission Company Limited (MSETCL) Approval/NoC from MSETCL for Power Supply to NMIA vide MSETCL/CO/STU/EHV Cons/ NMIA/ NO13379 dt 27th December 2018.
viii	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department shall be	**Agreed to Comply:** NMIAL has obtained Fire safety approvals as per following details.

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	obtained, as applicable by project proponents from the respective competent authorities.	1. Approval/ NoC of Fire Dept. CIDCO for Location for Airport Rescue & Fire Fighting Stations (ARFF) in NMIA Master Plan vide CIDCO/FIRE/HQ/ 2019/542 dt 30th September 2019. 2. Fire NoC from Fire Dept. CIDCO for Construction of Terminal-1 Building on NMIA vide CIDCO/FIRE/HQ/ 665/2019 dt 20th December 2019. 3. Petroleum & Explosives Safety Organization (PESO) approval regarding Class B Petroleum Storage Installation in Fuel Farm of NMIA received vide-A/P/HQ/MH/15/7592 (P562332) dated 20th April 2023. Other requisite approvals will be obtained progressively as project reaches respective stages.
I.	**Air quality monitoring and preservation:**	
i.	The project proponent shall install system to carryout Ambient Air Quality monitoring for common/criterion parameters relevant to the main pollutants released (e.g., PM_{10} and $PM_{2.5}$ in reference to PM emission, and SO_2 and NOx in reference to SO_2 and NOx emissions) within and outside the airport area at least at four locations (one within and three outside the plant area at an angle of 120 each), covering upwind and downwind directions.	**Agreed to Comply:** At Operations stage, air quality monitoring will be carried out by two Automatic weather stations and two Continuous Ambient Air Quality Monitoring Stations of NMIAL at suitable locations. In the meantime, at construction stage, NMIAL has appointed a Laboratory recognized by MOEFCC, for the monitoring for Air & noise (9 stations) and Ground water sampling (5 locations) on monthly basis. Marine/ Surface water (10 stations), & soil sampling (5 locations) on quarterly basis. Environmental monitoring reports for the reporting period are enclosed herewith. (**Annexure-II**)
ii	Diesel power generating sets proposed as source of backup power should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG	**Agreed to Comply**: We assure MOEFCC to abide by the condition during construction & operational phases.

	EC & CRZ Conditions-2021	Compliance Status
	sets should be equal to the height needed for the combined capacity of all proposed DG sets. Use of low Sulphur diesel. The location of the DG sets may be decided with in consultation with State Pollution Control Board.	The DG sets will be operated only during power failure. Location of DG sets will be in utility blocks and plan showing utility block locations is submitted to MPCB at the time of grant of CTE.
iii	Soil and other construction materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet.	**Being Complied**: At present, during construction phase, water is being sprinkled on trucks carrying excavated material, as also on roads and near construction sites e.g., material handling, RMC plant etc. to suppress dust prior to loading, unloading at regular intervals.
iv	The excavation working area should be sprayed with water after operation so as to maintain the entire surface wet.	**Being Complied**: Excavation working area is sprayed with water during construction activity.
v	Excavated materials shall be handled and transported in a manner that they do not cause any problems of air pollution.	**Being Complied:** Excavated material is mostly rock and has minimal soil. However, for such movement of any soil, spraying with water is being carried out. Excavation working area is sprayed with water during construction activity.
vi	The soil/ construction materials carried by the vehicle should be covered by impervious sheeting to ensure that the dusty materials do not leak from the vehicle.	**Being Complied:** for all incoming and outgoing vehicles from site the vehicle tops are being covered.
	II. Water quality monitoring and preservation:	
i	Run off from chemicals and other contaminants from aircraft maintenance and other areas within the airport shall be suitably contained and treated before disposal. A spillage and contaminant plan shall be drawn up and implemented to the satisfaction of the State Pollution Control Board.	**Agreed to Comply**: Oil water separator and silt pond are planned at all apron area to remove oil and chemicals in storm water. Storm water will be disposed as per MPCB norms.

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ii	Proper drainage systems, emergency containment in the event of a major spill during monsoon season etc. shall be provided.	**Agreed to Comply**: The storm water drainage system of NMIA is designed for 100 years return record with rainfall intensity 148.1 mm/hr. which is capable to handle any major spill during monsoon season. To contain major spills, specially designed kits containing absorbent pads and cushions will be provided on oil dispensing vehicles during operations phase.
iii	The runoff from paved structures like Runways, Taxiways, can be routed through drains to oil separation tanks and sedimentation basins before being discharged into rainwater harvesting structures.	**Agreed to Comply**: The runoff from paved area like runways, taxiways are routed through oil water separator at various places and treated water will be discharged as per MPCB norms
iv	Storm water drains are to be built for discharging storm water from the air-field to avoid flooding/ water logging in project area. Domestic and industrial waste water shall not be allowed to be discharged into storm water drains.	**Agreed to Comply:** Separate storm water drainage system is planned to prevent water logging in air-field. Separate sewage system is planned to collect the sewage from airport. Sewage will be treated in sewage treatment plant with UF, and RO. Entire treated water will be used for flushing, gardening and HVAC purpose and there will be no discharge at outfall.
v	Rainwater harvesting for roof run-off and surface run-off, as plan submitted should be implemented. Rainwater harvesting structures shall conform to CGWA designs. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease.	**Agreed to Comply**: We assure MOEFCC to abide by the condition during operational phase. Surface run-off from apron areas will pass through oil & grease separator before reaching RWH pond. Silt pond has been provided prior to outfall to settle other particulate matter.
vi	Total freshwater use shall not exceed the proposed requirement as provided in the project details. Prior permission from competent authority shall be obtained for use of fresh water.	**Agreed to Comply**: The total water demand in final phase is 21.82 MLD. Of which, freshwater demand of 10.61 MLD will be sourced from CIDCO. Water supply assurance has been obtained from Water Supply Dept.

	EC & CRZ Conditions-2021	Compliance Status
		CIDCO for Water Supply to NMIA vide CIDCO/ EE (Hetwane)/ 2018/ 322 dt 3rd August 2018.
vii	A certificate from the competent authority for discharging treated effluent/untreated effluents into the Public sewer/ disposal / drainage systems along with the final disposal point should be obtained.	**Being Complied**: Consent to Establish Phase-I&II granted by MPCB. Vide Format1.0/CAC/UAN No MPCB-CONSENT-0000128221 /CE/2206000673 dated 15th Jun 2022. (**Annexure -III**) 100% Recycling and reuse of treated sewage water is being planned in cooling tower make-up, flushing and gardening. STP including quaternary system of RO has been proposed. Since, project is yet to be operational. We assure MOEFCC to abide by the condition
viii	A detailed drainage plan for rainwater shall be drawn up and implemented.	**Being Complied**: NMIA has prepared the detailed drainage master that was reviewed and approved by CWPRS. The same drainage master plan is being implemented.
III.	**Noise monitoring and prevention:**	
i	Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to Regional Officer of the Ministry as a part of six-monthly compliance report.	**Being Complied**: Ambient Noise monitoring is regularly carried out every month & reports in this regard submitted to regional office of the Ministry as part of six-monthly compliance report regularly. (**Annexure II**)
ii	Noise from vehicles, power machinery and equipment on-site should not exceed the prescribed limit. Equipment should be regularly serviced. Attention should also be given to muffler maintenance and enclosure of noisy equipment's.	**Agreed to Comply**: We assure MOEFCC to abide by the condition during construction & operational phases. All contractors have been asked to establish maintenance workshop at site to ensure regular servicing of the equipment and vehicles.
iii	Acoustic enclosures for DG sets, noise barriers for ground-run bays, ear plugs for operating personnel shall be implemented as mitigation	**Agreed to Comply**: We assure MOEFCC to abide by the condition. DG sets will be CPCB certified with acoustic enclosure, PPE shall be

	EC & CRZ Conditions-2021	Compliance Status
	measures for noise impact due to ground sources.	provided to the DG set operator. Wherever permissible, noise barriers will be installed for ground-run bays.
iv	During airport operation period, noise should be controlled to ensure that it does not exceed the prescribed standards. During nighttime the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.	**Agreed to Comply**: We assure MOEFCC to abide by the condition during airport operation period.
IV.	**Energy Conservation measures:**	
i.	Energy conservation measures like installation of LED/CFL.s/TFLs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning.	**Agreed to Comply**: Energy efficient light fittings have been considered in the design of lighting system. Necessary energy conservation and water conservation measures will be adopted.
V.	**Waste management:**	
i.	Soil stockpile shall be managed in such a manner that dust emission and sediment runoff are minimized. Ensure that soil stockpiles are designed with no slope greater than 2:1 (horizontal/ vertical).	**Being Complied**: We assure MOEFCC to abide by the condition during construction phase. Opportunity to conserve the stockpile is limited as most of the excavated material is used in raising plot level to 8.5 m AMSL
ii	The project activity shall conform to the fly Ash notification issued under the E P. Act of 1986.	**Being Complied**: Fly ash has been considered in the concrete mix design and is being used during construction. EPC contractor has been asked to maintain record for use of fly ash.
iii	Solid inert waste found on construction sites consists of building rubble, demolition material, concrete; bricks, timber, plastic, glass, metals, bitumen etc. shall be reused/ recycled or disposed of as per Solid Waste Management Rules, 2016 and Construction and Demolition Waste Management Rules, 2016.	**Being Complied**: Inert material comprising of construction and demolition debris is collected and filled at a designated place within NMIA site. EPC contractors give other recyclable material such as glass, metal, cardboard, paper, etc. to a registered scrap dealer.

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iv	Any wastes from construction and demolition activities related thereto shall be managed so as to strictly conform to the Construction and Demolition Waste Management Rules, 2016.	**Being complied**: Construction and demolition waste generated during development phase is being handled as per The Construction and Demolition (C&D) Waste Management Rules, 2016. We assure MOEFCC to abide by the condition during construction phase.
v	The project proponents shall implement a management plan duly approved by the State Pollution Control Board and obtain its permissions for the safe handling and disposal of:	**Agreed to Comply**: NMIAL shall prepare Waste Management Plan for operations stage and obtain prior approval from MPCB.
	a. Trash collected in flight and disposed at the airport including segregation, collection and disposed.	**Agreed to Comply:** Trash collected at flight will be transported to the solid waste plant at NMIA wherein segregation will take place. The reusable, recyclable will be stored in closed room and to be taken away by MPCB authorised vendors. Non degradable and inert waste to be transferred to authorized waste disposal area of CIDCO.
	b. Toilet wastes and sewage collected from aircrafts and disposed at the Airport.	**Agreed to Comply:** Sewage cart trucks shall be taken to aircraft location and sewage from aircraft shall be collected in sewage tank inside sewage carts loaded sewage truck shall be taken to Triturator for primary treatment and further will be pumped to sewage treatment plant for final treatments. Treated sewage will be used for non-potable purpose.
	c. Wastes arising out of maintenance and workshops	**Agreed to Comply:** Wastes arising from maintenance and workshop will be stored at NMIA in closed room at ambient temperature and the same will be taken away by MPCB authorised vendors.
	D. Wastes arising out of eateries and shops situated inside the airport complex.	**Agreed to Comply:** Wastes from eateries will be sent to bio-conversion plant proposed at NMIA to from compost and biogas.

	EC & CRZ Conditions-2021	Compliance Status
		Compost will be used as a manure to landscape area of NMIA.
	e. Hazardous and other wastes	**Agreed to Comply**: Hazardous Wastes arising from maintenance and workshop will be stored at NMIA in closed room at ambient temperature and the same will be taken away by MPCB authorised vendors.
vi.	The solid wastes shall be segregated as per the norms of the Solid Waste Management Rules, 2016. Recycling of wastes such as paper, glass (produced from terminals and aircraft caterers), metal (at aircraft maintenance site), plastics (from aircrafts, terminals and offices), wood, waste oil and solvents (from maintenance and engineering operations), kitchen wastes and vegetable oils (from caterers) shall be carried out. Solid wastes shall be disposed in accordance to the Solid Waste Management Rules, 2016 as amended.	**Agreed to Comply**: We assure MOEFCC to abide by the condition during construction & operational phases. Requisite area has been provided for waste collection, segregation, safe storage and compliant disposal as per Solid Waste Management Rules 2016.
vii.	Used CFLs and TELs should be properly collected and disposed off/ sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Used CFL and TFLs will be collected and disposed of through MPCB authorized disposal facilities.
VI.	**Green Belt:**	
i.	Green belt shall be developed in area as provided in project details, with native tree species in accordance with Forest Department. The greenbelt shall inter alia cover the entire periphery of the Airport.	**Agreed to Comply:** Since first phase of project is under implementation and project is yet to be operational, we assure to abide by the condition by final phase. Green belt/ vegetation along periphery of the airport shall be developed at locations outside NMIA which are in compliance to operational safety requirement of airport. However, green area/open

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		area amounting to 33% of NMIA site area has been planned.
	Topsoil shall be separately stored and used in the development of green belt.	**Being Complied**: Topsoil is being separately stored for use in the development of green belt.
VII.	**Public hearing and Human health issues:**	
i	Construction site should be adequately barricaded before the construction begins.	**Complied:** Initially barricading was done with metal sheets. Now since the final design of the concrete compound wall has been approved, the metal sheet barricading is gradually being replaced with permanent RCC boundary wall along periphery of the project site
ii	Traffic congestion near the entry and exit points from the roads adjoining the airport shall be avoided. Parking should be fully internalized, and no public space should be utilized.	**Being Complied**: Traffic management plan prepared by EPC contractor is being implemented to ensure that the public place is not used for parking of vehicles.
iii	Provision of Electro-mechanical doors for toilets meant for disabled passengers. Children nursing/feeding room to be located conveniently near arrival and departure gates.	**Agreed to Comply:** Disabled person toilets are being designed as per National Building Code, 2016. Children nursing/ feeding room has been provided as per international best practice for airport passenger services.
iv	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	**Agreed to Comply:** EPC contractors have prepared risk assessment, HIRA and disaster management plan under the terms of the EPC contract for construction phase, implementation of which is supervised by the safety team of NMIA. Disaster Management Plan is under preparation which will be completed in due course of time.
v	Provision shall be made for the housing of construction labor within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water,	**Being Complied**: EPC Contractors have made requisite provisions for labour camp at site as per this condition.

	EC & CRZ Conditions-2021	Compliance Status
	medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	We assure MOEFCC to abide by the condition during construction phase.
vi	Occupational health surveillance of the workers shall be done on a regular basis.	**Being Complied**: Regular health check-up of workers is being carried out by contractor appointed by NMIAL. We assure MOEFCC to abide by the condition during construction & operational phases.
VIII.	**Miscellaneous:**	
i	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and Safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.	**Complied:** Public was informed about the grant of EC by advertisement in newspaper Business Standard Mumbai on 10.12.2021 and Lokmat (Marathi) on 10.12.2021 and copies of Newspaper cutting were submitted with EC Compliance report July- December 2021. Copy of EC and CRZ clearance, Consent to establish are available on NMIAL web site https://www.nmiairport.co.in/circulars.html
ii	The copies of the environmental clearance shall be submitted by the project proponent to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn must display the same for 30 days from the date of receipt.	**Complied:** MOEF&CC granted EC copy submitted to Local Bodies, Panchayats and municipal bodies. Acknowledgement copies were submitted with EC Compliance report July- December 2021.
iii	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	**Agreed to Comply**: All EC related compliance reports filed by NMIAL are uploaded on NMIAL website and available at the link (https://www.nmiairport.co.in/circulars.html)
iv	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the	**Agreed to Comply**: All EC related compliance reports filed by NMIAL are uploaded on NMIAL website and available at the link

	EC & CRZ Conditions-2021	Compliance Status
	Ministry of Environment, Forest, and Climate Change at environment clearance portal.	(https://www.nmiairport.co.in/circulars.html) Also, same will get uploaded on Parivesh portal of Ministry of Environment, Forest and Climate Change for environment clearance on regular basis
v	The company shall have a well laid down environmental policy duly approved by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/ deviation/ violation of the environmental /forest/ wildlife norms/ conditions. The company shall have defined system of reporting infringements/ deviation/ violation of the environmental/ forest/ wildlife norms/ conditions and/or shareholder's/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.	**Agreed to Comply**: NMIA has Environmental Policy approved by the then managing director on 15 Sept 2019. Process of revision in the policy statement is undergoing at present. Environment Management at NMIA shall evolve a system of checks and balances through continuous inspection and monitoring of environment, health & safety standards, regular assessment of methods/processes & records and review for further improvements at policy level. This will also facilitate to identify gaps which lead to update guidelines and to undertake remedial measures as well. Proactive & preventive measures on Environment, Health and Safety will be thoroughly implemented during development and operation phases of NMIA.
vi	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly report to the head of the organization.	**Complied**: Separate environmental team has been deployed at both project and company headquarter,
vii	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection	**Agreed to Comply**: Environmental management plan for construction phase and operations phase has been presented in Chapter 10 of EIA along with the budget. The expenditure incurred on EMP

	EC & CRZ Conditions-2021	Compliance Status
	measures shall be kept in separate account and not to be diverted or any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six-Monthly Compliance Report.	implementation during the reporting period is presented in Point No. 9 (e) and 9 (f) of the Data Sheet in the beginning of this report
viii	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	**Being Complied:** NMIAL's environment team conducts inspection of all activities of EPC contractors. Independent engineer appointed by CIDCO conduct monthly review of compliance.
ix	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Environmental Statement as per Form V will be prepared during operations and will be submitted at the end of each financial year to MPCB.
x	The criteria pollutant levels namely, PM10, PM2.5, SO2, NOx (ambient levels) shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	**Agreed to Comply:** All EC related compliance reports are being uploaded on NMIAL website. NMIA does regularly monitor pollutants like PM_{10}, $PM_{2.5}$, SO_2, NOx through NABL approved laboratory and displays the results near the main gate of NMIA project site.
xi	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	**Agreed to Comply:** Financial Closure for NMIA project Phase I & II (20 MPPA) was achieved on March 29, 2022, when State Bank of India (SBI) as a lead bank agreed to underwrite full loan amount of Rs. 12,770 Cr.
xii	The project. authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	Noted

	EC & CRZ Conditions-2021	Compliance Status
xiii	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Export Appraisal Committee.	Agreed
xiv	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Agreed
xv	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted
xvi	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted
xvii	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	Noted
xviii	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data/information/ monitoring reports.	Noted

	EC & CRZ Conditions-2021	Compliance Status
xix	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement| Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India/ High Courts/NGT and any other Court of Law relating to the subject matter.	Noted
xx	Any appeal against this EC shall lie with the National Green Tribunal. if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Noted

Annexure-I

Compliance to conditions stipulated in Environment Clearance & CRZ Clearance No.10-53/2009-I.A. III dt. 22.11.2010 & dt 20.12.2017

Present Status of Compliance to Conditions stipulated in EC &CRZ Clearance No.10-53/2009-I.A. III dt. 22.11.2010 & dt 20.12.2017 (Annexure- I)

Sr. No		Stipulated Condition-2010	Compliance status
		Specific Condition	
I.		**Construction Phase**	
	(i)	"Consent for Establishment" shall be obtained from State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.	**Complied:** Consent to Establish (CTE) is granted to NMIA by MPCB vide letter No. Format 1.0/ CAC/UAN No. MPCB-CONSENT-0000128221/CE-2206000673 dt. 15.06.2022 for Phase I & II (20 MPPA & Cargo Capacity 0.57 MTPA) which is valid up to 5.10.2026. (**Annexure III**) This document supersedes the previous CtE obtained by NMIAL
	(ii)	CIDCO shall rehabilitate about 3000 families of 10 settlements from 7 villages falling within the airport zone as per the R & R policy of the Government of India or the Government of Maharashtra, whichever is more beneficial to the project affected persons.	**Complied:** R and R package development and implementation was in scope of CIDCO as per NOC for transfer of EC and CRZ clearance given by CIDCO to NMIAL vide letter No. CIDCO/T&C/CT&CP/ NMIA/ 1317 dated 10th Feb 2020. CIDCO has handed over 100% encumbrance free RoW of the project site of 1160 Ha to NMIAL on 10th June 2022.
	(iii)	CIDCO shall obtain necessary permission from Hon'ble High Court of Bombay for cutting or damaging of mangroves and clearance under Forest Conservation Act 1980 as per the orders in respect of notice of Motion no. 417 of 2006 in PIL no. 87/2006, as required.	**Complied:** Necessary approvals / clearances have been taken by CIDCO from the MoEF&CC (stage II Forest clearance vide File No.: 8-95/2012-FC dated 24th April 2017 for diversion of 250.0635 ha area) and Permission for Removal of Mangroves over 108.607 Ha (98 Ha within site and balance in offsite area) vide Bombay High Court order dated October 29, 2013 as applicable.
	(iv)	The plantation and protection of mangroves over an area of 615 ha (245 hectares of good quality Mangroves Park shall be developed at Vaghivli on the north of the airport area + 60	**Complied:** The Urban Development Department, GoM has sanctioned change in Navi Mumbai Development Plan vide letter G.R.No.TPS/1711/2495/ C.R.202/11 /UD -12 dated 21st

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		hectare area located on the west side of the airport site around Moha creek and Panvel Creek + 310 hectares area on the northeast of the airport site between Gadhi River, Mankhurd Panvel Rail corridor and National Highway 4B shall be declared as No-development zone and CIDCO shall under take the development as Mangroves park/green area) would be developed and maintained in the shape of Biodiversity Mangrove Parks well before the airport project is initiated and its progress reported to the high level committee mentioned below at (xxxiii). CIDCO shall formally amend the land use in the sectioned development plan of Navi Mumbai following the due procedure under MRTP Act to achieve this objective.	march, 2012. It was noted that work of plantation & Protection of 310 ha + 60ha + 20 ha has been completed by Mangrove Cell, State Forest department as submitted in the earlier six-monthly report. In addition, 108 ha mangrove plantation has been completed in Kolekhar village near this, NDZ has been declared as per the Forest clearance condition of compensatory mangrove plantation. Details of mangrove pockets development including compensatory mangrove plantation and development of other pockets has been submitted by CIDCO vide letter CIDCO/GM(ENV&F)/nmia/2019/038 dtd 11th September 2020.
	[v]	The proposed re-coursing of tidally influenced water body outlets from Ulwe river has a large cross-sectional area at the middle with the river/creek on either end remaining unchanged with its natural course. The whole system should function as was functioning earlier without airport project. Surface runoff should not be let into the channel just because the area of cross section is large. The whole airport area will be reclaimed, and the level raised to 7m whereas the existing level all around the airport will continue to be low in its natural state. There will be flow all around due to surface runoff. This additional quantity must be collected by appropriate drainage system and let into	**Complied:** It may be noted, as per CIDCO report, as submitted to MOEFCC, that: 1. CWPRS, Pune has carried out 1D, 2D mathematical & physical Model studies based on the MoEF's approved layout plan of airport covering 1160 Ha. CIDCO has also completed designing the master drainage plan of surrounding areas by incorporating the various recommendations of CWPRS. 2. The detailed drainage plan for the airport has been prepared by the NMIAL as a part of Airport Master Plan, incorporating CWPRS recommendations and integrating with CIDCO drains plan and abiding by EC conditions. The storm Water from NMIA project area will be discharged in Pavel creek and Gadhi River after settling fine

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		Gadhi River and not into the re-coursing channel. The recourse channel may be able to take it but not the river or creek on either side of the channel. This aspect shall be examined by CIDCO in details to avoid the flooding of the low-lying areas besides inducting other hydrological and environmental studies.	particles in the silt pond proposed before outfall. 3. The Drainage Master Plan of airport is prepared for the worst conditions (highest high tide, tidal surge, maximum rainfall intensity of 148mm and simultaneous flooding in all rivers). NMIAL had engaged CWPRS to review the internal drainage system designed for the airport area to ensure its compatibility and suitability with external Drainage Master Plan of CIDCO for surrounding areas. 4. The Master plan developed by NMIA has ensured that there will be no discharge into the Ulwe recourse channel from Airport as mandated in EC.
	(vi)	The entire system shall be studied as one composite system with appropriate boundary conditions to reflect the worst conditions – minimum 100 years to be specified and compliance ensured such as - flooding, surface runoff not only from the airport but also from surrounding areas as well, normal flow, tidal flow due to tidal surge having a long return period, possible obstructions to flow, tributaries joining the main river etc. so as to take appropriate protection and remedial measures. Due to construction of recourse Channels and also due to tail end of the Gadhi & Ulwe Rivers into Panvel Creek, there is a need to prepare a Comprehensive Master Plan for Surface drainage and Flood protection, keeping in view the proposed developments. CIDCO	**Complied:** Main drains designed based on 148.1mm/hr for 1 in 100 year flood Return Period value recommended by CWPRS. Recommendations of the CWPRS report on Comprehensive Master Plan for Surface drainage and Flood protection and its compliance has been submitted to MOEFCC as a part of Comprehensive EIA report of 2020 which is being complied through the planning and design process. The earlier report was submitted to MOEFCC in 2017.

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		shall submit the above Master Plan to the Ministry.	
	(vii)	Systemic and periodic monitoring mechanism need to be put in place by CIDCO to assess the impact on sub-surface flow/ impact on aquifers as well as surface water bodies in different seasons. Necessary additional environmental protection measures to be adopted to address the impact of proposed development in coastal sub-subsurface flow as well as impact on aquifers.	**Complied:** NMIAL has appointed a Laboratory recognized by MOEFCC, for the monitoring for Air & noise (9 stations) and Ground water sampling (5 locations) on monthly basis. Marine/ Surface water (10 stations), & soil sampling (5 locations) on quarterly basis. Environmental analytical reports for the reporting period are enclosed herewith. (**Annexure II**) Since entire project is being constructed on land filled with broken rocks to an average level of 8.5 m AMSL and since ground water is not being mined for any project activity, sub-surface flow or the aquifer is not likely to be impacted.
	(viii)	CIDCO shall prepare a Management Plan to handle the runoff from the airport and to ensure that runoff associated risks/ impacts such as siltation in receiving water body are avoided and are taken care within airport area during monsoons.	**Complied:** Drainage Master Plan Report of Airport and its surrounding area is prepared which includes the issue of management of runoff and associated risks during the monsoon. CWPRS studies show that siltation rates in Gadhi River and Panvel creek are low and obstructions due to such factors are considered while designing Master Drainage layout. During construction phase run off will be passed through silt traps before letting it out to Panvel Creek and Gadhi River. The Storm Water drains are designed incorporating in-line features like silting chamber and oil water separator (for surface runoff from aprons) to remove suspended matter and oils.
	(ix)	On the northern part of the airport there is a secondary channel of the Gadhi River	**Complied:** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/9

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		which will be filled up for the airport runway construction. This will be replaced by a shorter channel along the northern boundary of the airport. The channel shall be designed appropriately through overall modeling study so that the channel provides tidal water to the mangrove park and moderate tidal flows under worst environmental conditions. Need for widening and deepening of Gadhi River may also be studied simultaneously, if required. The revised widths and depths of recourse channels shall be determined with modified drainage and worst rainfall/ tide conditions including appropriate factor of safety.	38 dated 11th September 2020 available at URL: https://cidco.maharashtra.gov.in/pdf/EC_Complience/160043466783295_NMIAECComplianceStatusFinal-.pdf as submitted to MOEFCC, that: 1. The proposed North connecting channel is designed in accordance with the Model studies carried out at CWPRS, Pune as submitted by CIDCO. 2. As per CWPRS recommendations Northern Channel is planned with 75 m width. Further, studies carried out with 75 m Northern channel having bed levels of -2 m and -1 m revealed that there are no significant changes in maxima flood levels predicted with earlier studies as reported in CWPRS report. CIDCO has also submitted to MOEFCC that at present 60% area of the channel is covered by Mangroves and hence is being retained as it is. However, sufficient care is ensured that flow is not obstructed. Construction of new Channel for Gadhi River, north of NMIA Site shall be completed by CIDCO.
	[x]	The flow channels and the low - lying mangrove area which will receive water from diverted recourse/ channels should remain undisturbed. No road, embankment or any other construction shall be permitted. Any island formed due to deposition of sediment in front	**Complied:** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/938 dated 11th September 2020 available at URL: https://cidco.maharashtra.gov.in/pdf/EC_Complience/160043466783295_NMIAECComplianceStatusFinal-.pdf, as submitted to

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		of Panvel creek shall be periodically removed.	MOEFCC, that all the flow channels in No Development Zone (615 Ha.) are kept undisturbed. CWPRS studies show that siltation rates in Gadhi River and Panvel creek are low.
	[xi]	A detailed map shall be submitted by CIDCO to the Ministry with quantification of affected mangrove area with density i.e., initial proposal & modified proposal and proposed mangrove forestation with species. The work on the proposed compensatory mangrove park should commence well before the construction of the airport is undertaken. The mangrove irrigation systems and diverse species selections for all the four areas may be scientifically made. The river front development in all the areas not protected by adequate mangrove buffer along the Panvel creek and Gadhi river may be considered through studies.	**Complied:** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/938 dated 11th September 2020 as submitted to MOEFCC, that: 1. Mumbai University has quantified the affected mangroves using Satellite Imagery for years 1995, 2000, 2005 and 2010. and qualitative analysis is done by field study to ascertain Density & Dominance of affected mangrove area. 2. The same was incorporated in the Updated EIA Report of 2011 and Comprehensive EIA Report 2017. 3. CIDCO has developed compensatory mangrove plantation over 108.67 Ha at S. No. 27, village Kolhekhar in between Jui creek and Taloja creek through the Mangrove Cell of State Forest Dept. Further, CIDCO has modified Navi Mumbai Development Plan (NMDP) to provide mangrove cover in four NDZ pockets over 616.2 Ha which was approved by GoM vide G.R. dt 12.03.12. 4. The scheme for regeneration of Mangroves is prepared through a consultant M/s. Lewis Environment Services USA. The regeneration of mangroves was done in a phased manner, in consultation with the Mangrove Cell of State Forest Dept. through FDCM in the 310 Ha of NDZ to the North East of airport, 60 Ha in Moha Creek and 20 Ha on North of

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			Airport. A certificate from Mangrove Cell, Forest department showing completion of Mangrove regeneration over 390 Ha and photographs have been submitted. CIDCO's position regarding development of Mangrove biodiversity park is replied in item sr. no. (iv) above. 5.
	[xii]	Whatever EIA data was submitted and presented was related to a situation for "no airport condition". The project proposal has undergone many changes in terms of converting the lagoon as Mangrove Park, shifting of non-aeronautical activities to the south etc. Updated EIA report with all the modifications and commitments given by CIDCO shall be submitted to the MoEF, MPCB and to MCZMA. This updated EIA report will serve as the preliminary baseline data. CIDCO shall submit the second report (EIA Report II) after finalization of all the facilities followed by Comprehensive EIA report prepared with approved layout of the airport, new hydrological scenario, altered topography and land use. The Comprehensive EIA report should also include ecological aspects answering quires raised by BNHS and several other points raised during the meeting. After completion of Phase I of the project, the CIDCO shall conduct the "Environmental Audit" with a reputed organization and the audit shall also include the "Validation of the conclusions drawn in the EIA Report" and to submit to MoEF, MPCB and to	**Complied:** Updated EIA report was submitted to MoEF, MPCB and MCZMA on 21st April, 2011 by CIDCO. Further, a Comprehensive EIA report incorporating the various studies / activities carried out by CIDCO post Environmental Clearance, has been prepared and submitted to MoEF, MPCB and MCZMA vide letter dtd 29th August, 2017. NMIAL has submitted EIA report 2021 to MOEFCC vide letter dated 25th Oct 2021 for obtaining fresh clearance. The EIA report is uploaded on web site also & link is: https://nmiairport.co.in/circulars.html Environmental Audit will be conducted after commissioning of phase-I&II (20MPPA) which is under construction. It may be noted that the same has been mandated in the Concession Agreement for NMIA.

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		MCZMA and shall be uploaded on the website.	
	[xiii]	The water quality of the River Gadhi, Ulwe, the Panvel Creek and the ground water is to be monitored on quarterly basis for TOC, Pb, Cd and Hg at all the locations identified in the EIA study for a period of at least 2 years from the commencement for the construction work and the quarterly reports to be submitted to Ministry of Environment and Forests Govt. of India and MPCB.	**Complied**: Marine Surface Water quality monitoring is being carried out on quarterly basis and ground water monitoring on monthly basis by NMIAL through MoEF&CC recognized Lab. Environmental analytical reports for the reporting period are enclosed as **Annexure -II**
	(xiv)	The wastewater generated from the aircraft maintenance hangars may contain hazardous materials like lead, chromium, Sulphates, Phenolic compounds, V.O.C's etc. The surface runoff from the airport area shall also contain oils, grease, Sulphates etc, which cannot be sent directly to sewage treatment plant for the treatment. A separate treatment plant for managing the wastewater shall be specified and adopted.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Primary treatment will be provided at hangars to remove all heavy metals and then the sewage will be discharged to STP followed with UF and RO.
	[xv]	Based on the geological profile underneath the proposed airport, suitable consolidation factor shall be arrived to assess the additional noise/ vibration levels that would be produced during impact of landing & take off the air crafts simultaneously on both the runways. Further, the partially quarried hills in the vicinity will become a rebound shell for noise. CIDCO shall examine the details of noise/ vibration levels those are likely to be increased both during day and nighttime and the mitigation measures shall be installed to reduce the (noise/ vibration levels) impacts.	It may be noted that runway pavement has been designed taking into consideration subsoil condition beneath to minimize noise/vibration. Aircraft undercarriage is designed in a manner not to produce vibration on the ground due to impact at the time of landing. At present, during construction phase, geographic details of the portion of partially quarried hills that would remain at the time of operations phase is not known.

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	[xvi]	Standard instrument arrival and departure procedure shall be designed to minimize the noise levels within the permissible limits for the area falling in the funnel near the airport on either side.	**Noted:** Will be complied Standard instrument arrival and departure procedures are designed by Airport Authority of India (AAI) considering International Civil Aviation Organization (ICAO) standards and recommended practices
	(xvii)	Energy conservation to the extent of 20% shall be incorporated in the bidding documents including water conservation (reuse/ recycle, rainwater harvesting and water efficient fixtures) and other green building practices for various buildings proposed within the airport complex. CIDCO shall consider ECBC Guidelines 2009 to achieve the energy – efficient design.	**Being Complied:** Passenger Terminal-1 building will be LEED certified. Preliminary energy assessment shows saving more than 20%. Energy, water conservation and green practices being implemented for Passenger Terminal Building are as per LEED guidelines and for the other buildings ECBC norms are being followed.
	(xviii)	CIDCO shall prepare a detailed traffic management plan to take care of increased vehicular traffic which should also cover/ clearly delineate widening/ increasing the existing roads and associated road infrastructure approving / installation of road safety features/ pedestrian facility/ FOB / under passes etc. (that can be done by carrying out road safety audits). Measures shall be taken to prevent encroachment along/within the ROWs on connecting/ main arterial roads.	**Complied:** It may be noted, as per CIDCO report, as submitted to MOEFCC, that a detailed Connectivity Study "Regional and Local Transport Connectivity Plan for Navi Mumbai International Airport" has been carried out through international consultant M/s. Lea Associates South Asia Pvt Ltd. Based on the findings of study, CIDCO and various state Government agencies have taken up various projects for improving the connectivity through various modes, by giving emphasis to public transport.
	(xix)	Necessary road (National and State Highways) and rail connectivity shall also be upgraded to handle the increased passenger and cargo traffic, in addition to metro for transition of passengers. The	**Complied:** It may be noted, as per CIDCO report, vide Letter CIDCO/GM(ENV&F)/NMIA/2019/938 dated 11th September 2020 as submitted to MOEFCC, the National and State Highway surrounding the airport are being

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		proposal of Hoverport shall not be taken up on the north part of the airport area as this shall damage the mangroves.	upgraded for increased traffic by Mumbai JNPT Port Road Company Ltd (MJPRCL) and PWD. The proposal is to widen the existing National and State Highways in the airport vicinity to 8 Lane with service roads and further to 6 Lane with service roads has been commenced by MJPRCL. Widening of Sion – Panvel highway up to 10 lanes is completed. Further, additional bridges are being constructed at the Thane Creek bridge on SP Highway. The Seawoods-Uran Rail link has been recently commissioned as part of this work. These include Mumbai Trans Harbour Link (MTHL) (connecting Sewree and Navi Mumbai) being implemented by MMRDA, expansion of Amra Marg (west of NMIA site) and NH4B bypass (east of NMIA site) by MJPRCL, construction of Northern bund road and road to the south of the NMIA project by CIDCO, etc.
	(xx)	The measures should be taken to improve public transportation including dedicated road / MRTS corridors to access to Airport, may also be considered for the same. Energy Efficient dedicated rail based public transport facility; suburban/ metro train in particular, may be created between the Santa Cruz and the Navi Mumbai Airport in addition to all other links connecting various parts of Mumbai city.	**Being Complied:** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/9 38 dated 11th September 2020 as submitted to MOEFCC, that CIDCO has initiated discussions with Mumbai Railway Vikas Corporation Ltd (MRVC) as well as MMRDA for planning a direct metro rail link to the airport. The Master Plan of airport envisages metro connectivity from Mumbai and Navi Mumbai to western and eastern part of airport. In continuation to above, CIDCO appointed an agency for "Preparation of Detailed Project Report (DPR) for proposed Metro Line from Mankhurd to NMIA (Extension of CSMIA- Mankhurd Metro Line-B)," in November 2022.

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			CIDCO is also planning to integrate Metro Line from Mankhurd to NMIA with Belapur-NMIA Line-IA (Extension of Navi Mumbai Metro Line-I Belapur-Pendhar) at Sagarsangam station.
	(xxi)	Traffic Management during construction phase should be clearly planned so that the traffic situation is not further worsened on the existing connecting roads. Installations of Noise barrier/ Green Belts should be clearly indicated in the plan (After identifying critical locations).	**Being Complied:** Construction phase traffic management plan has been prepared with entry/ exit scheme and queue length for NMIA construction vehicles. Also, necessary parking space has been created within the NMIA site so that public space is not occupied for parking of construction vehicles. During construction phase, vehicles related to the construction activities of NMIA are planned to ply on the external roads in non-peak hour. This shall reduce the traffic load on external roads and maintain the desirable Level of Services. Also, construction vehicles shall only ply on the service roads of external roads not disturbing through traffic. Airport boundary wall is being constructed and shall act as a noise barrier for external roads.
	(xxii)	To avoid accidental damage (fire, hazardous material waste handling, oil spills, wastewater disposal) in the adjacent ecologically fragile surroundings and mangrove area – a risk assessment plan and disaster management plan should be prepared and with periodic compliance of safety measures in place to avoid loss due accidental damage that could have been otherwise avoided. Further CIDCO shall appoint a dedicated professional team/cell to	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. Risk Assessment and Disaster Management Plan shall be prepared to avoid accidental damage in the adjacent ecologically fragile surroundings and mangrove area. Disaster Management Plan will be updated periodically. EPC contractors have prepared risk assessment and disaster management plan under the terms of the EPC contract for construction phase,

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		handle disaster and associated risks.	implementation of which is supervised by the safety team of NMIA.
	(xxiii)	In addition to the above – CIDCO shall ensure that all the risks (such as fire, hazardous material waste handling, oil spills, waste – both liquid/solid wastes) associated/ resultant risk during various stages of development (like planning, construction, operation) are managed within the airport area. In case of any unforeseen event as stated above the liability – environmental and social will rest with the developer/ CIDCO, the decision of the high-level Committee, stipulated below will be full and final for liability fixations.	**Agreed to Comply:** Since project is yet to be operational, we assure to abide by the condition. However, we assure that action will be taken as per condition (xxii) cited above.
	[xxiv]	The compliance report of the monitoring committee shall be made 'public' (put online and/or also displayed for wider dissemination of compliance) at all stages (planning, construction, operation) to ensure effective monitoring and compliance of conditions.	**Complied:** After approval of MoEF&CC for Transfer of Environment & CRZ Clearance from CIDCO to NMIAL has been obtained vide letter No. F. No. 10-53/2009-IA-III dated 17th August 2020, onwards NMIAL uploaded on NMIA website EC Compliance Report at the following link. https://www.nmiairport.co.in/circulars.html
	[xxv]	Environment Management Plan or associated monitoring plan shall ensure that mitigation measures detailed out in terms of role, responsibility, budgetary provisions, timeline for completion, frequency of monitoring and compliance etc.	**Complied** Detailed Construction and Operation phase EMP and monitoring plan with budgetary allocation have been dealt in EIA report September 2021 which was submitted to MOEF&CC. Further, we assure you to abide by the condition.
	[xxvi]	In order to meet all the essential aeronautical requirements and the further airport expansions, no property development shall be undertaken within the	This condition is not applicable as all the land requirements of future expansion have been planned for. Moreover, EC of 2021 does not offer any limitation/ restriction in this regard.

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		proposed aeronautical Airport Zone area (1160 ha).	
	[xxvii]	The Master plan/ Development plan of Navi Mumbai shall be revised and recasted in view of the airport development to avoid and unplanned haphazard growth around the airport. The land use should take care of bird menace including that from the Mangrove Parks.	**Complied:** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/9 38 dated 11th September 2020, as submitted to MOEFCC, that: 1.The Navi Mumbai Development Plan has been revised vide Govt. Order No. TPS-1711/2495/C.R. 202/11/UD-12 vide dtd. 21st March, 2012 & copy was submitted. 2., GoM has issued notification dated 10th January, 2013, declaring the area around proposed International Airport as "Navi Mumbai Airport Influence Notified Area" (NAINA) and appointed CIDCO as the Special Planning Authority to avoid haphazard development around the airport. Copy of NAINA Notification was also submitted to R.O. Nagpur. 3. BNHS is conducting decadal avifauna study in NMIA region.
	[xxviii]	All other nearby villages, if not required to be relocated should be provided with best possible infrastructure so that they compare well with the adjoining ultra-modern airport infrastructure.	**Complied: :** It may be noted, as per CIDCO report vide Letter CIDCO/GM(ENV&F)/NMIA/2019/9 38 dated 11th September 2020, as submitted to MOEFCC, that all the nearby villages are being provided physical and social infrastructure under Gaothan expansion scheme & Grant in Aid scheme is implemented to develop social infrastructure in nearby villages for improvement of social infrastructure like water supply, sanitation, providing sewerage system, roads etc.
	[xxix]	CRZ provisions shall be applicable on the tidally influenced diverted channels of Ulwe and Gadhi Rivers and	**Agreed to Comply:** CRZ clearance has been obtained by NMIAL along with EC2021 wherein, NMIA boundary has been clearly demarcated. All

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		CIDCO shall finalize the Airport plans accordingly.	developmental activities of the project are within this boundary. CIDCO has obtained requisite CRZ clearance for off-site infrastructure such as north boundary road, bridges of eastern side, etc. wherever road component touches tidal influence area of the rivers. Master Plan was prepared for NMIA development is in strict compliance with the applicable CRZ provisions and requirement for compliance in this regard has been incorporated appropriately into the Concessionaire Agreement with NMIAL. Further, it shall be monitored by Environment Cell as well as HLAMC.
	[xxx]	Any cutting or filling up the airport site will create significant turbidity problem. CIDCO shall examine the impact on the marine life. The details will be put up on the website every 3 months.	**Complied:** Turbidity during pre-construction and construction period is tested and analyzed regularly through MOEF & CC recognized laboratory appointed to carry out quarterly environmental monitoring at pre-defined locations in surface waters around the airport. The quarterly monitoring of turbidity is being carried out. Environmental analytical reports for the reporting period are enclosed herewith. (**Annexure -II**).
	[xxxi]	CIDCO shall conduct the baseline survey of avian fauna before the start of construction and the details shall be put up every 3 months on the website in association with BNHS.	**Being Complied:** BNHS was appointed by CIDCO to do the Base Line Survey of Avian Fauna between 2012 to 2016. Quarterly reports of BNHS are available on CIDCO website in public domain. CIDCO has also signed a long-term MOU (ten-year period ending 2028) with BNHS. A meeting was held dated 20th Apr'23 between CIDCO, NMIAL & BHNS officials wherein measures to mitigate risk of bird strikes

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			were discussed. NMIAL presented its concerns regarding some of the bird sites (NRI colony (NRI), Training Ship Chanakya (TCS) and Delhi Public School (DPS)) being located close to the airport, as they come within Inner Horizontal Surfaces (IHS) of NMIA. NMIAL has offered to assist BHNS in rest of its recommendations, other than its recommendation for NRI, TSC and DPS sites to be conserved as Water Bird Habitats. NMIAL has also informed CIDCO about the same for CIDCO's advice to BNHS. .
	[xxxii]	The Environmental Clearance / CRZ Clearance is recommended below is only for the Navi Mumbai Airport project. CIDCO shall obtain the Environmental and CRZ clearance separately for off airport facilities and other off infrastructure projects after finalizing the locations and details as may be required under the EIA Notification 2006 and the CRZ Notification.	**Complied:** CIDCO has sought separate approvals for associated infrastructure of airport. The status of various clearances is as below: • The CRZ clearance for off-site physical infrastructure of roads, bridges and interchanges has been granted by MCZMA vide letter dated 15th February 2016which was due for expiry in Feb 2023. In Jan 2023, prior to the expiry of the previous CRZ clearance, CIDCO had applied for extension of CRZ clearance to Off-site Infra project. Extension of 3 years upto 12 Feb 2026 has been recommended by MCZMA for the project. • CRZ clearance for Shifting of EHVT lines has been granted by MOEF vide letter no. F.No.11-38/2016-Ia.III dated 28th August 2017. The work of shifting of EHVT lines has been completed.

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			• Forest Clearance Stage I for shifting of EHVT Lines was received vide letter dt. 02.08.18; Process of obtaining Final Forest Clearance under FC Act for Shifting of EHVT lines is in final stage. The Bombay High Court permitted CIDCO to clear Mangroves for the rerouting of EHVT lines for development of NMIA vide its Order dt. 19th December 2013 in WP no 22362 OF 2019. The work of shifting of EHVT lines has been completed.
	[xxxiii]	Taking a cue from the man-made 26/11 incident arising out of external threat to our country, a strategic airport safety and security plan covering also surrounding inhabited areas of the airport shall be prepared and put in place in consultation with appropriate government departments	**Agreed to Comply:** We participate in the "District Level Coastal Security Co-ordination Committee" coordinated by Navi Mumbai Police. The Airport security plan will be prepared as per guidelines issued by **"Bureau of Civil Aviation Security"**, the national Regulator for Civil Aviation Security.
	[xxxiv]	A high level advisory and monitoring committee which should include international experts of repute, reporting directly to the highest Airport Management Authority shall be constituted by CIDCO to plan, execute and maintain the environmental issues / recommendations mentioned above. The monitoring shall be done at various stages (planning, construction, operation) of project for compliance of conditions. Budgetary provisions shall be made to the satisfaction of this Committee. The committee	**Agreed to Comply:** The implementation was discussed in the EAC 74th Meeting held on 8th Oct 2021, and it was explained that the project is periodically monitored by CM, GOM and Chief Secretary, GOM. Thus, condition may be considered as complied and no separate meeting is required.

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		shall meet at least once in three months and the decisions taken in the meetings shall be put up on the web site for public information.	
	[xxxv]	Regular modeling study of air, noise shall be carried out due to the increase in traffic.	**Complied**: Air and noise modelling was carried out during EIA study. Monthly monitoring of ambient air and noise levels is being continued by NMIAL and reports are being submitted along with six monthly compliance reports (**Annexure - II**). Modeling study of air and noise will be carried out again after the project goes operational
	[xxxvi]	The solid waste shall be properly collected, segregated and disposed as per the provision of Solid Waste (Management and Handling) Rules, 2000.	**Being Complied**: At present, during construction phase, compliance with solid waste management has been included as a responsibility of EPC contractor. NMIAL's environment team monitors the compliance on monthly basis.
	[xxxvii]	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	**Being complied**: EPC Contractor has provided labour housing facilities as per BoCW Act and corresponding Rules and as per requirements of CA and EC.
	[xxxviii]	A First Aid Room will be provided in the project both during construction and operation of the project.	**Being Complied**: First aid facilities have been provided at site offices of various contractors as also in labour colony. In addition, EPC contract mandates contractor to maintain an ambulance and have tie up with local Hospitals to ensure that in case of emergency necessary medical facilities will be available. Safety team of NMIAL regularly monitors safety compliance of the contractor.

Sr. No		Stipulated Condition-2010	Compliance status
	[xxxix]	Disposal of muck during construction phase should not create any adverse effect on the neighboring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.	**Being Complied**: C&D waste is being disposed as a filler material at a designated place within the NMIA site. No muck is taken out of NMIA site during the ongoing Phase I & II (20 MPPA) construction for disposal.
	[xl]	Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.	**Complied:** Soil & ground water quality monitoring during pre-development work was being carried out by CIDCO through MOEFCC recognized Lab and regular reports have been submitted to MOEFCC along with six monthly compliance reports. NMIAL has continued the monitoring for Air & noise (9 stations) and Ground water sampling (5 locations) on monthly basis. Marine/ Surface water (10 stations), & soil sampling (5 locations) on quarterly basis. Environmental analytical reports for the reporting period are enclosed herewith (**Annexure-II**).
	[xli]	Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.	**Being Complied**: Inert construction spoils are collected and deposited at a designated area within the site as a filler material. Bituminous waste is collected given to Hot Mix Plant for recycling. No material is allowed to contaminate surface water or ground water.
	[xlii]	Installation and operation of DG set shall comply with the guidelines of CPCB.	**Being complied**: DG sets installed at site are
	[xliii]	The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules	**Being Complied**: Tender condition stipulates that the EPC contract should use DG set only in case of power failure and fuel used in DG sets should be low sulphur quality.

Sr. No		Stipulated Condition-2010	Compliance status
		prescribed for air and noise emission standards.	
	[xliv]	The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.	**Being Complied**: During construction, diesel is not being stored at site as of now. Instead, oil company's bowser reaches each DG set, equipment and vehicle to dispense the fuel with proper safety precaution.
	[xlv]	Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.	**Being Complied**: We assure MOEFCC that this condition is being complied with. PUC certificate of each vehicle entering the NMIA project site is checked for validity and emission standards.
	[xlvi]	Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/ MPCB.	**Being Complied:** Noise making construction activities such as drilling are being carried out only during Day time between 7 AM and 6 PM. **Following measures are being taken to reduce load on Ambient Noise & Air:** ▪ The noise generating activities are being carried out only during daytime. ▪ Separate Entry & Exit for the construction vehicles has been provided. Construction vehicles are mostly within site and do not exit project site. However, vehicles if any, entering or exiting site, for that separate exit & entry have been provided.
	[xlvii]	Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003.	**Being Complied**: Fly ash has been considered in the concrete mix design and is being used during construction. EPC contractors have been asked to maintain record for use of fly ash.

Sr. No		Stipulated Condition-2010	Compliance status
	[xlviii]	Ready mixed concrete must be used in building construction.	**Being complied**: Ready mixed concrete is being used in building construction.
	[xlix]	Storm water control and its re-use as per CGWB and BIS standards for various applications.	**Being Complied:** Storm water drains are provided with the silt pond before discharge. At construction stage, storm water is not being reused. During operations phase, water from Rainwater Harvesting pond will be used for irrigation.
	(l)	Water demand during construction should be reduced by use of pre-mixed concrete, curing agents other best practices referred.	**Being complied**: We assure MOEFCC to abide by the condition during construction phase. Curing agents have been included in the tender specifications for all grades of concrete.
	(li)	Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on air-conditioning. If necessary, use high quality double glass with special reflective coating in windows.	**Being Complied:** Passenger terminal building is being designed as per ASHARE standards and other airport buildings have been designed in accordance with ECBC standards to make them more energy efficient.
	(lii)	The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of firefighting equipment, etc. as per National Building Code including protection measures from lightening etc.	**Being Complied**: Requisite fire NoC and structural stability certification/ approval is being obtained for buildings to be constructed in the Airport.
	(liii)	Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.	. **Being Complied:** Various functional teams of NMIAL including Environment team continuously supervise EPC contractor's work for quality as well as compliance.
II.		**Operation Phase: -** Project is under construction, the condition pertaining to operation phase will be implemented.	

Sr. No		Stipulated Condition-2010	Compliance status
	i)	Diesel power generating sets proposed as source of backup power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Use of low sulphur diesel. The location of the DG sets may be decided with in consultation with Maharashtra Pollution Control Board.	**Agreed to Comply**: Noted and shall be adhered during operation phase.
	ii)	Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.	**Agreed to Comply**: Noted and shall be adhered during operation phase.
	iii)	The green belt of the adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.	**Agreed to Comply**: Since first phase of project is under implementation and project is yet to be operational, we assure to abide by the condition. Green belt/ vegetation along periphery of the airport shall be developed at locations outside NMIA which are in compliance to operational safety requirement of airport. However, green area/open area amounting to 33% of NMIA site area has been planned.
	iv)	Weep holes in the compound walls shall be provided to ensure natural drainage of rainwater in the catchment area during the monsoon period.	**Being complied**: Drainage plan of the site is such that the rainwater will get accumulated in the drains and not along compound wall.

Sr. No		Stipulated Condition-2010	Compliance status
	vi)	The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.	**Complied:** Monitoring of ground water level and its quality around the project site have been carried out by CIDCO and reports were submitted along with Six monthly compliance report to MOEFCC. NMIAL has continued the monitoring for Air & noise (9 stations) and Ground water sampling (5 locations) on monthly basis. Marine/ Surface water (10 stations), & soil sampling (5 locations) on quarterly basis. Environmental analytical reports for the reporting period are enclosed herewith (**Annexure -II**).
	vii)	Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.	**Agreed to Comply**: In terms of Phase I & II (20 MPPA) operational point of view, necessary parking provisions made at Central Terminal Complex (at Underground parking), Taxi Staging area, Bus Terminal, and CTC Bus Terminal.
	viii)	Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning. Use CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/ rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible.	**Agreed to Comply**: Noted and shall be adhered during operation phase.
	ix)	Efforts should be made to use solar energy to the maximum extent possible.	**Noted:** Shall be adhered to during Operations stage. Terminal building including all other building shall have solar PV panels installed on the roof. Additional panels will be installed along the side of runway.
General Conditions:			

Sr. No	Stipulated Condition-2010	Compliance status
(i)	In the event of any change in the project profile a fresh reference shall be made to the Ministry of Environment and Forests.	**Agreed to Comply**: We will abide by the condition.
(ii)	This Ministry reserves the right to revoke this clearance, if any, of the conditions stipulated are not complied with to the satisfaction of this Ministry.	**Noted.**
(iii)	This Ministry or any other competent authority may stipulate any additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.	**Noted.**
(iv)	Full support should be extended to the officers of this Ministry's Regional Office at Bhopal and the offices of the Central and State Pollution Control Board 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:** Full support was extended to the officers of Environment Ministry's Regional Office during visit and assured to render the same as & when required.
8	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 Municipal Solid Wastes (Management and Handling) Rules, 2000 including the amendments and rules made thereafter.	**Noted.**
9	All other statutory clearances such as the approvals for	**Complied:** All the necessary approvals required for the project

Sr. No	Stipulated Condition-2010	Compliance status
	storage of diesel from Chief Controller of Explosives, Fire Department and Civil Aviation Department from height point of view, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	have been obtained and copies have been submitted to R.O, MOEFCC, Nagpur. NMIAL shall abide by the condition.
10	The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at http://www.envfor.nic.in. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bhopal.	**Complied:** Public was informed about the grant of EC by advertisement in newspaper DNA, Mumbai on 30.11.2010 and Lokmat (Marathi) on 30.11.2010 and copies of Newspaper cutting were submitted to Regional Office.
11	Environmental 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, if applicable to this project.	**Noted.**
12	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	**Complied:** CIDCO had submitted status as "Complied" in the earlier compliance report.

Sr. No	Stipulated Condition-2010	Compliance status
	on the website of the company by the proponent.	
13	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. The criteria pollutant levels namely; SPM, RSPM, SO_2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	**Complied:** CIDCO has been submitting six monthly compliance reports regularly. All EC related compliance reports are uploaded on the CIDCO website at the following link: https://cidco.maharashtra.gov.in/navi_mumbai_airport# under Pre-Development tab as submitted by CIDCO. After approval of MoEF&CC for Transfer of Environment & CRZ Clearance from CIDCO to NMIAL has been obtained vide letter No. F. No. 10-53/2009-IA-III dated 17th August 2020, onwards NMIAL uploaded on NMIA website EC Compliance Report at the following link. https://nmiairport.co.in/circulars.html
14	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.	**Complied:** Same as mentioned above in General Condition 13.
15	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the	**Agreed to Comply**: Will be submitted in Operation Phase of project.

Sr. No	Stipulated Condition-2010	Compliance status
	respective Regional Offices of MoEF by e-mail.	

Compliance to additional conditions stipulated by MOEFCC while granting Extension of Validity for Environmental and CRZ Clearance to NMIA Project vide letter dated 20th Dec 2017.

No.	Stipulated Condition-	Compliance status
i)	Certified report on sources and availability of water from the local body supplying water along with the permission received by them for the shall be submitted. This report shall specify the total annual water availability with the organization (local Body), the quantity of water already committed to other development projects, the quantity of water committed for this project and the balance water available for distribution. This should be specified separately for ground water and surface water sources and ensure that there is no impact on other uses.	**Complied:** CIDCO has submitted water Adequacy Report as a part of Compliance report for the period of Jan- June 2018 vide letter no. CIDCO/ GM (ENV & F)/NMIA/2018/184 dated 21st Sept. 2018. NMIAL has ensured that water requirement for the project is much lower (22 MLD at 60 MPPA) than that envisaged at the time of CEIA studies by CIDCO (41 MLD at 60 MPPA).
ii)	Detailed traffic management and traffic decongestion plan, to ensure that the current level of service of the roads within a 5 kms radius of the project site is maintained and improved upon, shall be drawn up through an organization of repute and specializing in Transportation Planning within next 6 months. This should be based on the cumulative impact of all development and increased inhabitation being carried out by the project or other agencies in this 5 kms radius from the site under different scenarios of space and time and shall be implemented to the satisfaction of State Urban Development and Transports Departments with the consent of all the concerned implementing agencies.	**Complied:** CIDCO, the nodal agency for Navi Mumbai International Airport has prepared "Detailed Traffic Management and Traffic Decongestion Plan for Navi Mumbai International Airport (NMIA)" in April 2020 which ensure that the current level of service of the roads within a 05 km radius of the project is maintained and improved upon after the implementation of the project. CIDCO has submitted final report for "Detailed Traffic Management and Traffic Decongestion Plan for Navi Mumbai International Airport (NMIA)" to MOEF vide letter No. CIDCO/GM(ENV&F)/NMIA/2020 /491 dated 14th July 2020.
iii)	Treated effluents shall also be used for irrigation and Roadside plantation after taking due permissions from the concerned authorities/Forest	**Agreed to Comply**: We assure to abide by the condition.

No.	Stipulated Condition-	Compliance status
	department.	
iv)	Project proponent shall satisfactorily address all the complaints that have been received against the project and submit a compliance report to the Ministry.	**Agreed to Comply:** Compliance was submitted to MOEF vide letter No. CIDCO/ GM (ENV & F)/NMIA/2017/1017 dated 2nd November 2017. We assure to abide by the condition.
v)	The extension of validity is being granted for the original proposal for which Environmental and CRZ Clearance was granted earlier. The Project proponents will not make any changes in the project nature, structure and configuration and limit themselves to activities for which the Environmental and CRZ Clearance has been given earlier.	**Agreed to Comply:** The approval of MoEF&CC for Transfer of EC from CIDCO to NMIAL has been obtained vide letter No. F. No. 10-53/2009-IA-III dated 17th August 2020. NMIAL had applied to MOEFCC for grant of fresh EC & CRZ clearance. Validity of existing EC was extended up to 21st Nov 2021 in reference to MOEFCC's Notification dated 18th Jan 2021. Fresh EC and CRZ Clearance for on-going project was granted on 28.11.2021 (No. 21-60/2021-IA-III) and issued on 1st Dec 2021.

Annexure-II

Environmental Monitoring Report
(Oct 2022- Mar 2023)

ENVIRONMENTAL COMPLIANCE MONITORING REPORT

for

Navi Mumbai International Airport (NMIA)

Sponsor:

Navi Mumbai International Airport Pvt. Ltd. (NMIAL)

Period:

October 2022 to March 2023

PREPARED BY

ADITYA ENVIRONMENTAL SERVICES PVT.LTD.
MOEFCC Recognized Laboratory under EP Act 1986
Accredited under ISO 9001: 2015 & OHSAS 18001: 2007 by ICQS
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1. INTRODUCTION

Mumbai Metropolitan Region (MMR) comprises of areas in and around Mumbai city and includes parts of Mumbai, Thane and Raigad Districts in Maharashtra. Mumbai is known as the commercial capital of India and the MMR is an industrially and technologically advanced region, which has experienced rapid growth in income and employment. The increase in trading, business and financial services demands the highest order of infrastructure. There is a need for enhancement of the available capacity of the airport, as the existing airport in Mumbai is under tremendous pressure to meet the air traffic demands of this vibrant region. Realizing this need, the Government of Maharashtra conceptualized the Navi Mumbai International Airport (NMIA) project and appointed City and Industrial Development Corporation of Maharashtra Ltd. (CIDCO) as the Nodal Agency for implementation of the project.

This project was taken up on Public Private Partnership (PPP) basis, on approval of the Government of India and the Government of Maharashtra. After an open global bidding process, CIDCO issued Letter of Award dated 25th October 2017 to Mumbai International Airport Pvt Ltd (MIAL) for development of the project.

The objective of the monitoring is to understand the Ambient Air quality, Ambient Noise quality, Ground water quality, soil and marine water quality at Navi Mumbai International Airport site and nearby villages.

The focus of compliance monitoring is to assess the reporting period environmental conditions in and around the surrounding project area to check for possible impacts on environment at an early stage so that necessary actions can be initiated. The assignment comprises monitoring of following parameters:

- Ambient Air Monitoring
- Ambient Noise Level Monitoring
- Soil
- Ground/Surface Water
- Marine Water for Biological and Physicochemical Parameters
- DG Stack Monitoring

2. SCOPE OF MONITORING WORK

2.1 Scope of Monitoring Work as per Work Order:

Scope of monitoring work as per Work Order are as given below:

Table 2-1: Scope of Environmental Monitoring Work as per Work Order

Sr. No.	Parameters – as per Annexure B	Location	Frequency	Samples/ Year
1.	**Ambient Air Quality:** As per NAAQS standards Published by CPCB (12 Parameters)	9	9 Stations per Month	108
2.	**Noise: Parameters: Leq Noise level** - Day time & Nighttime separately as per CPCB norms.	11	Same as Air Quality	132
3.	**Ground Water Quality:** As per IS 10500:2012 Revised	5	5 Stations per Month	60
4.	**Soil: Parameters:** pH, Texture, EC, Na, Available N, Available K, Available Phosphorus, Sulphate, Chloride, Ca, Mg, Fe, Mn, Cu, Hg, Cd, As, Pb, Zn, Al, Ni, Co, Cr, Na	8	8 Stations (Quarterly)	32
5.	**Marine/Surface Water Quality parameters:** **Physico Chemical parameters:** PH, Temperature, Turbidity, EC, Salinity (ppt), **Chemical Parameters:** DO, BOD, Magnesium, Hardness, Alkalinity, Chloride, Sulphate, Fluoride, Sodium, Potassium, Phenol, Total phosphorus, Total Nitrogen. **Heavy Metals:** Fe, Zn, Mg, Mn, Cd, Cr, Hg, Pb **Bacteriological parameters:** Coliform Colonies (MPN). **Marine Biology:** Chlorophyll, Phaeophytin, Phytoplankton, Zooplankton, Benthos, Diversity indices	10	10 stations (Quarterly)	40
6.	**DG Set Stack Monitoring**	1	1 station (Quarterly)	4

2.2 Locations of Monitoring:

Details of monitoring stations for Ambient Air Quality, Ambient Noise, Soil, Ground Water, Marine Water-physicochemical & biological showing station locations and DG set Stack Monitoring are as given below:

Table 2-2: Details of Ambient Air Quality Monitoring Stations

Station Code	Station	Remarks
A1	Owale	Residential Village
A2	Pargaon	Receptor oriented - 400m from proposed runway
A3	Ulwe Node	Area near highway
A4	NMIA Project Site	Within project site
A5	Kille Gaothan	Receptor oriented – on main access road
A6	Kombadbhuje (Balaji Site Office)	Within Project site (No access to Kombadbhuje)
A7	Panchsheel (Old Location)/ Diwalegoan (New Location onwards Feb 2023)	Receptor oriented – on main access road
A8	Jui	Eastern side of NMIA, outside project site
A9	Panvel	residential zone

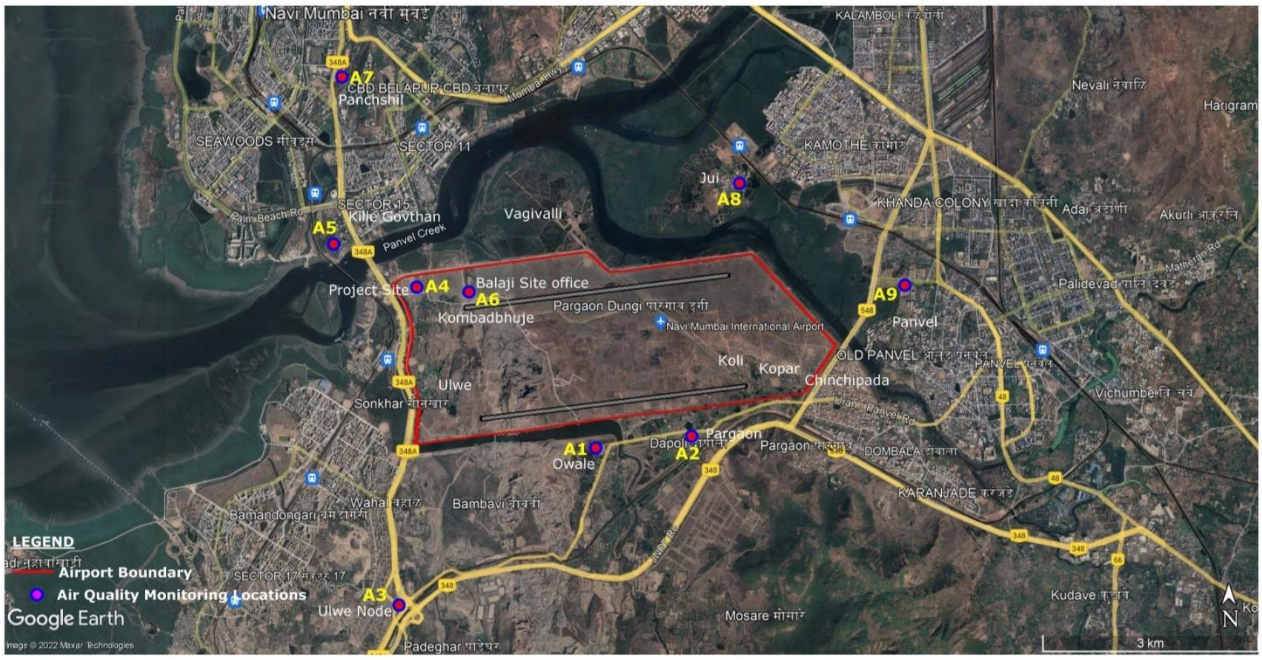

Figure 2-1 Ambient Air Monitoring Locations

* Ambient Air Monitoring stations can be changed on the basis of access to villages situated within NMIA project site and other locations. The air sampling was done at location of Panchsheel till December 2022 and onwards Feb 2023 it is replaced with Diwale Koliwada.

Table2-3: Ambient Noise Level Monitoring Stations

Sr. No.	Station Name	Category of area
N1	Owale	Residential Area
N2	Pargaon	Sensitive area (Mixed category)
N3	Ulwe Node	Sensitive Area
N4	NMIA Project site	Within Airport site
N5	Kombadbhuje (Balaji Site Office)	Within Airport site
N6	Kille Gaothan	Receptor oriented – on main access road
N7	Panchsheel/ Diwale Koliwada (Onwards Feb 2023)	Receptor oriented – on main access road
N8	Jui	Eastern end, outside project site
N9	Panvel	Residential Area (Mixed category)
N10	Vadghar/ Karanjade (Onwards Feb 2023)	Residential Area
N11	Bhangarpada	Residential Area

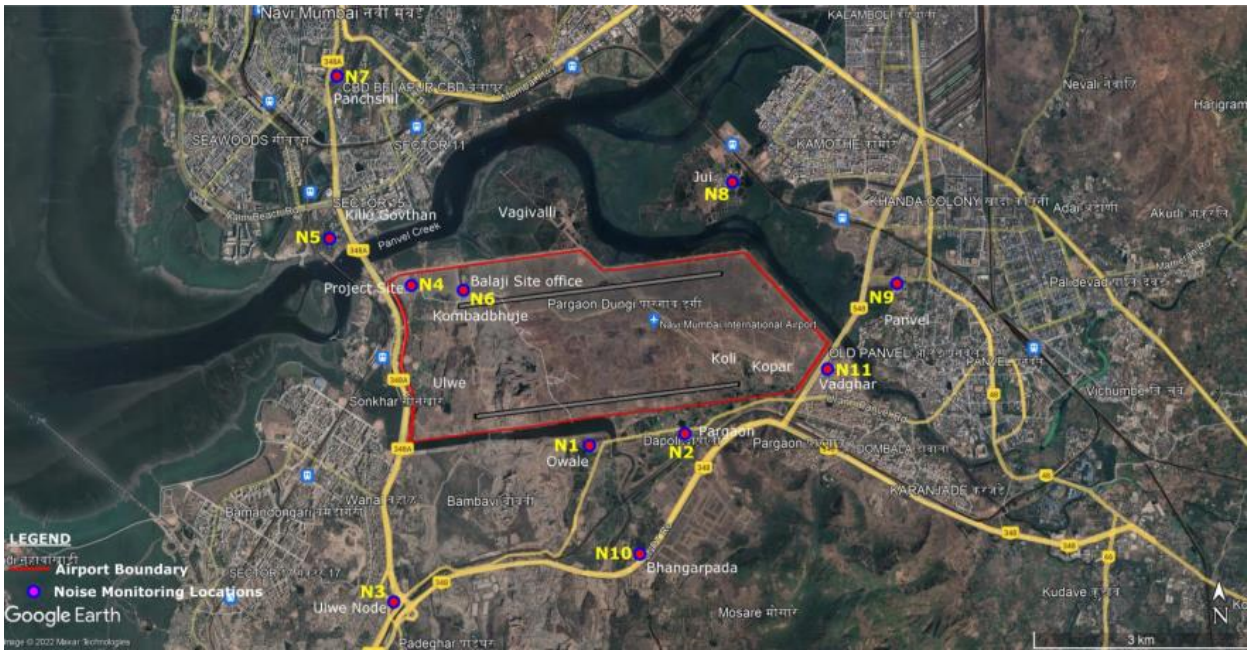

Figure 2-2 Noise Level Monitoring Locations

Table 2-4: Soil Quality Monitoring Stations

Station Code	Stations Name
S1	Pargaon
S2	Chinchpada
S3	Koli
S4	Kopar
S5	Ulwe
S6	NMIA project Office
S7	Kombadbhuje
S8	Owale

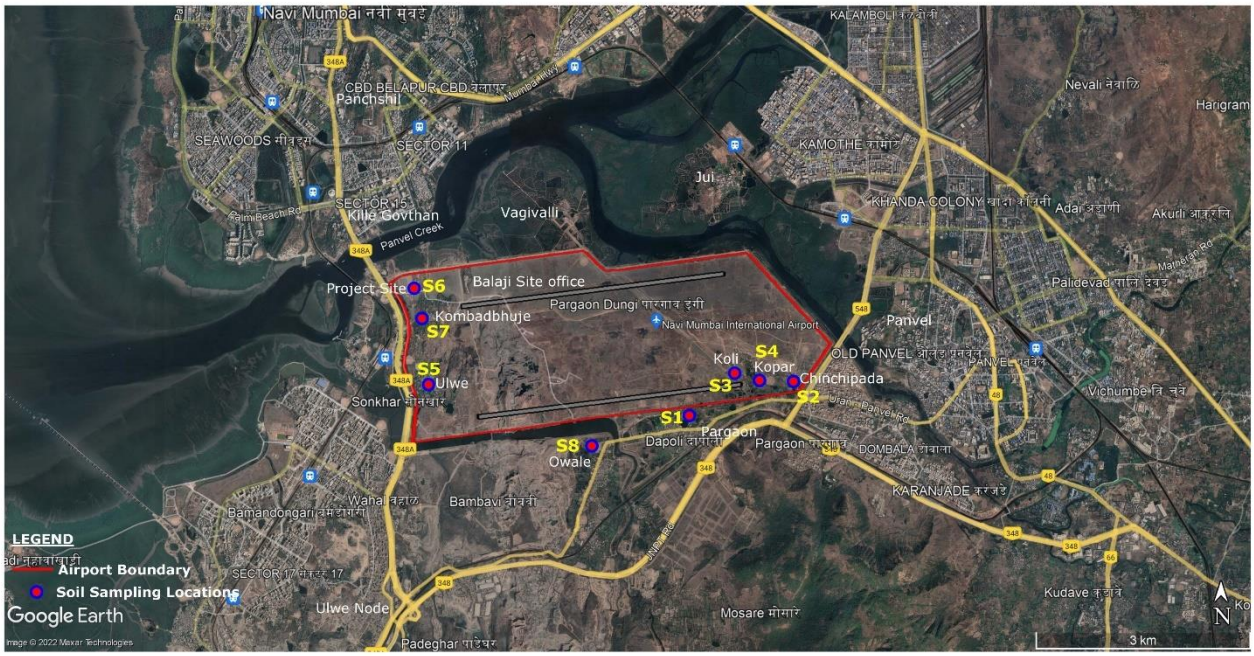

Figure 2-3 Soil Sampling Locations

Table 2-5: Details of Ground Water Quality Monitoring Stations

Station Code	Month	Station Code	Month
	October, December, February		**November, March**
GW1	Dugwell at Ulwe	GW I	Dugwell at Kombadbhuje
GW2	Open well at Dapoli	GW II	Dugwell at Owale
GW3	Open well at Kille Gaothan	GW III	Dugwell at Pargaon
GW4	Open well at Jui	GW IV	Open well at Chinchpada
GW5	Open well at Panvel		

Figure 2-4 Ground Water Sampling Locations

Table 2-6: Details of Marine Water Quality Monitoring Stations

Station Code	Station details / Location
MW1	Extreme end of Gadhi River (upstream side)
MW2	Near Chinchpada village (2 km from MW1) in Gadhi River
MW3	Near Jui Village (1.8 from MW2) in Gadhi River
MW4	At Junction of Ulwe and Gadhi Rivers in Panvel Creek
MW5	Near Vaghivali village (2 km from MW4) in Gadhi River
MW6	Near CBD Belapur (1.5 km from MW5) in Panvel Creek
MW7	Near Vaghivali Creek Junction (800m from MW6) in Gadhi River
MW8	Near Rathi bander in Panvel Creek
MW9	Mouth of Panvel Creek
MW10	Ulwe River near Owle Village

Figure 2-5 Marine Water Sampling Locations

Table 2-7: Details DG set Stack Monitoring Stations

Station Code	Station details / Location
DG set Stack 1	NMIA Project site

Figure 2-6 DG Stack monitoring Locations

2.3 Period/Time of Sampling (October 2022 to March 2023):

The sampling survey was planned to be carried out as per schedule mentioned in Table below.

Table 2-8: Period/Time of Sampling for this Survey

Month	Parameter	Sampling Stations	Dates of Sampling	Time Period
October 2022	AAQ	A1,A2,A3	12.10.2022	24 hours starting from 10:00am
		A4, A5, A6	13. 10.2022	
		A7,A8,A9	14. 10.2022	
	NLS	N1, N2, N3	12.10.2022	
		N4,N5, N6	13. 10.2022	
		N7,N8, N9, N10, N11	14.10.2022	
	GW	GW1, GW2, GW3, GW4, GW5	12. 10.2022	Grab Sample
	DG Stack Monitoring	DG Set Stack 1	13.10.2022	Grab Sample
November 2022	AAQ	A1, A2, A3	14.11.2022	24 hours starting from 10:00am
		A4, A5, A6	15.11.2022	
		A7, A8, A9	16.11.2022	
	Noise Level	N1,N2, N3, N10	14.11.2022	
		N4, N5, N6, N11	15.11.2022	
		N7,N8, N9	16.11.2022	
	GW	GW1, GW I, GW II, GW III, GW IV	14.11.2022	Grab Sample
	Soil	S1, S2, S3, S4, S5, S6, S7, S8	17.11.2022	Grab Sample
	Marine Water	MW5, MW6, MW7, MW8, MW9	18.11.2022	Grab Sample
		MW1, MW2, MW3, MW4, MW10	19.11.2022	
	DG Stack Monitoring	ST 1	15.11.2022	Grab Sample
December 2022	AAQ	A1, A2,A3	12.12.2022	24 hours starting from 10:00am
		A4,A5, A6	13.12.2022	
		A7, A8, A9	14.12.2022	
	Noise Level	N1, N2,N3, N10	12.12.2022	
		N4,N5, N6,N11	13.12.2022	
		N7, N8, N9	14.12.2022	
	Ground Water	GW1, GW2, GW3, GW4, GW5	12.12.2022	Grab Sample
	DG Stack Monitoring	DG Set Stack 1	14.12.2022	Grab Sample
February 2023	AAQ	A1, A2,A3	20.02.2022	24 hours starting from 10:00am
		A4, A5, A6	21. 02.2022	
		A7, A8,A9	22. 02.2022	
	Noise Level	N1, N2 ,N3, N10	20.02.2022	
		N4, N5, N6	21. 02.2022	
		N7, N8, N9	22. 02.2022	
	Ground Water	GW1, GW2, GW3, GW4, GW5	20.02.2022	Grab Sample
	DG Stack Monitoring	ST 1	21.02.2023	Grab Sample
March 2023	AAQ	A1, A2, A3	13.03.2022	

Month	Parameter	Sampling Stations	Dates of Sampling	Time Period
		A4, A5,A6	14.03.2022	24 hours starting from 10:00am
		A7, A8, A9	15. 03.2022	
	Noise Level	N1, N2, N3, N10	13.03.2022	
		N4, N5, N6	14.03.2022	
		N7, N8, N9	18. 05.2022	
	Ground Water	GW1, GW I, GW II, GW III, GW IV	13.03.2023	Grab Sample
	Soil	S1, S2, S3, S4, S5, S6, S7, S8	16.03.2023	Grab Sample
	Marine Water	MW5, MW6, MW7, MW8, MW9	20.03.2023	Grab Sample
		MW1, MW2, MW3, MW4, MW10	21.03.2023	

Note: During the current reporting period, environmental monitoring was carried out in October - December 2022, and from February – March 2023. January 2023 sampling could not be done due to unavoidable circumstances.

3. METHODOLOGY ADOPTED FOR ENVIRONMENTAL MONITORING

3.1 AMBIENT AIR QUALITY

3.1.1 Reconnaissance Survey:

Reconnaissance survey in study area (10 km around proposed airport site) shows that sources of air pollution include the following:

- Airport land development work and predevelopment works
- heavy traffic along Amara Marg, NH4/4BB and Uran / JNPT Road
- construction activity in Ulwe node and nearby areas
- industries in Panvel (private), MIDC Taloja (6km NE of site) & MIDC TTC (4km N of site)
- burning of poor quality fuels in villages to the south of proposed site

In the month of March 23 exceedance in the particulate matter level is due to increase in traffic and other developmental activities in the areas. This is also due to the influence of regional weather conditions of stagnation on the Arabian Sea, due to which background concentration of particulate matter all over MMRDA region was very high.

In order to arrest the deterioration in air quality, Govt. of India has enacted Air (Prevention and Control of Pollution) Act in 1981. The responsibility has been further emphasized under Environment (Protection) Act, 1986. The National Ambient Air Quality Standards (NAAQS) have been published by CPCB in November 2009 giving methods for measurement.

3.1.2 Methodology for Ambient Air Quality Monitoring:

To monitor Air Pollutants in Ambient air following method of analysis adopted

Table 3-1 Methods Adopted for Analysis of AAQ Parameters

S N	Parameter	Sampling Equipment	Method of Analysis
1.	PM_{10}	RSPM Sampler/ Glass Fiber filter paper.	IS 5182 (Part 23) RA2017
2.	$PM_{2.5}$	$PM_{2.5}$ Sampler/Filter – PTFE, Teflon membrane	IS 5182 (Part 24) 2019

S N	Parameter	Sampling Equipment	Method of Analysis
3.	SO_2	Absorption in TCM	IS 5182 (Part 2) RA2017
4.	NO_X	Absorption in NaOH	IS 5182 (Part 6) RA2017
5.	CO	Sampling in Tedlar bags / CO Meter	IS 5182 (part 10) RA2019
6.	Lead	Sampling using EPM 2000 equivalent Glass Fiber Filter paper	APHA Air method 822-3rd
7.	NH_3	Absorption in sulfuric acid	IS 5182 (part 25) RA 2018
8.	Ozone	Absorption in Potassium Iodide	IS 5182 (part 9) RA2019
9.	Benzene[C_6H_6]	Collection Activated Carbon	IS 5182 (part 11) RA2017
10.	Benzopyrene	Sampling using EPM 2000 equivalent Glass Fiber Filter paper	CPCB manual vol. I:2013
11.	Arsenic [As]	Sampling using EPM 2000 equivalent Glass Fiber Filter paper	APHA Air method 302-3rd
12.	Nickel [Ni]	Sampling using EPM 2000 equivalent Glass Fiber Filter paper	APHA Air method 822-3rd

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Figure 3-1 Ambient Air Quality Monitoring

3.1.3 Selection of air sampling location

Selection of representative location is very important. Following precautions have been taken while installing AAQM stations:

- It is away from source & other interferences
- Samplers are installed at free flowing well mixed area (3m) above ground level
- Only Calibrated Air Samplers are used
- the samples are transported to the laboratory at the earliest for further analysis
- Gaseous samples were preserved in cold box before taking to laboratory

3.2 AMBIENT NOISE LEVEL

3.2.1 Reconnaissance Survey:

Reconnaissance survey in study area (10 km around proposed airport site) shows that sources of air pollution include the following:

- Airport land development work and predevelopment works
- heavy traffic along Amara Marg, NH4/4BB and Uran / JNPT Road
- construction activity in Kharghar, Belapur and Ulwe node and nearby areas

- industries in Panvel (private), MIDC Taloja (6km NE of site) & MIDC TTC (4km N of site)
- burning of poor quality fuels in villages to the south of proposed site

Noise pollution in urban areas is now being recognized as a major environmental issue around the world. With increasing awareness of the adverse impacts of noise on human health, more and more people becoming less tolerant to environmental noise. The objective of this exercise is to assess the baseline status within study area and to compare the noise levels with Ambient Noise Standards as prescribed under Environmental Protection Act, 1986.

3.2.2 Methodology for Sample Collection

Integrated Sound Level Meter C390 was used for undertaking the surveys and installed on tripods at the selected locations over a 24-hour period. This Meter is then taken to laboratory where the data collected is downloaded onto PC using specialized software.

Center C-390 Sound level Meter with data logger

Noise is measured in decibel (dB) and 'A' weighting is used for this entire monitoring since in this method of frequency weighting, the signal generated reproduces the way the human ear responds to a range of acoustic frequencies. Leq: The equivalent continuous Sound Pressure Level for a particular duration. The Day-Night Equivalent Sound Level refers to average sound exposure over a 24- hour period. Leq day & night values are calculated from hourly Leq values, with the Leq values for the nighttime increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

Figure 3-2 Ambient Noise level Monitoring

3.3 Soil

The purpose of soil testing is to identify contamination of soil due to land development works and the soil fertility from a viewpoint of use for landscape development.

3.3.1 Reconnaissance Survey:

Southern side of study area is rural in character and large tracts are being cultivated as paddy fields. Soil is also seen plentifully at bottom of hills where it supports large vegetation. However, Northern portion of study area is mostly urban in character since it has seen largescale development being part of Navi Mumbai.

3.3.2 Methodology of Sample Collection:

Soil samples are collected after removing top two inches – which may contain high amount of organic carbon and humus. The soil area and volume could be a large field, a small garden, or simply the root zone of a single tree or shrub. The most difficult step in soil testing is accurately representing the desired area of soil. When the sampling area is determined, a sufficient number of soil cores taken to acquire a representative sample. This is generally 10 to 20 cores. The depth of sample for surface soils was taken from 0 to 6 inches or as deep as the primary tillage.

Soil samples collected from proposed project stations by using stainless steel soil sampling probe, packed in labeled polythene bags & send for analyze the physicochemical characteristics. The sample so collected is then made representative by coning- quartering and then stored in plastic bags, sealed and then sent to laboratory for analysis.

Figure 3-3 Soil Sample Collection

3.4 GROUND WATER SAMPLING

3.4.1 Reconnaissance Survey:

The villages to the south of airport site use ground water from open/bore well for drinking and other domestic purposes. Ground water gets contaminated due to bad sanitary habits such as washing of utensils, cattle and bathing and location of septic tanks in/near the open wells.

3.4.2 Methodology of Sampling:

Ground water sample is collected by using containers and the sampling container is rinsed before using it for storing water samples. Ground water samples are stored in two separate containers for Physicochemical & Microbiological analysis and preservatives added as recommended by Standard Methods APHA, stored in cold storage box and transferred to the laboratory for the further analysis.

Figure 3-4 Ground Water Sampling

3.5 MARINE WATER, SEDIMENTS & PLANKTON SAMPLING EQUIPMENTS

3.5.1 Reconnaissance Survey:

The site for the project is located in four different micro water sheds – viz Panvel creek, Gadhi river, Kasardi river, Ulwe river. The study area represents complex hydrodynamic system. The Ulwe river flows down through the mountains (to the south) towards the centre of project site and has been diverted/retrained as part of the project. The Gadhi river flows from the East to the West and is partly retrained towards the northern part of the site. The river Gadhi receives sewage from Panvel town and nearby areas. Both the rivers drain into the Panvel creek flowing adjacent to the North of site which drains into the Arabian sea to the west. The Panvel creek also receives treated effluents from CETP at MIDC Taloja and sewage from NMMC STPs in Nerul.

4.5.2 Methodology of Sampling:

4.5.2.1 Niskin Bottle - Marine Water Sampler

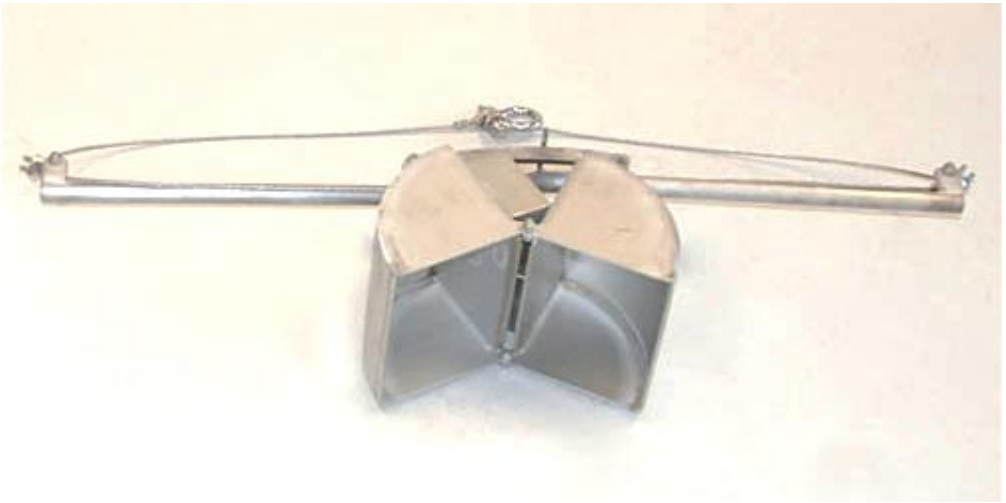
This Water Sampler is used to collect samples at various water depths and can operate at any depth on a cable or line with a messenger.

4.5.2.2 Plankton Net - Biological Samples

This plankton net operates a cable or lined by hand or behind a boat, it can be towed vertically or horizontally. Nets comes in varieties of size (Mesh no 00 equal an aperture of 0.30 inches)

4.5.2.3 Grab Sampler - For Marine Sediments

Sediment grab operate at any depth on a cable or line by free fall (without a messenger). It is extremely heavy and can take samples of hardest rocky ocean bottoms.



Grab Sampler

4.5.2.4 Selection of Stations, Preservation and Transportation of Samples:

Marine water samples were collected from sampling locations in Gadhi River, Ulwe River and Panvel Creek at the locations indicated by NMIAL – in all, 10 samples were collected from 10 sampling locations for physicochemical and Biological samples (Stations 1 to 4 are located in Gadhi River & Station 5 & 8 are Panvel Creek while station 9 Mouth of Panvel Creek and Station 10 in Ulwe River. A good amount of mangrove vegetation was noted on either side of stream 2, 3, 4 and 7. Sampling locations were approached by boats (wherever possible) and collection done irrespective of tide. Sampling was done only for surface water. The samples were preserved and taken to laboratory using vehicle on same day.

3.6 Laboratory Credentials

Sampling and analysis were done by laboratory of Aditya Environmental Services Pvt Ltd located at Plot P-1, MIDC Commercial plots, Mohopada, Tal Panvel, Dist. Raigad.

- Environmental Laboratory is recognized by Ministry of Environment & Forest (MoEFCC), Govt. of India under Environment (Protection) Act, 1986.
- Laboratory is also certified ISO 9001:2015 and OHSAS 18001:2007.
- Laboratory is accredited under ISO/IEC 17025:2005 (vide Certificate No. TC-7085) for water, wastewater and soil parameters
- Environmental sampling conducted by our experienced, qualified environmental staff & Analysis and reporting by approved Government Analyst.
- Instruments used for sampling are from reputed manufacturers & are regularly calibrated.
- Chemicals used are Analytical Reagent grade and from reputed manufacturer.
- Analytical Instrumentation used in the laboratory is regularly calibrated.
- Laboratory has a regular program of Preventive & Annual Maintenance for all critical equipment.
- Ground Water, Soil Analysis - using APHA, BIS, ASTM & CPCB standards Methods for water Analysis.
- Standard Methods Adopted in the laboratory are those prescribed by APHA, BIS, ASTM & CPCB for water, waste & marine water analysis using methods as per NIO (National Institute of Oceanography) Manual.
- Laboratory has CRMs (Certified Reference Material) for heavy metals from reputed manufacturers for heavy metals and Standard Sea water which we use for analysis.
- Laboratory is regularly participating in Proficiency testing with reputed Organizations like Central Pollution Control Board (CPCB), Goa State Pollution Control Board and others as also Intra laboratory QC testing to check performance of our chemists.
- Overall approach & methodology is with Annexure IA Scope of the work & the Best practices as per prevailing norms of Central Pollution Board /Ministry of Environment & Forest etc. /Internationally adopted practices.

4. COMPILATION OF DATA & INFERENCE

4.1 Ambient air quality monitoring report

4.1.1 AAQM Data

Ambient Air Quality was monitored at various locations for relevant parameters as per NAAQS standards published by CPCB in November 2009. Data is compiled and presented below:

Table 4-1: Ambient Air Quality monitoring at various stations during October 2022

Sampling Locations	Owale Village	Pargaon High School	Ulwe Node	Kille Gaothan Guest House	NMIA Project Site	Balaji Office	Panvel	Panchsheel Guest House	Jui Village	Limit #	Unit
Sampling Date	**12.10.2022**			**13.10.2022**			**14.10.2022**				
SO_2	13.6	14.1	17.0	13.9	15.9	16.2	15.9	15.4	14.4	80	µg/m³
NO_X	24.9	24.6	26.7	24.8	25.9	26.0	25.5	25.3	24.2	80	µg/m³
PM_{10}	58.4	60.1	68.9	61.0	65.4	67.4	66.8	62.6	63.8	100	µg/m³
$PM_{2.5}$	19.6	20.8	24.2	20.8	22.1	24.2	24.2	21.3	22.1	60	µg/m³
Ozone (O_3)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	180	µg/m³
Lead (Pb)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	1	µg/m³
CO	0.34	0.36	0.43	0.37	0.40	0.42	0.44	0.39	0.39	4	mg/m³
Benzene (C_6H_6)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	5	µg/m³
Benzopyrene	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	1	ng/m³
Arsenic (As)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	6	ng/m³
Nickel (Ni)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	20	ng/m³
NH_3	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BD (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	BDL (DL-1.0)	400	µg/m³

BDL–Below Detectable Limit (Note # Limits as per National Ambient Air Quality Standards NAAQS,2009)

Results:

Particulate Matter (PM10): A maximum value for PM10 is observed at Ulwe Node as 68.9 µg/m^3 with the minimum value observed at Owale as 58.4 µg/m^3 .

Particulate Matter (PM2.5): A maximum value for PM2.5 is observed at Ulwe Node as 24.2 µg/m^3 with the minimum value observed at Pargaon, Balaji Office and Panvel respectively as 19.6 µg/m^3.

Sulphur Dioxide (SO^2): Maximum value for SO2 is observed at near Panchsheel as 17.0 µg/m^3 with the minimum value observed at Owale village as 13.6 µg/m^3.

Oxides of Nitrogen (NOX): Maximum value for NOx is observed at Ulwe Node as 26.7 µg/m^3 with the minimum value observed at Jui as 24.2 µg/m^3.

Carbon Monoxide (CO): The maximum value for CO is observed at Panvel as 0.44 mg/m^3 with the minimum value observed at Owale as 0.34 mg/m^3.

All above parameters are observed to be in compliance with permissible limits as per NAAQ Standards. Also, parameters such as Ozone (O3), Lead (Pb), Arsenic (As), Nickel (Ni), Ammonia (NH3), Mercury (Hg), Benzo(a)Pyrene (BaP) and Benzene (C6H6) were found to be within the prescribed limits in the month of October 2022.

Table 4-2: Ambient Air Quality monitoring at various stations during November 2022

Sampling Locations	Ulwe Node	Pargaon High School	Owale Village	Kille Gaothan Guest House	NMIA Project site	Balaji Office	Panvel	Panchsheel Guest House	Jui Village	Limit #	Unit
Sampling Date	**14.11.2022**			**15. 11.2022**			**23. 02.2022**				
SO_2	13.6	14.9	10.9	14.9	14.9	17.7	13.6	14.9	14.4	80	µg/m³
NO_X	31.8	31.6	29.3	31.5	34.1	33.3	32.3	30.1	24.2	80	µg/m³
PM_{10}	80.6	82.6	93.4	82.3	85.3	90.4	88.2	87.8	63.8	100	µg/m³
$PM_{2.5}$	41.3	45.4	47.1	39.2	40.8	40.9	34.6	37.9	22.1	60	µg/m³
Ozone (O_3)	9.7	11.4	13.1	14.5	10.9	12.5	8.1	6.7	BDL (DL-1.0)	180	µg/m³
Lead (Pb)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	1	µg/m³
CO	0.72	0.66	0.67	0.78	0.81	0.79	0.66	0.42	0.45	4	mg/m³
Benzene (C_6H_6)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	5	µg/m³
Benzopyrene	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	1	ng/m³
Arsenic (As)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	6	ng/m³
Nickel (Ni)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	20	ng/m³
NH_3	11.6	8.0	6.0	15.2	13.1	14.7	13.8	11.6	BD (DL-1.0)	400	µg/m³

BDL–Below Detectable Limit (Note # Limits as per National Ambient Air Quality Standards NAAQS,2009)

Results:

Particulate Matter (PM10): A maximum value for PM10 is observed at Owale as 93.4 µg/m3 with the minimum value observed at Jui as 63.8 µg/m3 .

Particulate Matter (PM2.5): A maximum value for PM2.5 is observed at Owale as 47.1 µg/m3 with the minimum value observed at Jui as 22.1 µg/m3 in the month of February,2023.

Sulphur Dioxide (SO_2): Maximum value for SO2 is observed at near Balaji Office as 17.7 µg/m3 with the minimum value observed at Owale as 10.9 µg/m3.

Oxides of Nitrogen (NOX): Maximum value for NOx is observed at NMIA project site as 34.1 µg/m3 with the minimum value observed at Jui as 24.2 µg/m3.

Carbon Monoxide (CO): The maximum value for CO is observed at NMIA project site as 0.81 mg/m3 with the minimum value observed at Panchsheel Guest House as 0.42 mg/m3.

Ammonia (NH3): The maximum value for NH3 is observed at Kille Gaothan Guest House as 15.2 μg/m3 with the minimum value observed at Owale as 6.0 μg/m3.

All above parameters are observed to be in compliance with permissible limits as per NAAQ Standards in the month of November 2022. Also, parameters such as Ozone (O3), Lead (Pb), Arsenic (As), Nickel (Ni), Ammonia (NH3), Mercury (Hg), Benzo(a)Pyrene (BaP) and Benzene (C6H6) were found to be within the prescribed limits.

Table 4-3: Ambient Air Quality monitoring at various stations during December 2022

Sampling Locations	Pargaon High School	Ulwe Node	Owale Village	Kille Gaothan Guest House	NMIA Project site	Balaji Office	Panvel	Panchsheel Guest House	Jui	Limit #	Unit
Sampling Date	**12.12.2022**			**13.12.2022**			**14.12.2022**				
SO_2	16.3	16.3	14.9	14.9	13.6	17.7	17.7	19.0	24.5	80	µg/m³
NO_X	32.3	22.5	20.4	15.5	10.5	14.8	36.5	35.8	37.9	80	µg/m³
PM_{10}	70.3	75.1	88.4	88.9	82.5	84.8	87.7	84.6	84.4	100	µg/m³
$PM_{2.5}$	40.8	43.3	46.7	48.3	44.2	47.1	45.8	47.1	47.9	60	µg/m³
Ozone (O_3)	9.7	9.5	9.5	10.3	11.4	9.7	10.6	11.4	11.4	180	µg/m³
Lead (Pb)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	1	µg/m³
CO	0.35	0.35	0.35	0.35	0.35	0.35	0.59	0.47	0.47	4	mg/m³
Benzene (C_6H_6)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	5	µg/m³
Benzopyrene	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	1	ng/m³
Arsenic (As)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	6	ng/m³
Nickel (Ni)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	20	ng/m³
NH_3	18.1	14.0	11.9	10.4	12.0	10.8	15.6	12.4	16.5	400	µg/m³

BDL–Below Detectable Limit (Note # Limits as per National Ambient Air Quality Standards NAAQS,2009)

Results:

Particulate Matter (PM10): A maximum value for PM10 is observed at Kille Gaothan Guest House as 88.9 µg/m³ with the minimum value observed at Pargaon High School as 70.3 µg/m³.

Particulate Matter (PM2.5): A maximum value for PM2.5 is observed at Kille Gaothan Guest House as 48.3 µg/m3 with the minimum value observed at Pargaon High School as 40.8 µg/m3.

Sulphur Dioxide (SO_2): Maximum value for SO2 is observed at Jui as 24.5 µg/m3 with the minimum value observed at tow places Owale and Kille Gaothan Guest House as 14.9 µg/m3.

Oxides of Nitrogen (NOX): Maximum value for NOx is observed at Jui as 37.9 µg/m3 with the minimum value observed at NMIA project site as 10.5 µg/m3.

Carbon Monoxide (CO): The maximum value for CO is observed at Panvel as 0.59 µg/m3 with the minimum value observed at Pargaon High School, Ulwe Node, Owale, Kille Gaothan Guest House, NMIA project site and Balaji Guest House respectively as 0.35 µg/m3.

Ammonia (NH3): The maximum value for NH3 is observed at Paragon High School as 18.1 µg/m3 with the minimum value observed at Kille Gaothan Guest House as 10.4 µg/m3.

All above parameters are observed to be in compliance with permissible limits as per NAAQ Standards in the month of November,2009. Also, parameters such as Ozone (O3), Lead (Pb), Arsenic (As), Nickel (Ni), Ammonia (NH3), Mercury (Hg), Benzo(a)Pyrene (BaP) and Benzene (C6H6) were found to be within the prescribed limits in the month of December 2022.

Table 4-4: Ambient Air Quality monitoring at various stations during February 2023

Sampling Locations	Pargaon High School	Ulwe Node	Owale Village	Kille Gaothan	NMIA Project site	Balaji Office	Panvel	Diwale Koliwada	Jui Village	Limit #	Unit
Sampling Date	**20.02.2023**			**21. 02.2023**			**22. 02.2023**				
SO_2	18.4	18.4	15.6	31.4	26.8	26.8	22.5	23.8	26.8	80	µg/m³
NO_X	33.8	24.0	21.8	46.1	37.8	37.8	31.5	34.5	38.6	80	µg/m³
PM_{10}	70.7	75.3	84.5	81.1	84.3	84.3	89.5	87.4	82.8	100	µg/m³
$PM_{2.5}$	35.8	35.8	40.8	33.8	35.8	35.8	37.1	35.4	3.8	60	µg/m³
Ozone (O_3)	10.6	10.0	9.7	8.6	9.5	9.5	8.6	8.6	9.7	180	µg/m³
Lead (Pb)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	1	µg/m³
CO	0.75	0.50	0.40	0.70	0.70	0.70	0.85	0.80	0.50	4	mg/m³
Benzene (C_6H_6)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	5	µg/m³
Benzopyrene	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	1	ng/m³
Arsenic (As)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	6	ng/m³
Nickel (Ni)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	20	ng/m³
NH_3	20.6	16.0	13.4	49.7	43.2	43.2	21.6	18.8	25.96	400	µg/m³

BDL–Below Detectable Limit (Note # Limits as per National Ambient Air Quality Standards NAAQS,2009)

Results:

Particulate Matter (PM10): A maximum value for PM10 is observed at Panvel as 89.5 µg/m³ with the minimum value observed at Pargaon High School as 70.7 µg/m³.

Particulate Matter (PM2.5): A maximum value for PM2.5 is observed at Owale as 40.8 µg/m³ with the minimum value observed at Jui as 3.8 µg/m³.

Sulphur Dioxide (SO2): Maximum value for SO2 is observed at Kille Gaothan 31.4 µg/m³ with the minimum value observed at Owale as 15.6 µg/m3.

Oxides of Nitrogen (NOX): Maximum value for NOx is observed at Kille Gaothan as 46.1 µg/m³ with the minimum value observed at Owale as 21.8 µg/m³.

Carbon Monoxide (CO): The maximum value for CO is observed at Panvel as 0.85 mg/m³ with the minimum value observed at Owale as 0.40 mg/m³.

Ammonia (NH3): The maximum value for NH3 is observed at Kille Gaothan Guest House as 49.7 µg/m3 with the minimum value observed at Owale as 13.4 µg/m3.

All above parameters are observed to be in compliance with permissible limits as per NAAQ Standards November,2009. Also, parameters such as Ozone (O3), Lead (Pb), Arsenic (As), Nickel (Ni), Ammonia (NH3), Mercury (Hg), Benzo(a)Pyrene (BaP) and Benzene (C6H6) were found to be within the prescribed limits in the month of February 2023.

Table 4-5: Ambient Air Quality monitoring at various stations during March 2023

Sampling Locations	Pargaon High School	Ulwe Node	Owale Village	Kille Gaothan Guest House	NMIA Project site	Balaji Office	Panvel	Diwale Koliwada	Jui Village	Limit #	Unit
Sampling Date	**13.03.2023**			**14.03.2023**			**15.03.2023**				
SO_2	23.0	18.4	21.47	19.2	27.6	25.3	28.4	22.2	26.1	80	µg/m³
NO_X	36.0	30.8	32.3	36.0	39.8	38.0	43.5	39.0	42.8	80	µg/m³
PM_{10}	144.3	1140.6	429.58	435.0	306.3	338.8	452.0	153.2	851.4	100	µg/m³
$PM_{2.5}$	35.0	185.83	99.6	75.8	81.6	71.7	57.1	47.9	266.3	60	µg/m³
Ozone (O_3)	9.9	8.0	9.6	9.6	8.5	BDL (DL-1.0)	10.7	10.43	9.6	180	µg/m³
Lead (Pb)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	BDL (DL-0.8)	1	µg/m³
CO	0.42	0.46	0.46	0.67	0.79	0.80	0.80	0.44	0.96	4	mg/m³
Benzene (C_6H_6)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	BDL (DL-0.2)	5	µg/m³
Benzopyrene	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	BDL (DL-0.5)	1	ng/m³
Arsenic (As)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	BDL (DL-0.1)	6	ng/m³
Nickel (Ni)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	BDL (DL-0.3)	20	ng/m³
NH_3	28.2	23.0	25.6	26.3	26.0	27.5	30.1	27.5	28.6	400	µg/m³

BDL–Below Detectable Limit (Note # Limits as per National Ambient Air Quality Standards NAAQS,2009)

Results:

Particulate Matter (PM10): A maximum value for PM10 is observed at Ulwe Node, as 1140.0 µg/m³ with the minimum value observed at Kille Gavthan (AAQ-5), as 306 µg/m³. Particulate matter exceeds the limits of NAAQS, due to other construction activities in near vicinity.

Particulate Matter (PM2.5): A maximum value for PM2.5 is observed at Ulwe Node, as 185.8 µg/m³ (Exceeds NAAQS limits) with the minimum value observed at Pargaon High School as 35.0 µg/m³.

Sulphur Dioxide (SO2): Maximum value for SO2 is observed at Panvel as 28.4 μg/m^3 with the minimum value observed at Ulwe Node 18.4 μg/m^3.
Oxides of Nitrogen (NOX): Maximum value for NOx is observed at Panvel as 43.5 μg/m^3 with the minimum value observed at Ulwe Node as 30.8 μg/m^3.
Carbon Monoxide (CO): The maximum value for CO is observed at Jui as 0.96 mg/m^3 with the minimum value observed at Pargaon High School as 0.42 mg/m^3.
Ammonia (NH3): The maximum value for NH3 is observed at Panvel as 30.1 μg/m3 with the minimum value observed at Ulwe Node as 23.0 μg/m3.

All above parameters except PM10 and PM2.5 are observed to be in compliance with permissible limits as per NAAQ Standards in the month of March 2023. Also, parameters such as Ozone (O3), Lead (Pb), Arsenic (As), Nickel (Ni), Ammonia (NH3), Mercury (Hg), Benzo(a)Pyrene (BaP) and Benzene (C6H6) were found to be within the prescribed limits in the month of March 2023. Exceedance in the particulate matter level is due to increase in traffic and other developmental activities in the areas. This is also due to regional weather conditions influence by stagnation on the Arabian Sea, due to which background concentration of particulate matter all over MMRDA region was very high.

4.1.2 Inference of AAQM Data

The concentration of Particulate Matter – 10 µ (PM_{10}) was observed in range of 58.4 – 1140.6 µg/m^3 and level of Particulate Matter - 2.5 µ (PM 2.5) were noted ranged from 3.8 to 266.3 µg/m^3.PM10 exceeds NAAQS limit at all locations during March 2023 and at Pargaon High school, Panvel and Diwale Koliwada PM 2.5 is under NAAQS limits at other places in exceed NAAQS Limits during March 2023. Gaseous pollutants - Nitrogen Oxide, Sulfur Dioxide, Carbon Monoxide and Ammonia are under NAAQS norms during collection period during October 2022 to March 2023 (Refer Tables 4.1 to 4.5 above) Lead, Ozone, Benzene (C_6H_6), Benzopyrene , Arsenic, Nickel were found below detectable level.

4.2 AMBIENT NOISE LEVEL MONITORING REPORT

4.2.1 Noise Level Data

Ambient Noise level was monitored over 24 hours' duration for Day and Nighttime as per Schedule - II of Environmental Protection Act 1986 for Industrial, Commercial, Residential and Sensitive Area (Refer Table 3.3).

Results of analysis are compiled below:

Table 4-6: Ambient Noise Level monitoring during October 2022 to March 2023

Stn Code	Sampling Location	Sampling Date	Observed Value (Leq) (dB(A))						Limiting Standard (Leq) as per EP Act Schedule II. dB(A)	
			Day Time			Nighttime				
			Max	Min	Avg	Max	Min	Avg	Day Time	Nighttime
N1	Owale	12.10.2022	59.1	49.9	54.2	53.4	52.4	52.8	55	45
N2	Pargaon		67.0	57.7	60.8	58.5	57.7	58.0	55	45
N3	Ulwe Node		67.8	58.8	63.6	60.9	58.4	59.1	65	55
N4	NMIA Project site	13.10.2022	68.5	53.1	55.7	52.9	51.6	52.2	65	55
N5	Kombadbhuje (Balaji Site Office)		81.5	76.2	77.1	76.1	76.7	76.3	65	55
N6	Kille Gaothan		73.2	62.2	63.7	62.8	62.2	62.5	55	45
N7	Panchsheel	14.10.2022	69.1	57.2	59.9	58.8	58.0	58.4	55	45
N8	Jui		61.8	55.8	57.8	57.2	55.7	56.6	55	45
N9	Panvel		65.6	57.0	60.3	61.5	52.6	56.2	65	55
N10	Vadghar		71.2	51.9	66.5	68.0	66.3	67.1	55	45
N11	Bhangarpada		72.4	59.5	66.2	68.8	62.8	67.0	55	45
N1	Owale	14.11.2022	57.9	48.3	55.2	54.6	48.3	50.5	55	45
N2	Pargaon		54.1	55.9	54.9	55.3	57.1	56.1	55	45
N3	Ulwe Node		46.8	60.2	51.4	44.6	47.9	45.9	65	55
N10	Vadghar		64.5	55.3	62.4	52.1	57.2	53.9	55	45
N4	NMIA Project site	15.11.2022	60.3	56.1	59.0	60.6	59.6	60.3	65	55
N5	Kombadbhuje (Balaji Site Office)		63.7	57.7	59.1	62.4	57.3	58.9	65	55
N6	Kille Gaothan		72.6	60.7	65.4	61.0	61.7	61.4	55	45
N11	Bhangarpada		70.3	73.1	71.6	70.6	71.4	70.9	55	45
N9	Panvel	16.11.2022	70.6	52.9	61.2	53.0	58.1	54.8	65	55
N7	Panchsheel		58.0	55.8	56.5	56.8	58.0	57.3	55	45
N8	Jui		66.4	37.6	54.1	45.2	37.6	39.6	55	45
N1	Owale	12.12.2022	59.1	35.6	47.2	38.1	35.0	36.3	55	45
N2	Pargaon		56.7	47.9	51.0	47.8	48.9	48.1	55	45

Stn Code	Sampling Location	Sampling Date	Observed Value (Leq) (dB(A))						Limiting Standard (Leq) as per EP Act Schedule II. dB(A)	
			Day Time			Nighttime				
			Max	Min	Avg	Max	Min	Avg	Day Time	Nighttime
N3	Ulwe Node		76.8	58.1	62.4	60.4	58.1	59.6	65	55
N10	Vadghar		63.9	53.1	60.6	55.3	49.1	52.8	55	45
N4	NMIA Project site	13.12.2022	58.7	46.2	54.3	55.5	53.9	54.8	55	45
N5	Kombadbhuje (Balaji Site Office)		63.4	54.2	59.5	59.3	59.3	55.8	65	55
N6	Kille Gaothan		62.0	58.2	59.4	62.2	57.7	59.6	55	45
N11	Bhangarpada		72.8	68.3	70.8	71.3	69.3	70.3	55	45
N7	Panchsheel	14.12.2022	64.9	53.2	54.9	55.0	54.3	54.5	55	45
N8	Jui		63.1	38.1	54.9	49.3	38.6	43.2	55	45
N9	Panvel		66.3	52.1	60.0	56.9	48.6	52.3	65	55
N1	Owale	20.02.2023	62.7	55.2	57.5	55.3	54.6	54.9	55	45
N2	Pargaon		69.2	57.7	62.8	58.9	57.0	57.8	55	45
N3	Ulwe Node		71.1	62.4	67.7	68.3	66.4	67.3	65	55
N10	Karanjade		60.8	48.3	56.3	53.3	45.7	50.2	55	45
N4	NMIA Project site	21. 02.2023	72.4	64.3	68.2	68.0	64.3	65.5	65	55
N5	Kombadbhuje (Balaji Site Office)		62.3	52.5	57.8	56.8	52.4	55.3	65	55
N6	Kille Gaothan		61.5	56.0	58.0	58.5	55.7	56.5	55	45
N7	Diwale Koliwada	22. 02.2023	54.9	46.2	50.7	49.2	46.2	47.8	65	55
N8	Jui		63.6	54.2	59.4	63.9	62.6	63.3	55	45
N9	Panvel		59.9	47.2	55.7	53.6	50.6	52.6	55	45
N1	Owale	13.03.2023	68.1	55.4	62.9	62.5	61.7	62.2	55	45
N2	Pargaon		60.8	52.7	58.4	55.6	50.5	52.6	55	45
N3	Ulwe Node		70.1	65.6	67.9	67.0	65.7	66.3	65	55
N10	Karanjade		67.8	57.6	61.3	62.9	56.7	57.9	55	45
N4	NMIA Project site	14.03.2023	64.5	59.3	61.3	66.5	60.2	63.6	65	55
N5	Kombadbhuje (Balaji Site Office)		76.3	61.2	67.5	76.5	65.7	74.3	65	55
N6	Kille Gaothan		61.1	44.7	51.0	57.5	43.1	49.0	55	45
N7	Diwale Koliwada	15. 03.2023	73.8	54.0	61.9	67.3	49.9	57.6	55	45
N8	Jui		70.2	48.4	59.8	54.5	41.5	46.3	55	45
N9	Panvel		62.9	49.2	59.1	61.1	49.2	56.9	55	45

4.2.2 Inference of Noise Data

During daytime, the average Noise level was observed in the range of 47.2 -77.1 dB(A) & Nighttime levels were observed at 36.3 – 76.3 dB(A) during sampling period. Following observations are made about average Noise levels in the monitoring carried out in different months:

- In October 2022 average Noise level exceeded the EP Act Standards during nighttime (52.8, 59.1 and 56.2 dBA) at Owale, Ulwe Node and Pavel respectively. During daytime (60.8, 77.1, 63.7, 59.9, 57.8, 66.5 and 66.2) and nighttime (58.0, 76.3, 62.5, 58.4, 56.6, 56.2, 67.1 and 67.0 dBA) at Pargaon, Balaji site Office, Kille Gaothan, Panchsheel, Jui, Vadghar and Bhangarpada respectively average noise level exceeds due to high vehicular movement.

- In November 2022 average Noise level exceeds during nighttime (56.1 dBA) only Pargaon. During daytime (55.2, 62.4, 59, 62.4, 59, 65.4, 71.6 and 56.5 dBA) and nighttime (50.5, 53.9, 60.3, 58.9, 61.4, 70.9,

and 57.3 dBA) at Owale, Vadghar, NMIA project site, Kille Gaothan, Bhangarpada and Panchsheel respectively, average noise level exceeds EP act standards due to vehicular movement.

- In December 2022 average Noise level exceeded during nighttime (48.1, 59.6, 55.8, 54.5 dBA) at Pargaon, Ulwe Node, Kombadbhuje and Panchsheel. During daytime (60.6, 59.4 and 70.8 dBA) and nighttime (52.8, 59.6 and 70.3 dBA) at Vadghar, Kille Gaothan and Bhangarpada respectively, average noise level exceeds EP act standards. This is due to high vehicular movement.

- In February 2023 average Noise level exceeded during nighttime (55.3 and 56.3 dBA) at Balaji site office and Kille Gaothan respectively. During daytime and nighttime at other places the average noise level exceeds limits of NAAQS standards due to high vehicular movement.

- In March 2023 average Noise level exceeds the EP Act Standards during nighttime (63.6 and 49.0 dBA) at NMIA project site and Kille Gaothan respectively. During day and as well as nighttime at other locations average noise levels were higher than NAAQS limits due to high vehicular movement.

4.3 SOIL QUALITY MONITORING REPORT

4.3.1 Soil Analysis Data (November 2022 and March 2023)

Data on soil analysis is compiled and presented below for the sampling period:

Table 4-7: Quarterly Soil analysis of various stations in study area during November 2022 (Oct – Dec 2022)

Sr. No.	Locations		Pargaon	Chinchpada	Koli	Kopar	Ulwe	NMIA Project site	Kombadbhuje	Owale	Unit
	Sampling Date		17.11.2022								
1.	pH		6.78	6.91	7.12	7.15	6.95	6.94	7.12	6.92	--
2.	Texture	Clay	74	78	78	74	72	78	78	74	%
		Silt	16	12	12	12	14	11	10	12	
		Fine Sand	10	10	10	14	14	11	12	14	
3.	Conductivity		312.5	248.5	324.5	324.5	301.5	288.5	420.5	324.5	µS/cm
4.	Organic Carbon		0.28	0.24	0.24	0.28	0.32	0.24	0.32	0.28	%
5.	Available Nitrogen		0.0084	0.0098	0.0078	0.0078	0.0102	0.0082	0.0112	0.0102	%
6.	Available Phosphorus		52	62	50	52	62	50	54	64	kg/ha
7.	Available Potassium		80	80	80	80	90	80	90	70	kg/ha
8.	Chloride		44	52	46	52	52	34	48	48	mg/kg
9.	Sulphate as SO_4		38	30	36	48	42	42	32	38	mg/kg
10.	Calcium as Ca		34	34	32	34	38	32	38	32	meq/l
11.	Magnesium as Mg		12	12	12	12	16	12	16	12	meq/l
12.	Sodium as Na		90	80	80	80	80	90	90	80	kg/ha
13.	Manganese as Mn		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
14.	Copper as Cu		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
15.	Cadmium as Cd		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
16.	Cobalt as Co		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
17.	Zinc as Zn		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
18.	Nickel as Ni		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
19.	Aluminium as Al		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
20.	Arsenic as As		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
21.	Mercury as Hg		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
22.	Chromium as Cr		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
23.	Iron as Fe		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
24.	Lead as Pb		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg

4.3.2 Soil Data Inference during November 2022:

It has been observed that the pH of the soil ranged from 6.78 to 7.15 indicating that the soils are Neutral in nature. The soil in the study area is mostly clay. The electrical conductivity was observed to be in the range of 248.5 to 420.5 µS/cm.

The nitrogen concentrations are in the range of 0.0082 % to 0.0112%. The phosphorous concentrations are in the range of 50 kg/ha to 64 kg/ha indicating that soils have less to on an average sufficient quantities of phosphorus.

The potassium concentrations range between 70 kg/ha to 90 kg/ha, which indicate that the soils have very less quantity of potassium.

Table 4-8: Quarterly Soil analysis of various stations in study area during March 2023 (Jan – Mar 2023)

Sr. No.	Locations / Sampling Date		Pargaon	Chinchpada	Koli	Kopar	Ulwe	NMIA project site	Kombadbhuje	Owale	Unit
			16.03.2023								
1.	pH		7.25	5.87	5.98	6.71	7.31	6.50	7.23	7.35	--
2.	Texture	Clay	79	77	70	69	67	74	80	79	%
		Silt	10	10	12	14	15	18	8	10	
		Fine Sand	11	13	18	17	18	8	12	11	
3.	Conductivity		195.9	754.3	615.5	76.28	297.9	40.03	1887	1350	µS/cm
4.	Organic Carbon		0.98	1.55	2.34	0.583	1.38	1.09	1.23	0.95	%
5.	Available Nitrogen		0.0063	0.0072	0.0206	0.0064	0.0052	0.0088	0.0057	0.0035	%
6.	Available Phosphorus		29.3	12	216.3	10.52	49.6	11	316.9	50	kg/ha
7.	Available Potassium		60	80	80	70	90	70	80	60	kg/ha
8.	Chloride		10	17.2	5.8	10	10	10	10	10	mg/kg
9.	Sulphate as SO_4		34	52	42	32	32	42	30	38	mg/kg
10.	Calcium as Ca		15.8	31	37	32	26.1	22.6	30.7	15.9	meq/l
11.	Magnesium as Mg		29.8	28	33	14	11.5	8.3	1.4	7.9	meq/l
12.	Sodium as Na		90	113	30	40	60	70	50	90	kg/ha
13.	Manganese as Mn		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
14.	Copper as Cu		<0.04	1.68	<0.04	<0.04	0.84	<0.04	0.37	0.04	mg/kg
15.	Cadmium as Cd		0.08	<0.04	<0.04	<0.04	0.75	<0.04	0.77	0.29	mg/kg
16.	Cobalt as Co		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
17.	Zinc as Zn		0.08	1.68	0.13	<0.04	0.85	0.15	2.17	0.39	mg/kg
18.	Nickel as Ni		0.65	1.88	0.46	0.08	0.84	<0.04	0.55	0.27	mg/kg
19.	Aluminium as Al		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
20.	Arsenic as As		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
21.	Mercury as Hg		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg
22.	Chromium as Cr		<0.04	0.08	<0.04	<0.04	0.08	<0.04	<0.04	<0.04	mg/kg
23.	Iron as Fe		<0.04	0.24	<0.04	<0.04	0.12	<0.04	0.14	<0.04	mg/kg
24.	Lead as Pb		0.82	0.61	0.17	0.61	1.04	<0.04	0.50	<0.04	mg/kg

4.3.3 Soil Data Inference during March 2023:

It has been observed that the pH of the soil ranged from 5.87 to 7.31 indicating that the soils are Moderately acidic to Neutral. The soil in the study area is mostly clay. The electrical conductivity was observed to be in the range of 40.03 to 1887 µS/cm.
The nitrogen concentrations are in the range of 0.0035% to 0.0206%. The phosphorous concentrations are in the range of 11 kg/ha to 316.9 kg/ha indicating that soil at Chinchpada and NMIA project site has very less phosphorus. Medium phosphorus at Ulwe and Owale, better at Koli and more than sufficient at Kombadbhuje. The potassium concentrations range between 60 kg/ha to 90 kg/ha, which indicate that the soils have very less quantity of potassium.

4.4 GROUND WATER QUALITY ANALYSIS REPORT

4.4.1 GW Analysis Data during October 2022

Ground water samples were collected in October 2022. Owale was selected as new location as access to Vaghivali was not possible during collection time.

Table 4-9: Ground water analysis at various stations during October 2022

Sr. No.	Sampling Locations	Ulwe	Dapoli	Kille Gaothan	Jui	Panvel
	Sampling month	**12.10.2022**				
1.	Colour, Hazen	5.0	5.0	5.0	5.0	5.0
2.	pH@ 25°C	6.98	6.82	7.28	7.41	7.28
3.	Turbidity, NTU	<2.4	2.2	2.2	2	2.1
4.	TDS, mg/l	200	240	220	270	250
5.	NH3(as N), mg/l	< 0.56	< 0.56	< 0.56	< 0.56	< 0.56
6.	Boron, mg/l	<0.05	<0.05	0.05	0.05	0.05
7.	Calcium as Ca, mg/l	30.5	28	32	48.1	46.5
8.	Chlorides, mg/l	44	52	48	54	58
9.	Fluoride, mg/l	0.32	0.32	0.32	0.34	0.34
10.	Free Res Cl_2, mg/l	0.56	0.58	0.56	0.56	0.60
11.	Iron, mg/l	0.032	0.032	0.032	0.032	0.034
12.	Magnesium as Mg, g/l	5.8	4.8	12	12	3.8
13.	Sulphate, mg/l	40	44	48	64	54
14.	Alkalinity, mg/l	104	118	120	150	128
15.	Hardness, mg/l	100	90	130	162	132
16.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17.	Aluminum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
18.	Detergents, mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
19.	Barium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
20.	Chloramines, mg/l	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
21.	Copper, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22.	Manganese, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23.	Mineral oil, mg/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
24.	Nitrate, mg/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
25.	Phenolic comp, mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
26.	Selenium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
27.	Silver, mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28.	Sulphide, mg/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
29.	Zinc, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30.	Cadmium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31.	Cyanide, mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
32.	Lead, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
33.	Mercury, mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
34.	Molybdenum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
35.	Nickel, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
36.	PCB, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
37.	PAH, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
38.	Arsenic, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Sr. No.	Sampling Locations	Ulwe	Dapoli	Kille Gaothan	Jui	Panvel
	Sampling month	**12.10.2022**				
39.	Chromium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
40.	Alachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
41.	Atrazine, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
42.	Aldrin, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
43.	Alpha HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
44.	Beta HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
45.	Butachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
46.	Chlorpyriphos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
47.	Delta HCH, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
48.	2,4 Dichloro PAA, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
49.	DDT, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
50.	Endosulphan, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
51.	Ethion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
52.	Lindane, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
53.	Isoproturon, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
54.	Malathion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
55.	Methyl parathion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
56.	Monocrotophos , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
57.	Phorate, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Microbiology						
58.	Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600
59.	E. Coli/100 ml	Present	Present	Present	Present	Present

4.4.2 GW Analysis Inference:

The analysis results indicate the pH range of 6.82 to 7.28 and is observed to be within the desirable limit of 6.5 to 8.5, beyond this range water will affect the mucous membrane and/or water supply system. The total hardness is in the range of 200 to 2270 mg/l, and is observed to be within the permissible limit of 600 mg/l at all five locations. The total hardness beyond the permissible limit causes encrustation in water supply structure and adverse effects on domestic use. The iron concentration is found to be in the range of 0.032 to 0.034 mg/l for all the five samples and is observed to be within the desirable limit of 1.0 mg/l at all locations. Beyond the desirable limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.

The chlorides concentration is in the range of 44 mg/l to 58 mg/l, and is observed to be within the desirable limit of 250 mg/l at all five locations. Beyond this limit, taste, corrosion and palatability are affected. The fluoride concentration is 0.32 to 0.34 mg/l, and is observed to be within the desirable limit of 1.5 mg/l at all locations, high fluoride may cause fluorosis. The TDS are in the range of 200 to 270 mg/l, and is observed to be within the desirable limit of 500 mg/l at all five locations and are also within the permissible limit of 2000 mg/l.

The ground water samples collected from five locations and are analyzed for physical, chemical and biological parameters. The chemical and physical characteristics of the analyzed ground water samples shows that the samples are potable as per IS 10500-2012. The biological characteristics of the analyzed ground water samples shows that the samples are not potable as per IS 10500-2012.

4.4. 3 GW Analysis Data during November 2022

Ground water samples were collected in November 2022. Access was not available to predefined locations; hence sampling was done at nearby and other locations within study area.

Table 4-10: Ground water analysis at various stations during November 2022

Sr. No.	Sampling Locations	Pargaon	Owale	Chinchpada	Kombadbhuje	Ulwe
	Sampling month	**14.11.2022**				
1.	Colour, Hazen	5.0	5.0	5.0	5.0	5.0
2.	pH@ 25°C	7.64	7.73	7.64	7.21	7.8
3.	Turbidity, NTU	2.3	2.2	2.3	2.0	2.1
4.	TDS, mg/l	180	390	180	320	270
5.	NH3(as N), mg/l	<0.56	<0.56	<0.56	<0.56	< 0.56
6.	Boron, mg/l	<0.05	< 0.05	<0.05	<0.05	0.05
7.	Calcium as Ca, mg/l	28	58	28	42	38
8.	Chlorides, mg/l	34	80	34	58	52
9.	Fluoride, mg/l	0.32	0.32	0.32	0.34	0.32
10.	Free ResCl2, mg/l	0.56	0.56	0.56	0.58	0.56
11.	Iron, mg/l	0.42	0.32	0.42	0.34	0.32
12.	Magnesium as Mg, g/l	17	32	17	38	22
13.	Sulphate, mg/l	24	64	24	52	48
14.	Alkalinity, mg/l	150	280	150	260	200
15.	Hardness, mg/l	142	278	142	262	190
16.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17.	Aluminum, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
18.	Detergents, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
19.	Barium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
20.	Chloramines, mg/l	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
21.	Copper, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22.	Manganese, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23.	Mineral oil, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
24.	Nitrate, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
25.	Phenolic comp, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
26.	Selenium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Silver, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
28.	Sulphide, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
29.	Zinc, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30.	Cadmium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31.	Cyanide, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
32.	Lead, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
33.	Mercury, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
34.	Molybdenum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
35.	Nickel, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
36.	PCB, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
37.	PAH, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
38.	Arsenic, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
39.	Chromium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
40.	Alachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
41.	Atrazine, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
42.	Aldrin, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
43.	Alpha HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
44.	Beta HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Sr. No.	Sampling Locations	Pargaon	Owale	Chinchpada	Kombadbhuje	Ulwe
	Sampling month	14.11.2022				
45.	Butachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
46.	Chlorpyriphos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
47.	Delta HCH, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
48.	2,4 Dichloro PAA, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
49.	DDT, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
50.	Endosulphan, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
51.	Ethion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
52.	Lindane, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
53.	Isoproturon, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
54.	Malathion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
55.	Methyl parathion, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
56.	Monocrotophos , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
57.	Phorate, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Microbiology						
58.	Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600
59.	E coli	Present	Present	Present	Present	Present

4.4.4 GW Analysis Inference:

The analysis results indicate the pH range of 7.21 to 7.73 and is observed to be within the desirable limit of 6.5 to 8.5, beyond this range water will affect the mucous membrane and/or water supply system. The total hardness is in the range of 142 to 278 mg/l, and is observed to be within the permissible limit of 600 mg/l at all five locations. The total hardness beyond the permissible limit causes encrustation in water supply structure and adverse effects on domestic use. The iron concentration is found to be in the range of 0.32 to 0.42 mg/l, and is observed to be within the desirable limit of 1.0 mg/l at all locations. Beyond the desirable limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.

The chlorides concentration is in the range of 34 mg/l to 80 mg/l, and is observed to be within the desirable limit of 250 mg/l at all five locations. Beyond this limit, taste, corrosion and palatability are affected. The fluoride concentration is 0.32 to 0.34 mg/l, and is observed to be within the desirable limit of 1.5 mg/l at all locations, high fluoride may cause fluorosis. The TDS are in the range of 180 to 390 mg/l, and is observed to be within the desirable limit of 500 mg/l at all five locations and are also within the permissible limit of 2000 mg/l.

The ground water samples collected from five locations and are analyzed for physical, chemical and biological parameters. The chemical and physical characteristics of the analyzed ground water samples shows that the samples are potable as per IS 10500-2012. The biological characteristics of the analyzed ground water samples shows that the samples are not potable as per IS 10500- 2012.

4.4.5 GW Analysis Data during December 2022

Ground water samples were collected in December 2022.

Table 4-11: Ground water analysis at various stations during December 2022

Sr. No.	Sampling Locations	Kille Gaothan	Ulwe	Dapoli	Jui	Panvel
	Sampling month	12.12.2022				
1.	Colour, Hazen	5.0	5.0	5.0	5.0	5.0
2.	pH@ 25°C	7.28	7.08	6.82	7.31	7.22
3.	Turbidity, NTU	2	<2	2	2.2	2.1
4.	TDS, mg/l	230	210	240	270	250
5.	NH3(as N), mg/l	<0.56	<0.56	<0.56	<0.56	<0.56
6.	Boron, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
7.	Calcium as Ca, mg/l	34.4	32	30	46	46
8.	Chlorides, mg/l	51	46	48	52	56
9.	Fluoride, mg/l	0.30	0.30	0.32	0.34	0.32
10.	Free ResCl2, mg/l	0.56	0.56	0.60	0.56	0.62
11.	Iron, mg/l	0.32	0.32	0.034	0.032	0.04
12.	Magnesium as Mg, g/l	10.5	4.3	4.3	10.08	2.8
13.	Sulphate, mg/l	48	42	44	70	54
14.	Alkalinity, mg/l	128	100	114	150	122
15.	Hardness, mg/l	130	98	92	158	128
16.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17.	Aluminum, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
18.	Detergents, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
19.	Barium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
20.	Chloramines, mg/l	< 2.0	<2.0	< 2.0	< 2.0	< 2.0
21.	Copper, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22.	Manganese, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23.	Mineral oil, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
24.	Nitrate, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
25.	Phenolic comp, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
26.	Selenium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Silver, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
28.	Sulphide, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
29.	Zinc, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30.	Cadmium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31.	Cyanide, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
32.	Lead, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
33.	Mercury, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
34.	Molybdenum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
35.	Nickel, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
36.	PCB, mg/l	< 0.01	< 0.0001	< 0.01	< 0.01	< 0.01
37.	PAH, mg/l	< 0.01	< 0.0001	< 0.01	< 0.01	< 0.01
38.	Arsenic, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
39.	Chromium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
40.	Alachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Sr. No.	Sampling Locations	Kille Gaothan	Ulwe	Dapoli	Jui	Panvel
	Sampling month	**12.12.2022**				
41.	Atrazine, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
42.	Aldrin, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
43.	Alpha HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
44.	Beta HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
45.	Butachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
46.	Chlorpyriphos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
47.	Delta HCH, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
48.	2,4 Dichloro PAA,µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
49.	DDT, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
50.	Endosulphan, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
51.	Ethion , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
52.	Lindane , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
53.	Isoproturon, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
54.	Malathion , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
55.	Methyl parathion, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
56.	Monocrotophos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
57.	Phorate, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
58.	Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600
59.	E coli	Present	Present	Present	Present	Present

4.4.6 GW Analysis Inference:

The analysis results indicate the pH range of 6.82 to 7.31 and is observed to be within the desirable limit of 6.5 to 8.5, beyond this range water will affect the mucous membrane and/or water supply system. The total hardness is in the range of 92 to 158 mg/l, and is observed to be within the permissible limit of 600 mg/l at all five locations. The total hardness beyond the permissible limit causes encrustation in water supply structure and adverse effects on domestic use. The iron concentration is found to be in the range of 0.04 to 0.34 mg/l for all the 5 samples, and is observed to be within the desirable limit of 1.0 mg/l at all locations. Beyond the desirable limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.

The chlorides concentration is in the range of 46 mg/l to 56 mg/l, and is observed to be within the desirable limit of 250 mg/l at all five locations. Beyond this limit, taste, corrosion and palatability are affected. The fluoride concentration is 0.30 to 0.34 mg/l, and is observed to be within the desirable limit of 1.5 mg/l at all locations, high fluoride may cause fluorosis. The TDS are in the range of 210 to 250 mg/l, and is observed to be within the desirable limit of 500 mg/l at all four locations and are also within the permissible limit of 2000 mg/l.

The ground water samples collected from five locations and are analyzed for physical, chemical and biological parameters. The chemical and physical characteristics of the analyzed ground water samples shows that the samples are potable as per IS 10500-2012. The biological characteristics of the analyzed ground water samples shows that the samples are not potable as per IS 10500- 2012.

4.4.7 GW Analysis Data during February 2023

Ground water samples were collected in February 2023. No access was available to Kopar, Koli, Chinchpada, Pargaon during collection period, hence sampling was done in nearby and other villages within study area.

Table 4-12: Ground water analysis at various stations during February 2023

Sr. No.	Sampling Locations	Panvel	Dapoli	Ulwe	Kille Gaothan	Jui
	Sampling month	20.02.2023				
1.	Colour, Hazen	5.0	5.0	5.0	5.0	5.0
2.	pH@ 25°C	7.06	6.92	7.25	7.12	6.86
3.	Turbidity, NTU	2.8	2.6	<2.0	2.8	2.2
4.	TDS, mg/l	260	280	240	260	250
5.	NH3(as N), mg/l	<0.56	< 0.56	< 0.56	< 0.56	< 0.56
6.	Boron, mg/l	<0.05	< 0.05	<0.05	<0.05	< 0.05
7.	Calcium as Ca, mg/l	36	36	34.4	38.4	40
8.	Chlorides, mg/l	48	56	50	58	54
9.	Fluoride, mg/l	0.32	0.32	0.32	0.36	0.32
10.	Free ResCl2, mg/l	0.56	0.64	0.56	0.56	0.56
11.	Iron, mg/l	0.04	0.034	0.033	0.034	0.033
12.	Magnesium as Mg, g/l	5.8	10.1	6.72	12.96	8.64
13.	Sulphate, mg/l	50	50	44	54	64
14.	Alkalinity, mg/l	120	128	102	138	140
15.	Hardness, mg/l	114	132	114	150	136
16.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17.	Aluminum, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
18.	Detergents, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
19.	Barium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
20.	Chloramines, mg/l	< 2.0	< 2.0	<2.0	< 2.0	< 2.0
21.	Copper, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22.	Manganese, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23.	Mineral oil, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
24.	Nitrate, mg/l	0.5	<0.5	<0.5	<0.5	<0.5
25.	Phenolic comp, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
26.	Selenium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Silver, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
28.	Sulphide, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
29.	Zinc, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30.	Cadmium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31.	Cyanide, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
32.	Lead, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
33.	Mercury, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
34.	Molybdenum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
35.	Nickel, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
36.	PCB, mg/l	< 0.01	< 0.01	< 0.0001	< 0.01	< 0.01
37.	PAH, mg/l	< 0.01	< 0.01	< 0.0001	< 0.01	< 0.01
38.	Arsenic, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
39.	Chromium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
40.	Alachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
41.	Atrazine, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Sr. No.	Sampling Locations	Panvel	Dapoli	Ulwe	Kille Gaothan	Jui
	Sampling month	**20.02.2023**				
42.	Aldrin, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
43.	Alpha HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
44.	Beta HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
45.	Butachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
46.	Chlorpyriphos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
47.	Delta HCH, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
48.	2,4 Dichloro PAA, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
49.	DDT, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
50.	Endosulphan, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
51.	Ethion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
52.	Lindane, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
53.	Isoproturon, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
54.	Malathion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
55.	Methyl parathion, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
56.	Monocrotophos , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
57.	Phorate, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Microbiology						
58.	Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600
59.	E coli	Present	Present	Present	Present	Present

4.4.8 GW Analysis Inference:

The analysis results indicate the pH range of 6.86 to 7.25 and is observed to be within the desirable limit of 6.5 to 8.5, beyond this range water will affect the mucous membrane and/or water supply system. The total hardness is in the range of 114 to 150 mg/l, and is observed to be within the permissible limit of 600 mg/l at all five locations. The total hardness beyond the permissible limit causes encrustation in water supply structure and adverse effects on domestic use. The iron concentration is found to be in the range of 0.04 to 0.032 mg/l, and is observed to be within the desirable limit of 1.0 mg/l at all locations. Beyond the desirable limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.

The chlorides concentration is in the range of 48 to 58 mg/l, and is observed to be within the desirable limit of 250 mg/l at all five locations. Beyond this limit, taste, corrosion and palatability are affected. The fluoride concentration is 0.32 to 0.36 mg/l, and is observed to be within the desirable limit of 1.5 mg/l at all locations, high fluoride may cause fluorosis. The TDS are in the range of 240 to 280 mg/l, and is observed to be within the desirable limit of 500 mg/l at all five locations and are also within the permissible limit of 2000 mg/l.

The ground water samples collected from five locations and are analyzed for physical, chemical and biological parameters. The chemical and physical characteristics of the analyzed ground water samples shows that the samples are potable as per IS 10500-2012. The biological characteristics of the analyzed ground water samples shows that the samples are not potable as per IS 10500- 2012.

4.4.9 GW Analysis Data during March 2023

Ground water samples were collected in March 2023. Owale was selected as new station instead of Vaghivali, and sampling at Kopar was not possible due to no access.

Table 4-13: Ground water analysis at various stations during March 2023

Sr. No.	Sampling Locations	Owale	Pargaon	Chinchpada	Ulwe	Kombadbhuje
	Sampling month		13.03.2023			
1.	Colour, Hazen	5.0	5.0	5.0	5.0	5.0
2.	pH@ 25°C	7.80	7.58	7.45	7.64	7.3
3.	Turbidity, NTU	<2.0	<2.0	<2.0	<2.0	<2.0
4.	TDS, mg/l	410	220	230	320	360
5.	NH3(as N), mg/l	<0.56	< 0.56	<0.56	< 0.56	< 0.50
6.	Boron, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
7.	Calcium as Ca, mg/l	59.2	28.8	30.4	38.4	44.8
8.	Chlorides, mg/l	86	44	44	55	69
9.	Fluoride, mg/l	0.32	0.32	0.34	0.32	0.34
10.	Free ResCl2, mg/l	0.58	0.56	0.58	0.56	0.60
11.	Iron, mg/l	0.32	0.40	0.40	0.34	0.32
12.	Magnesium as Mg, g/l	32.6	17	18	24.8	37.4
13.	Sulphate, mg/l	66	31	41	52	58
14.	Alkalinity, mg/l	278	148	154	204	260
15.	Hardness, mg/l	282	142	150	198	266
16.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
17.	Aluminum, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
18.	Detergents, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
19.	Barium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
20.	Chloramines, mg/l	< 2.0	<2.0	< 2.0	< 2.0	< 2.0
21.	Copper, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22.	Manganese, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
23.	Mineral oil, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
24.	Nitrate, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
25.	Phenolic comp, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
26.	Selenium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
27.	Silver, mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
28.	Sulphide, mg/l	<0.5	<0.5	<0.5	<0.5	<0.5
29.	Zinc, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
30.	Cadmium, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
31.	Cyanide, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
32.	Lead, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
33.	Mercury, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05
34.	Molybdenum, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
35.	Nickel, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
36.	PCB, mg/l	< 0.01	< 0.0001	< 0.01	< 0.01	< 0.01
37.	PAH, mg/l	< 0.01	< 0.0001	< 0.01	< 0.01	< 0.01
38.	Arsenic, mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
39.	Chromium, mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
40.	Alachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
41.	Atrazine, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
42.	Aldrin, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Sr. No.	Sampling Locations	Owale	Pargaon	Chinchpada	Ulwe	Kombadbhuje
	Sampling month		13.03.2023			
43.	Alpha HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
44.	Beta HCH, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
45.	Butachlor, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
46.	Chlorpyriphos, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
47.	Delta HCH, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
48.	2,4 Dichloro PAA, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
49.	DDT, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
50.	Endosulphan, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
51.	Ethion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
52.	Lindane, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
53.	Isoproturon, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
54.	Malathion, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
55.	Methyl parathion, µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
56.	Monocrotophos , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
57.	Phorate, , µg/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
58.	Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600
59.	E coli	Present	Present	Present	Present	Present

4.4.10 GW Analysis Inference:

The analysis results indicate the pH range of 7.30 to 7.80 and is observed to be within the desirable limit of 6.5 to 8.5, beyond this range water will affect the mucous membrane and/or water supply system. The total hardness is in the range of 142 to 282 mg/l, and is observed to be within the permissible limit of 600 mg/l at all four locations. The total hardness beyond the permissible limit causes encrustation in water supply structure and adverse effects on domestic use. The iron concentration is found to be in the range of 0.32 to 0.40 mg/l, and is observed to be within the desirable limit of 1.0 mg/l at all locations. Beyond the desirable limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria.

The chlorides concentration is in the range of 44 mg/l to 86 mg/l, and is observed to be within the desirable limit of 250 mg/l at all 5 locations. Beyond this limit, taste, corrosion and palatability are affected. The fluoride concentration is 0.30 to 0.34 mg/l, and is observed to be within the desirable limit of 1.5 mg/l at all locations, high fluoride may cause fluorosis. The TDS are in the range of 220 to 410 mg/l, and is observed to be within the desirable limit of 500 mg/l at all four locations and are also within the permissible limit of 2000 mg/l.
The ground water samples collected from four locations and are analyzed for physical, chemical and biological parameters. The chemical and physical characteristics of the analyzed ground water samples shows that the samples are potable as per IS 10500-2012. The biological characteristics of the analyzed ground water samples shows that the samples are not potable as per IS 10500- 2012.

4.5 QUARTERLY MARINE WATER QUALITY ANALYSIS REPORT DURING November 2022

Surface Marine water samples were collected for the quarter from October 2022 to December 2022 for different Physiochemical and Biological parameters from 10 stations on 18th and 19th November 2022. Analysis part is mentioned in subsequent sections below.

Figure 4-1 Collection of Marine Water samples during November 2022

4.5.1 Analytical Data - Physicochemical Parameters during November 2022

Table 4-14: Marine water physicochemical analysis at various stations during November 2022

Sr. No.	Parameter	MW 1	MW 2	MW 3	MW 4	MW 5	MW 6	MW7	MW 8	MW9	MW 10	Unit
		S	S	S	S	S	S	S	S	S	S	
1.	pH	7.29	7.11	7.67	7.48	7.85	7.94	7.58	7.37	7.34	7.29	--
2.	Temperature	25.5	25.0	25.5	25.0	29.5	30	29	28	28	27.5	°C
3.	Turbidity	7.2	6.18	5.10	8.42	7.82	6.23	7.24	7.72	7.82	20.3	NTU
4.	Conductivity	542	14230	28590	41560	38962	37860	40590	41560	42480	350	µS/Cm
5.	Salinity,	0.56	9.36	10.02	25.08	25.26	22.46	28.26	31.63	29.57	0.19	ppt
6.	Iron as Fe,	0.082	0.12	0.020	0.012	<0.02	0.032	0.032	0.028	0.02	0.08	mg/l
7.	Magnesium as Mg	22.8	340	794.6	882	850	980.2	948	1006	1098	112.4	mg/l
8.	Manganese as Mn	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l
9.	Fluoride	0.60	0.42	1.52	0.81	2.19	1.74	1.16	1.40	1.84	0.20	mg/l
10.	Sulphate	54	612	295	1850	987	1447	2528	1837	3499	15.7	mg/l
11.	Phenolic compounc	<2.4	<2.4	<2.4	<2.4	7.28	8.89	11.6	3.82	20.8	<2.4	µg/l
12.	Alkalinity	196	194	180	192	174	230	170	280	278	252	mg/l
13.	Hardness as CaCO3	182	1720	3880	4360	4120	3760	4560	4800	5280	168	mg/l
14.	Zinc as Zn	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l
15.	Cadmium as Cd	0.02	<0.01	<0.01	0.02	<0.01	0.04	<0.01	<0.01	<0.01	0.02	mg/l
16.	BOD	2.52	1.28	1.71	1.75	2.43	0.68	0.79	1.28	1.85	0.84	mg/l
17.	Chloride	153	5298	13696	14396	14442	12296	15295	14595	17794	83	mg/l
18.	DO	3.86	2.29	3.29	3.71	1.26	1.57	1.85	3.29	1.85	1.71	mg/l
19.	Total Nitrogen as N	3.04	6.5	6.8	0.20	7.3	6.2	3.9	4.2	10.2	1.3	µmol/l
20.	Phosphorus as P	0.82	0.42	0.30	0.20	3.28	5.52	4.28	1.20	3.29	1.0	µmol/l
21.	Sodium as Na	80	90	100	90	100	90	90	110	100	80	mg/l
22.	Potassium as K	50	80	80	70	70	60	70	70	70	60	mg/l
23.	Lead as Pb	<0.01	0.03	0.02	0.04	0.032	0.06	<0.01	0.08	0.14	<0.01	mg/l
24.	Mercury as Hg	<0.001	0.002	0.002	0.004	0.008	0.005	<0.001	0.002	0.007	<0.002	mg/l
25.	Chromium as Cr	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	mg/l

4.5.2 Inference - Physicochemical Parameters during November 2022

The pH value ranged from 7.11 to 7.94 at surface represents basic nature of water. Salinity was low only at MW1 and MW10 due to influx of fresh water and in increasing trends in Creek waters during collection Period of sampling as proceedings from Gadhi River to Panvel Creek.

Dissolved Oxygen level was observed low during collection of time due to seasonal variation. BOD value suggests the presence of organic matter present in water body which comes as domestic sewage discharge from surrounding areas (villages, STPs of NMMC in Nerul) and effluents from CETP at MIDC Taloja.

The concentration of Magnesium was high at all locations except MW1 and Iron were low at all stations (Refer Table 4.14).

4.5.3 Analytical Data - Biological Parameters during November 2022

Biological parameters viz. Phytopigments, Phytoplankton, Zooplankton, Benthos and Microbiology were analyzed, and compiled data is presented below:

Table 4-15: Marine Water biological analysis of stations (MW1 to MW5) during November 2022

Parameter	MW 1	MW 2	MW3	MW4	MW5
	S	S	S	S	S
Phytoplankton					
Chlorophyll (mg/m³)	22.99	12.83	34.21	37.96	40.10
Pheophytin (mg/m³)	29.40	53.57	13.63	60.46	127.56
Population (nox10³/L)	626.0	1753.6	13604.0	4143.6	7758.4
Total Genera (No)	24	23	17	13	199
Major Genera	*Navicula (34.5%) Scenedesmus(24.53%) Pediastrum (2.88%) Leptocylindrus(2.81%)*	*Navicula (47.22%) Scenedesmus(31.02%) Pediastrum (2.4%) Oscillatoria (0.6%)*	*Thalassiosira (95.56%) Skeletonema(3.32%) Leptocylindrus(0.96%) Chaetoceros (0.22%)*	*Thalassiosira (75.30%) Skeletonema(17.47%) Chaetoceros (5.26%) Leptocylindrus (0.89%)*	*Thalassiosira (76.6%) Chaetoceros (5.72%) Skeletonema (5.10%) Leptocylindrus(3.49%)*
Diversity Index	1.41	1.08	0.23	0.78	0.61
Zooplankton					
Population (no x 10³/100m³)	1908	4	10806	4	2
Total Group (No)	6	6	12	2	11
Major Groups	Copepods (97.90%) Medusae (1.18%) Decapods (0.39%) Gastropods (0.35%)	Copepods (98.20%) Marine insect(0.99%) Medusae (0.52%) Decapods Larvae (0.12%)	Copepods (95.47%) Medusae(3.06%) Polychaetes (0.34%) Marine insects(0.24%)	Copepods(80.0%) Decapods(20.0%)	Medusae (50.57%) Copepods (37.81%) Decapods(2.82%) Gastropods(1.50%)
Biomass (ml/100m³)	133.3	0.2	0.3	8.3	9
Diversity Index	0.13	0.11	0.19	0.50	1.12
Macrobenthos					
Population (no x 10²/m²)	191	4688	556	642	1024
Total Group (No)	1	1	1	1	2
Major Groups	Polychaete (100%)	Polychaete (100%)	Polychaete(100%)	Polychaete (100%)	Polychaete (84.14%) Bivalve (11.86%)
Biomass (gm/m²)	1.50	58.54	8.82	8.18	27.52
Diversity Index	0.00	0.00	0.0	0.00	0.36
Microbiology					
Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600

Table 4-16: Marine Water biological analysis of stations (MW6 to MW10) during November 2022

Parameter	MW 6	MW 7	MW8	MW9	MW10
	S	S	S	S	S
Phytoplankton					
Chlorophyll (mg/m³)	47.58	39.56	46.51	44.91	1.07
Pheophytin (mg/m³)	57.95	53.99	27.96	20.58	12.40
Population (nox10⁴/L)	7384.0	7804	3435.2	4172.8	193.6
Total Genera (No)	16	19	14	19	20
Major Genera	*Thalassiosira(81.23%) Skeletonema (13.16%) Chaetoceros (4.60%) Leptocylindrus(0.53%)*	*Thalassiosira (86.11%) Skeletonema (8.82%) Chaetoceros(4.20%) Leptocylindrus (0.56%)*	*Thalassiosira (80.34%) Chaetoceros (17.70%) Leptocylindrus(0.84%) Pseudonitzschia (0.54%)*	*Thalassiosira(12.8%) Skeletonema(25.50%) Chaetoceros (2.0%) Leptocylindrus(1.02%)*	*Navicula(44.63%) Thalassiosira (19.42%) Euglena (12.81%) Gyrosigma (6.2%)*
Diversity Index	0.64	0.53	0.59	0.81	1.82
Zooplankton					
Population (no x 10³/100m³)	11	21	2	3	6
Total Group (No)	11	12	19	11	1
Major Groups	Amphipods (97.42%) Decapods (2.13%) Gastropods (0.15%) Lucifer (0.11%)	Copepods (95.47%) Medusae(3.32%) Decapod (0.67%) Lucifer(0.22%)	Copepods (82.94%) Medusae (13.96%) Decapod(1.47%) Lucifer(0.68%)	Medusae(50.57%) Copepods(37.81%) Ostracods(6.01%) Decapods (2.82%)	Copepods(100%)
Biomass (ml/100m³)	0.7	2.6	1.9	13.06	8.3
Diversity Index	0.14	0.23	0.58	1.12	0.00
Macrobenthos					
Population (no x 10²/m²)	799	712	781	266	365
Total Group (No)	2	1	2	1	1
Major Groups	Polychaete (73.91%) Bivalve (26.09%)	Polychaete (100%)	Polychaete(97.78%) Amphipod(2.22%)	Polychaete (100%)	Polychaete (100%)
Biomass (gm/m²)	80.28	0.67	0.87	2.18	3.44
Diversity Index	0.57	0.0	0.11	0.0	0.0
Microbiology					
Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600

4.5.4 Inferences - Biological Parameters during November 2022

4.5.4.1 Phytoplankton

In November 2022, Chlorophyll ranged from 1.07 to 47.58 mg/m^3 and pheophytin ranged 12.4 to 127.56 mg/m^3; at surface water of all 10 stations. The **Figure 4.2** below shows graphical representation of phytopigments in different stations.

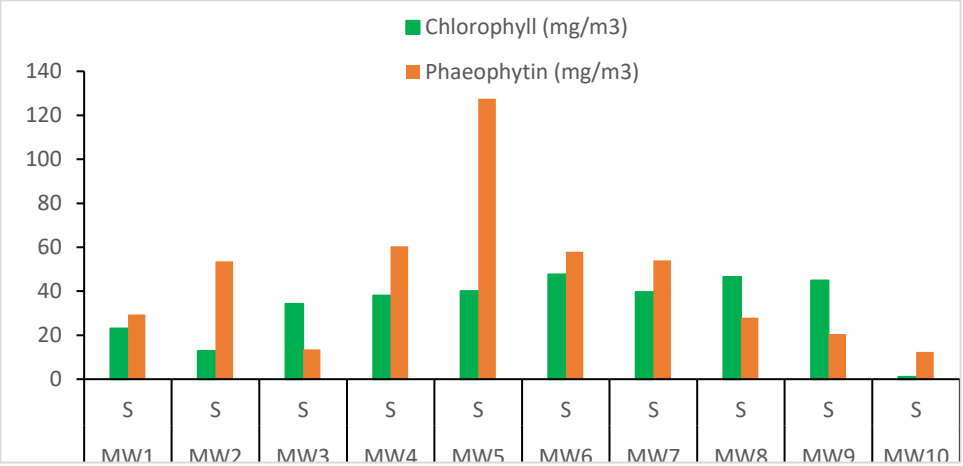


Figure 4-2: Representation of phytopigments for November 2022

Phytoplankton population density ranges from 193.6-13604 x 10^3/l at surface water of all 10 stations. Highest phytoplankton population at surface water of MW3 may be due to influx of domestic water from surrounding villages; total generic groups ranges from 13-24 nos. at surface water of all 10 stations. Maximum generic diversity 24 no. is observed at surface water of Station MW1 and lowest at MW4 respectively during November 2022 (Refer Table 4.15 and 4.16).

Thalassiosira, Leptocylindrus, Chaetoceros and *Skeletonema* are most common ones, followed by rest of observed genera like *Nitzschia, Pleurosigma, Navicula* and *Gyrosigma*. The other freshwater phytoplankton genera found are *Scenedesmus*, *Anabaena, Oscillatoria and Pediastrum* in Gadhi River (MW1) and Ulwe River (MW10) respectively. Graphical representations of phytoplankton population and total genera is represented in **Figure 4.3**.

The graph below represents the population of phytoplankton is more at MW3; and less at station MW10, which represents there is discharge of sewage and domestic waste. The phytoplankton trend with respect to total number of genera is high at Station MW1 and lowest at MW4. Some of the major genera seen were photographed and shown in **Figure 4.4**.

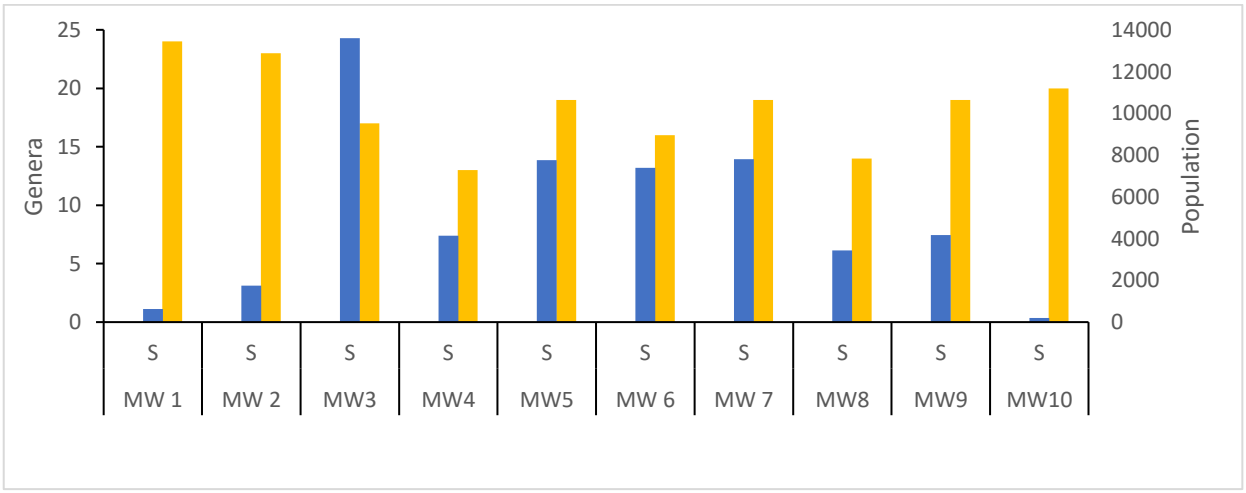
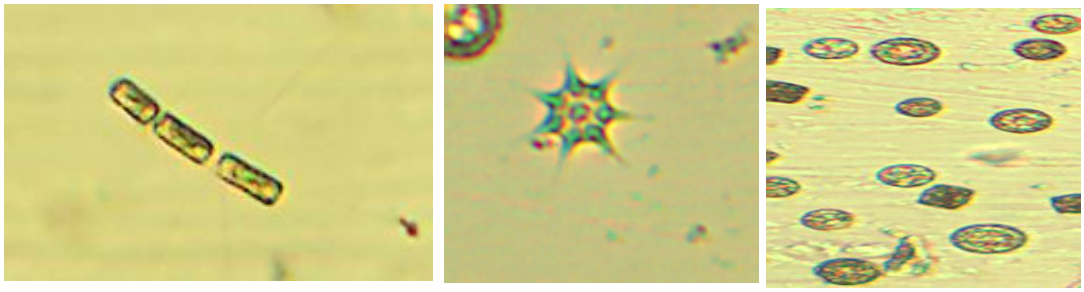


Figure 4-3: Representation of phytoplankton population & Total genera for November 2022



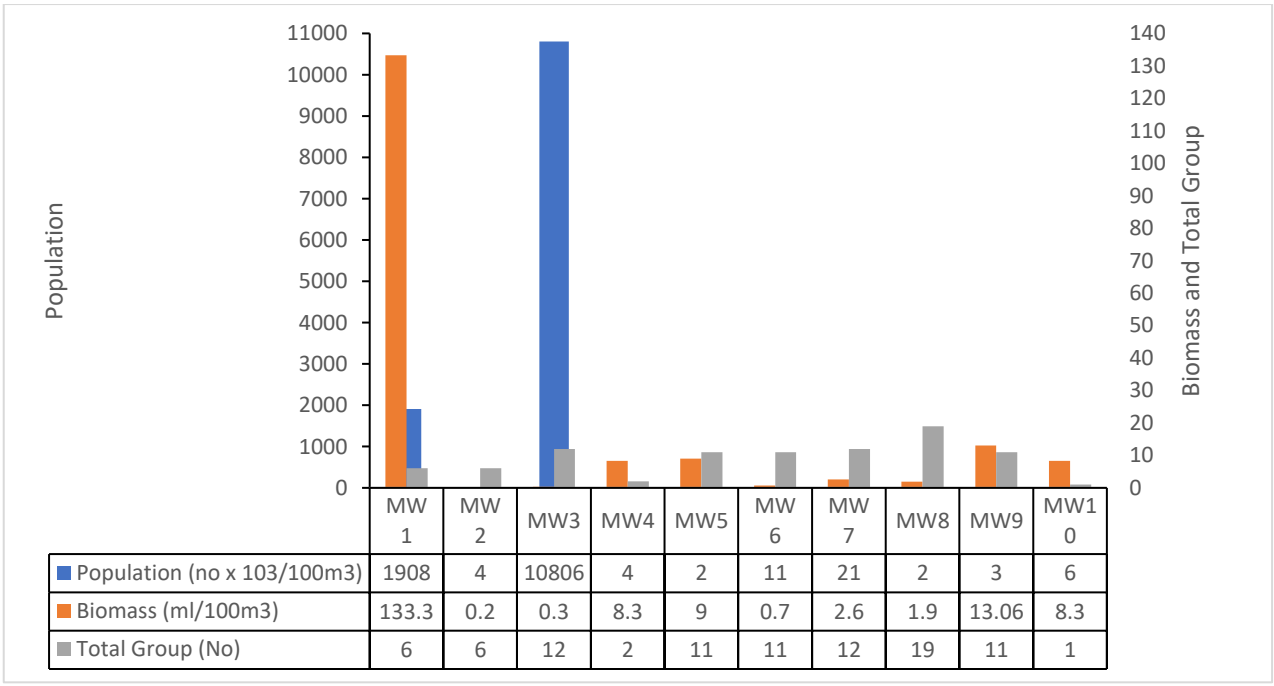
Chaetoceros *Pediastrum* *Thalassiosira*

Figure 4-4: Phytoplankton found in samples for November 2022

4.5.4.2 Zooplankton

In November 2022, the zooplankton biomass ranged from 0.2 to 133.3 ml/100 m^3 with population density of 2 to 10806 x 10^3/100 m^3 while having faunal group ranging from 1-9 nos. The zooplankton was noted with good population and group diversity. Polychaetes, Copepods, Decapods and Medusa were common groups observed, **Figure 4.5** represents zooplankton standing stock graphically and **Figure 4.6** represents photos of peculiar zooplankton genera.

The graph below represents that standing stock reported from all stations; MW5 and MW8 shows lowest population as compared to MW3 with highest population; and MW2 shows lowest biomass and MW1 shows highest biomass, respectively.



	MW 1	MW 2	MW3	MW4	MW5	MW 6	MW 7	MW8	MW9	MW1 0
Population (no x 103/100m3)	1908	4	10806	4	2	11	21	2	3	6
Biomass (ml/100m3)	133.3	0.2	0.3	8.3	9	0.7	2.6	1.9	13.06	8.3
Total Group (No)	6	6	12	2	11	11	12	19	11	1

Figure 4-5: Representation of Zooplankton Biomass, Population & Total group for November 2022

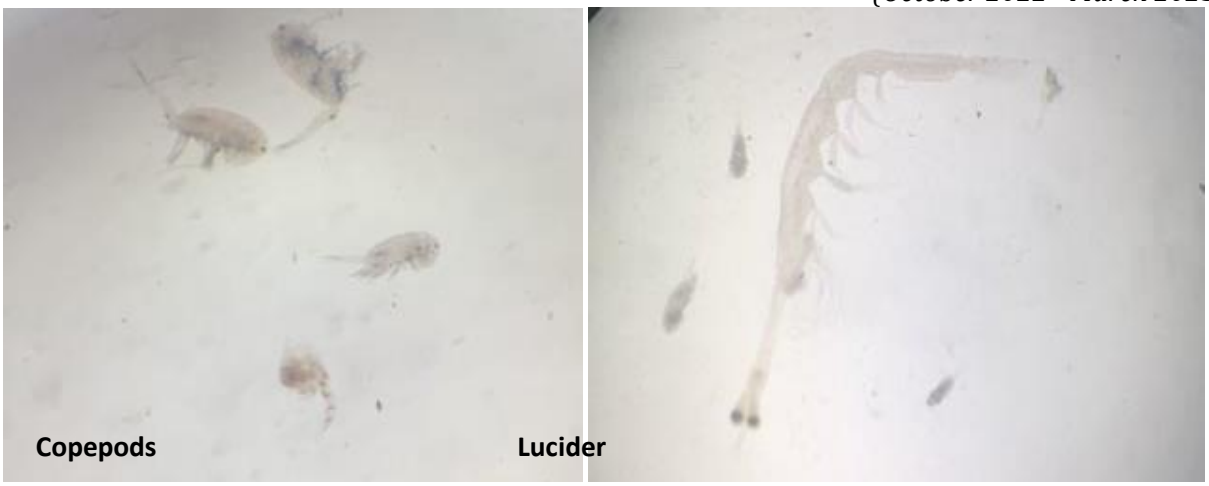


Figure 4-6 Zooplankton found in samples for November 2022

4.5.4.3 Macrofauna

In November 2022, macro-benthic biomass ranged from 0.67 to 80.28 gm/ m^2 with population ranging from 191 to 4684 (no x $10^2/m^2$). Total group ranges from 1 to 2. Low biomass noted at MW2 and high biomass at MW3. Low population were noted at MW1 and high population observed at MW2. The faunal group found were majorly Polychaete. The Figure 4.7 shows the % composition of benthic organisms for study period. Figure 4.8 shows peculiar organisms found.

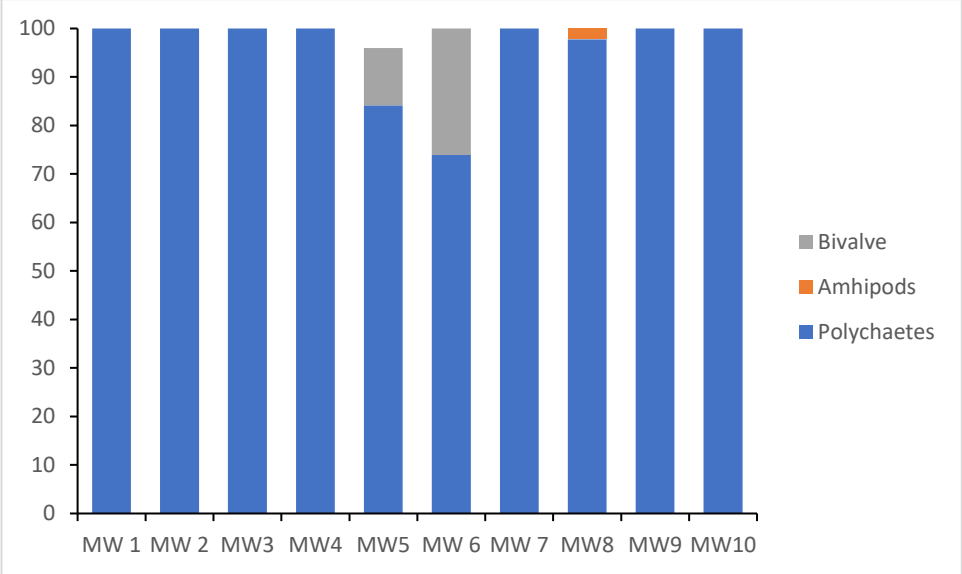


Figure 4-7 % Composition of Benthic organisms for November 2022

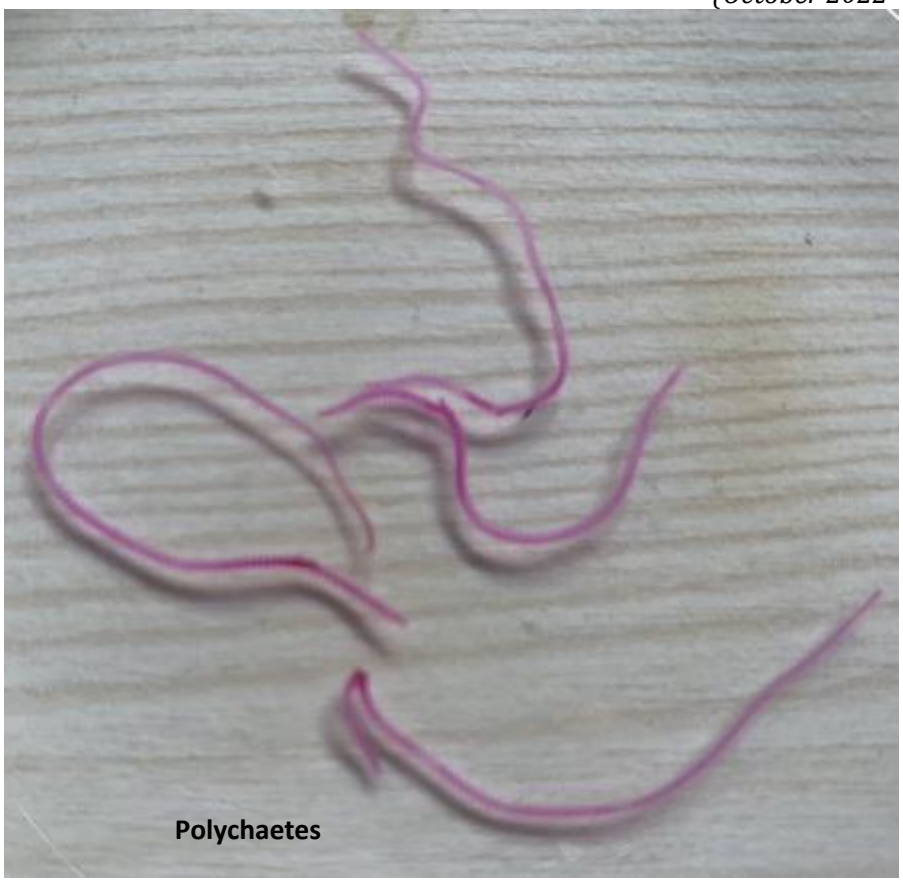


Figure 4-8 Benthic organism Found in samples for November 2022

4.5.4.5 Microbiology

Coliform microbes were present at all stations in surface level. No specific trend was observed.

4.6 QUARTERLY MARINE WATER QUALITY ANALYSIS REPORT DURING March 2023

Surface Marine water samples were collected for quarter from Jan to Mar 2023 for different Physiochemical and Biological parameters for 10 stations on 18th and 19th March 2023. Analysis part is mentioned in subsequent sections below.

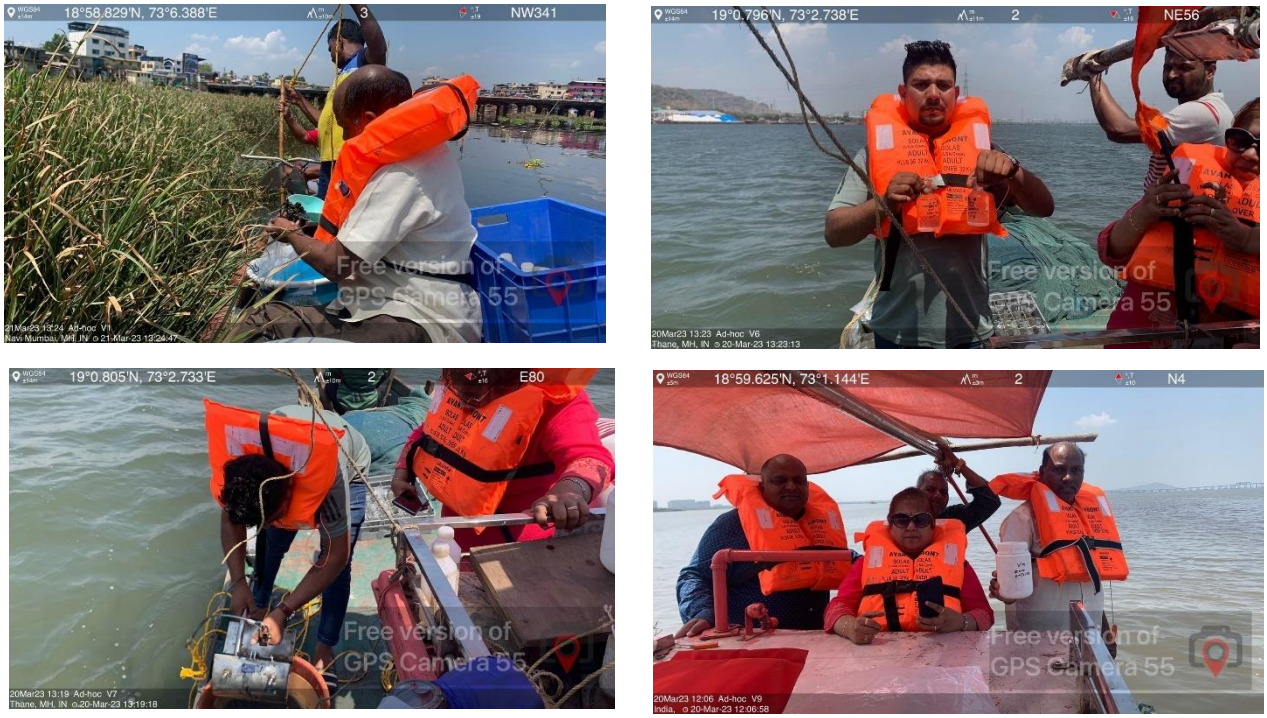


Figure 4-9 Collection of Marine Water samples during March 2023

4.6.1 Analytical Data - Physicochemical Parameters during March 2023

Table 4-17: Marine water physicochemical analysis at various stations during March 2023

Sr. No.	Parameter	MW 1	MW 2	MW 3	MW 4	MW 5	MW 6	MW 7	MW 8	MW9	MW 10	Unit
		S	S	S	S	S	S	S	S	S	S	
26.	pH	6.62	6.45	6.55	6.52	6.64	6.65	6.69	6.73	7.22	6.48	--
27.	Temperature	32	31	30	29.5	29.5	29.5	30	29.5	31	31	°C
28.	Turbidity	7.82	3.20	3.2	3.14	6.24	4.32	7.82	6.24	5.18	2.82	NTU
29.	Conductivity	20.40	38.54	42.81	44.21	42.24	43.72	43.69	46.16	46.60	9.25	µS/Cm
30.	Salinity,	10.27	21.03	24.23	25.57	30.45	29.5	28.77	30.78	30.28	4.37	ppt
31.	Iron as Fe,	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/l
32.	Magnesium as Mg	403.4	874.8	972	1030.3	1132.4	1190.7	1181	1258.7	1244.2	213.8	mg/l
33.	Manganese as Mn	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l
34.	Fluoride	0.78	1.56	1.38	1.49	1.56	1.39	1.70	1.41	1.66	0.86	mg/l
35.	Sulphate	1221	2917.2	2917.2	3597	3451.8	3451.8	3399	3755.4	3729	858	mg/l
36.	Phenolic compound	123.12	55.2	77.76	66.0	49.92	44.4	68.64	76.08	61.44	170.2	µg/l
37.	Alkalinity	214	224	220	216	196	180	196	210	204	226	mg/l
38.	Hardness as CaCO3	2100	4200	5000	5300	5600	6000	5700	6200	6100	1100	mg/l
39.	Zinc as Zn	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l
40.	Cadmium as Cd	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l
41.	BOD	4.85	0.5	0.60	0.86	0.74	0.74	1.28	1.57	4.0	0.8	mg/l
42.	Chloride	6398	13396	24492	26491	18494	24992	22493	25492	27491	2799	mg/l
43.	DO	5.29	1.0	1.0	1.0	1.14	1.14	1.57	2.14	4.28	2.0	mg/l
44.	Total Nitrogen as N	6.8	5.8	6.8	7.3	6.3	6.0	6.4	6.0	7.2	6.3	µmol/l
45.	Phosphorus as P	5.54	4.52	3.74	3.35	3.0	1.82	2.27	1.41	1.88	5.34	µmol/l
46.	Sodium as Na	90	2917.2	100	100	90	90	90	90	90	90	mg/l
47.	Potassium as K	80	80	80	70	80	80	60	60	60	80	mg/l
48.	Lead as Pb	0.0028	0.042	0.030	0.032	0.028	0.026	0.028	0.030	0.028	0.026	mg/l
49.	Mercury as Hg	0.006	0.010	0.009	0.008	0.002	0.011	0.008	0.009	0.009	0.006	mg/l
50.	Chromium as Cr	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	mg/l

4.6.2 Inference - Physicochemical Parameters during March 2023

The pH value ranged from 6.45 to 7.22 at surface, which shows basic nature of water. Salinity was found in increasing trend from MW1 to MW5 and again from MW6 to MW9. The salinity was observed low at station MW1 and MW10 due to influx of fresh water during collection Period of sampling.

Dissolved Oxygen level was observed low during collection of time due to seasonal variation at all locations except at MW1 and MW10. BOD value suggests the presence of organic matter in water body which comes as domestic sewage discharge from surrounding areas (villages, STPs of NMMC in Nerul) and effluents from CETP at MIDC Taloja. The concentration of Magnesium was high and Iron was low at all stations (Refer Table 4.17).

Analytical Data – Biological Parameters during March 2023.

Biological parameters viz. Phytoplankton, Zooplankton, Benthos and Microbiology were analyzed, and compiled data is presented below:

Table 4-18: Marine Water biological analysis of stations (MW1 to MW5) during March 2023

Parameter	MW 1	MW 2	MW 3	MW 4	MW 5
	S	S	S	S	S
Phytoplankton					
Chlorophyll (mg/m³)	45.98	36.25	36.35	12.30	10.69
Pheophytin (mg/m³)	17.64	63.94	2.25	1.18	0.53
Population (nox10³/L)	17690.4	4258.4	3414.4	2301.6	172.0
Total Genera (No)	17	14	11	14	12
Major Genera	*Thalassiosira (99.49%) Leptocylindrus (0.194%) Navicula (0.086%) Chaetoceros (0.068%)*	*Thalassiosira (98.16%) Chaetoceros(0.96%) Leptocylindrus(0.54%) Oscillatoria(0.11%)*	*Thalassiosira (97.24%) Chaetoceros (2.30%) Navicula(0.23%) Guinardia (0.07%)*	*Thalassiosira (97.32%) Navicula (0.87%) Chaetoceros (0.66%) Leptocylindrus (0.42%)*	*Thalassiosira88.4%) Chaetoceros(2.3%) Leptocylindrus (1.9%) Navicula(1.4%)*
Diversity Index	0.04	0.21	0.15	0.17	0.62
Zooplankton					
Population (no x 10³/100m³)	641	3	8	2	2
Total Group (No)	4	1	1	1	6
Major Groups	Copepods (98.31%) Gastropods (1.04%) Cirriped (0.52%) Polychaete (0.13%)	Copepods (100%)	Copepods (100%)	Copepods (100%)	Copepods (57.3%) Medusae (42.2%) Decapod larvae (0.2%) Chaetognaths (0.1%)
Biomass (ml/100m³)	66.7	150	16.7	16.67	0.2
Diversity Index	0.10	0.0	1.38	0.00	0.71
Macrobenthos					
Population (no x 10²/m²)	1649	69	122	3090	660
Total Group (No)	1	1	1	2	2
Major Groups	Polychaete (100%)	Polychaete (100%)	Polychaete (100%)	Polychaete (89.33%) Crab (10.67%)	Polychaete (97.37%) Bivalve (2.63%)
Biomass (gm/m²)	1.74	0.25	0.41	21.68	3.37
Diversity Index	0.0	0.0	0.0	0.34	0.12
Microbiology					
Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600

Table 4-19: Marine Water biological analysis of stations (MW6 to MW10) during March 2023

Parameter	MW 6	MW 7	MW 8	MW 9	MW 10
	S	S	S	S	S
Phytoplankton					
Chlorophyll (mg/m³)	4.81	14.43	13.90	19.25	16.04
Pheophytin (mg/m³)	3.05	2.83	1.92	14.01	3.80
Population (nox10³/L)	49.6	60.0	34.4	56.8	236.8
Total Genera (No)	13	10	15	15	19
Major Genera	*Thalassiosira (58.06%)* *Leptocylindrus (14.52%)* *Navicula (8.06%)* *Cyclotella (3.23%)*	*Thalassiosira (62.7%)* *Skeletonema (22.7%)* *Chaetoceros (4.0%)* *Nitzschia (2.67%)*	*Thalassiosira(27.9%)* *Skeletonema(18.6%)* *Leptocylindrus (18.6%)* *Nitzschia (7.0%)*	*Peridinium(63.8%)* *Thalassiosira(8.45%)* *Chaetoceros (5.63%)* *Skeletonema (5.63%)*	*Navicula (56.08%)* *Anabaena (23.65%)* *Cymbella (6.42%)* *Nitzschia (3.72%)*
Diversity Index	1.55	1.20	2.19	1.52	1.45
Zooplankton					
Population (no x 0³/100r	1	3	2	0.06	7
Total Group (No)	7	12	12	6	1
Major Groups	Medusae (55.51%) Copepods (39.59%) Gastropods (3.02%) Comb Jelly (0.85%)	Copepods (69.47%) Gastropods (22.26%) Decapods (2.16%) Chaetognaths (1.12%)	Copepods (71.85%) Gastropods (20.44%) Medusae (2.93%) Comb jelly (1.94%)	Copepods (49.12%) Medusae (24.56%) Decapods (15.79%) Comb jelly (7.02%)	Copepods (100%)
Biomass (ml/100m³)	8.5	0.8	0.9	0.3	16.7
Diversity Index	0.89	0.84	0.88	0.03	0.00
Macrobenthos					
Population (no x 10²/m²)	3229	764	868	747	17
Total Group (No)	2	2	2	1	1
Major Groups	Bivalve (52.15%) Polychaete (47.85%)	Polychaete (97.73%) Amphipod (2.73%)	Polychaete (98.0%) Amphipod (2.0%)	Polychaete (100%)	Polychaete (100%)
Biomass (gm/m²)	141.47	4.40	2.07	1.51	0.74
Diversity Index	0.69	2.07	0.10	0.00	0.0
Microbiology					
Coliform (MPN/100 ml)	>1600	>1600	>1600	>1600	>1600

4.6.4 Inferences - Biological Parameters during March 2023

4.6.4.1 Phytoplankton

In March 2023, Chlorophyll ranged from 4.81 to 45.98 mg/m^3 and pheophytin ranged 0.53 to 63.94 mg/m^3 at surface water of all 10 stations. The **Figure 4.10** below shows graphical representation of phytopigments at different stations.

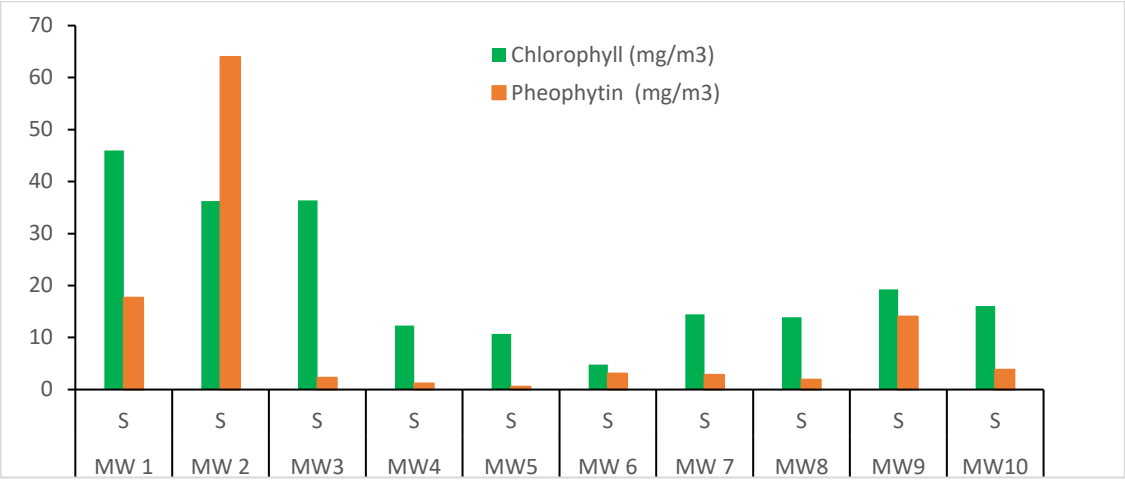


Figure 4-10: Representation of phytopigments for March 2023

The phytoplankton population ranged from 34.4 to 17690.4 (no x 10^3/l) with highest population noted at Station MW1 and Lowest at Station MW8. Total generic groups range from 10-19 nos. at surface water of all 10 stations. Maximum generic diversity 16 no. is observed at surface water of Station MW10 during March 2023 (Refer Table 5.20 and 5.21).

Leptocylindrus, Thalassiosira, Skeletonema and Chaetoceros are most common ones, followed by rest of observed genera like *Navicula, Pleurosigma*, *and Nitzschia*. The other freshwater phytoplankton genera found are *Scenedesmus*, *Agmenellum, Oscillatoria and Pediastrum* in Gadhi River (MW1) and Ulwe River (MW10) respectively. *Pleurosigma*, *Navicula and Thalassiosira* are common Genera noted in all stations. Graphical representations of phytoplankton population and total genera is represented in **Figure 4.11**.

The graph below represents the population of phytoplankton is more at MW1; and less at station MW8, probably due discharge of sewage and domestic waste. The phytoplankton trend with respect to total number of genera is high at Station MW10 and low at station MW7 respectively. Some of the major genera seen were photographed and shown in **Figure 4.12**.

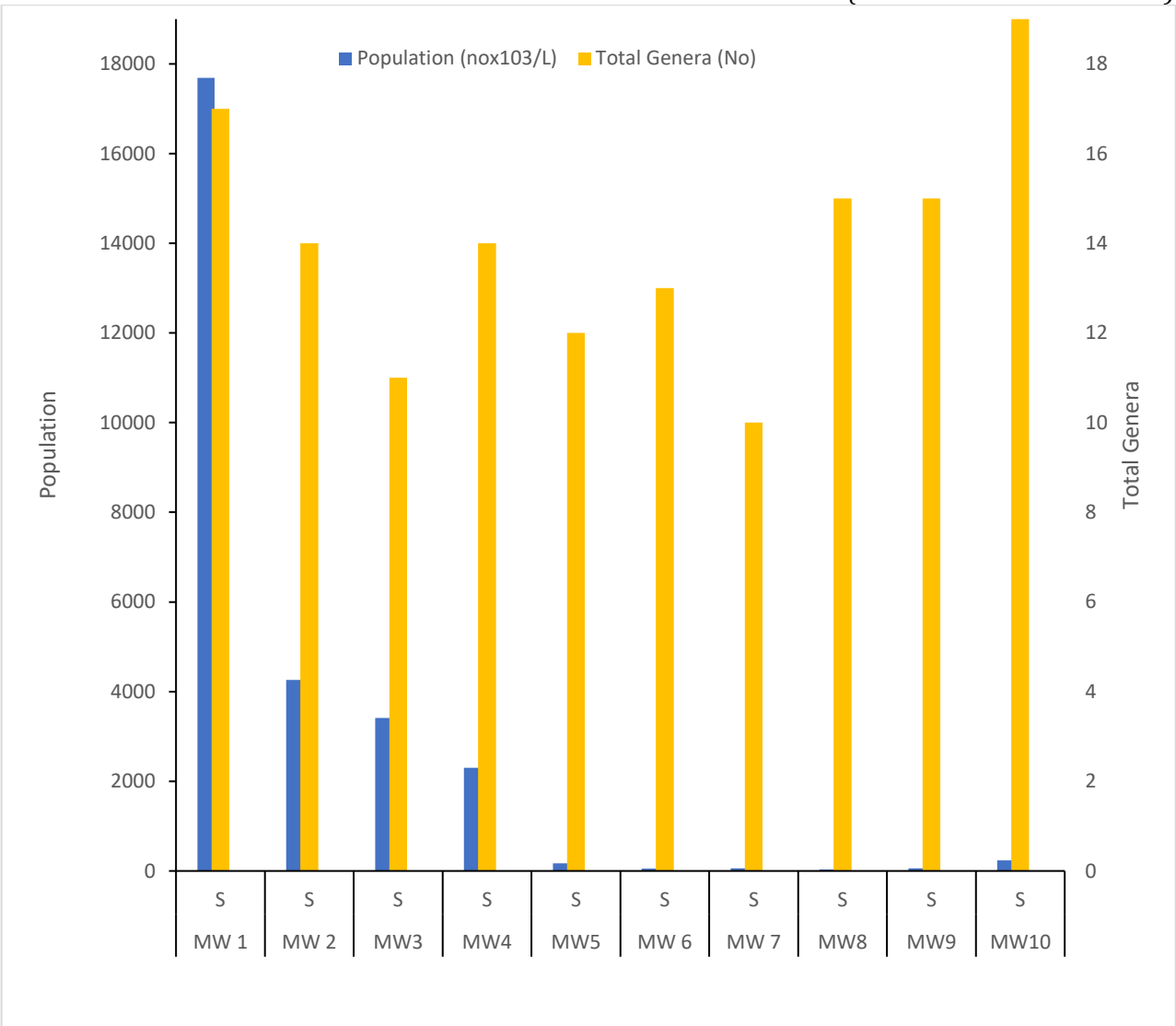
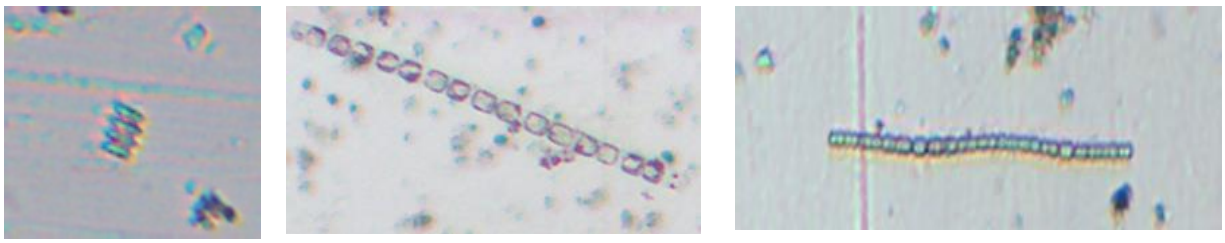


Figure 4-11: Representation of phytoplankton population & Total genera for March 2023



Scenedesmus *Chaetoceros* *Anabaena*

Figure 4-12: Phytoplankton found in samples for March 2023

4.6.4.2 Zooplankton

In March 2023, the zooplankton biomass ranged from 0.2 to 150 ml/100 m^3 with population density of 0.06 to 641 no x 10^3/100m^3 while having faunal group ranging from 1-12 nos. The zooplankton was noted with good population and group diversity. Copepods, Gastropods & Medusae were common groups observed, **Figure 4.13** represents zooplankton standing stock graphically and **Figure 4.14** represents photos of peculiar zooplankton found in marine water body.

The graph below represents that average standing stock reported from all stations; Station 7 and 9 shows lowest population as compared to Station 10 with highest population; and Station 7 and 8 shows lowest biomass and Station 2 shows highest biomass, respectively.

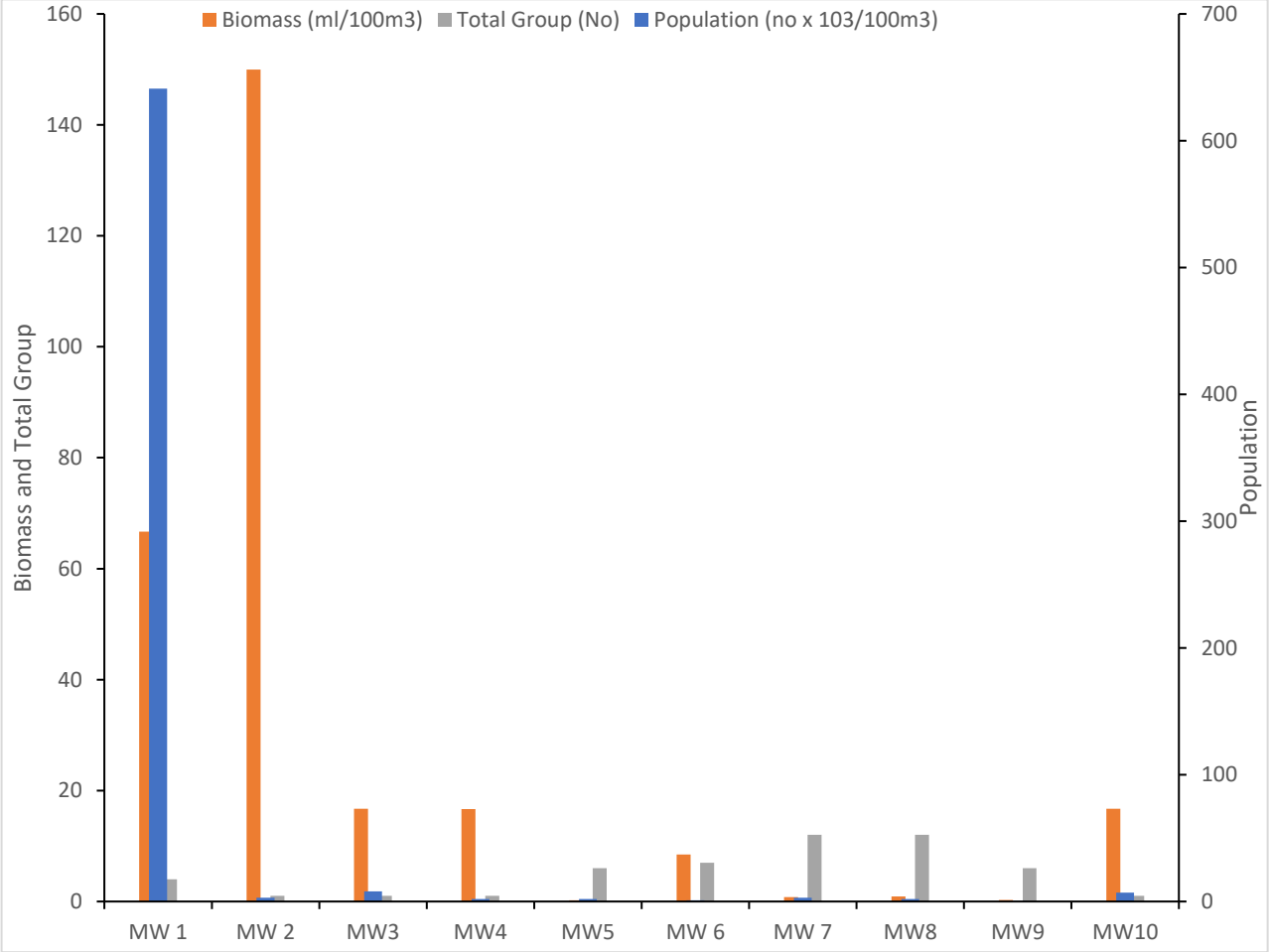


Figure 4-13: Representations of Zooplankton Biomass, Population & Total group for March 2023

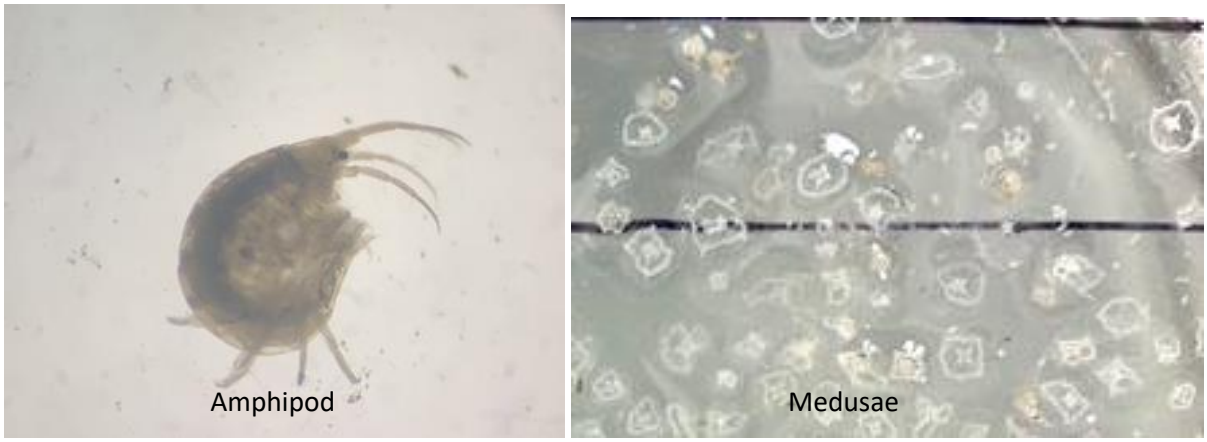


Figure 4-14: Zooplankton found in samples for March 2023

4.6.4.3 Macrofauna

In March 2023, macro-benthic biomass ranged from 0.25 to 141.47 gm/ m^2 with population ranging from 17 to 3229 (no x $10^2/m^2$). Total group ranges from 1 to 2. Lowest biomass was noted at MW2 and high biomass at MW6. Similarly lowest population were noted at MW10, and high population observed at MW6. The faunal group found were majorly Polychaetes. The % composition and peculiar Benthic organism is shown in Figure 4.15 and 4.16 respectively.

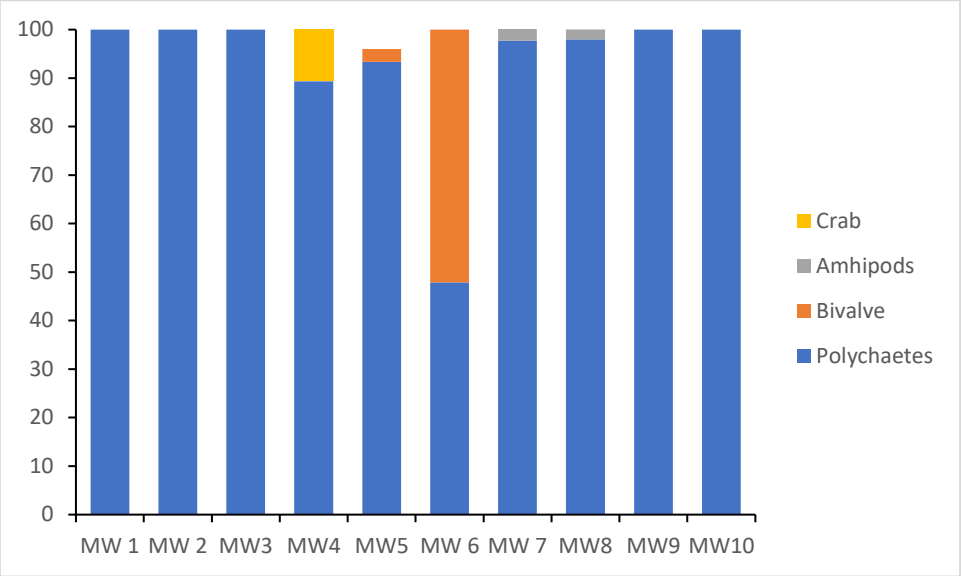


Figure 4-15: % composition of Benthic organisms for March 2023

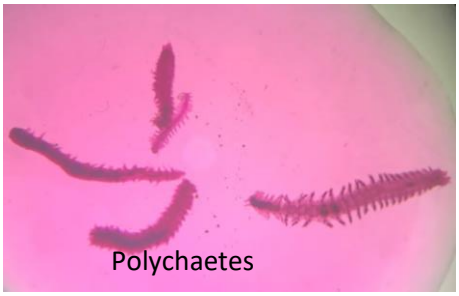


Figure 4-16: Benthic organism found in samples for March 2023

4.6.4.5 Microbiology

Coliform microbes were present at all stations in surface level. No specific trend was observed.

4.7 Stack Monitoring

The DG stack was monitored at NMIA project Site. The table below represents results of Gaseous emission from October 2022 to February 2023.

Sampling Locations	**DG Set Stack 1**				**MPCB Limit**	**Unit**
Sampling Date	**13.10.2022**	**15.11.2022**	**13.12.2022**	**21.02.2023**		
Gas Temperature	119	167	136	159	-	(°C)
Gas Velocity	7.13	8.73	7.03	7.5	-	(m/s)
Gas Flow Rate	2003	2174	1893	1910	-	(Nm3/hr.)
Particulate Matter	54.61	48.5	42.41	54	150	(mg/Nm3)
Sulphur Dioxide	4.76	2.11	1.06	1.4	-	(Kg/Day)
CO	19.6	21.07	22.6	18.9	-	(ppm)

The Particulate matter is under limit set by MPCB.

Figure 4-17 DG Stack Sampling

Annexure-III

Consent to Establish (CTE) granted to NMIA by MPCB dated June 15, 2022.

for

Phase I & II (20 MPPA & Cargo Capacity 0.57 MTPA)

MAHARASHTRA POLLUTION CONTROL BOARD

Tel: 24010706/24010437
Fax: 24023516
Website: http://mpcb.gov.in
Email: cac-cell@mpcb.gov.in

Kalpataru Point, 2nd and 4th floor, Opp. Cine Planet Cinema, Near Sion Circle, Sion (E), Mumbai-400022

RED/L.S.I (R23)
No:- Format1.0/CAC/UAN No.MPCB-CONSENT-0000128221/CE/2206000673

Date: 15/06/2022

To,
Navi Mumbai International Airport Pvt. Ltd., Villages Vadghar (Chinchpada), Kopar, Pargaon (Kohli), Pargaon-Dungi, Owale (Upper and Lower Owale + Waghivali Wada), Ulwe (Ulwe + Ganeshpuri), Targhar (Targhar + Kombadbhuje), Waghivali-Khar, Tal. Panvel, Dist. Raigad.

Your Service is Our Duty

Sub: Grant consent to establish for revised construction built up area, under RED category.

Ref:
1. Previous Environment & CRZ Clearance accorded vide dated 22.11.2010.
2. Previous Consent to Establish granted by Board vide dated 05.10.2021.
3. Revalidation of Environment & CRZ Clearance accorded vide dated 20.12.2017 which is transferred vide dated 17.08.2020.
4. Revalidation of Environment & CRZ Clearance accorded vide 28.11.2021
5. Minutes of 3rd CAC meeting held on 24.05.2022.

Your application No.MPCB-CONSENT-0000128221 Dated 23.12.2021

For: grant of Consent to Establish under Section 25 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 6 of the Hazardous & Other Wastes (Management & Transboundary Movement) Rules 2016 is considered and the consent is hereby granted subject to the following terms and conditions and as detailed in the schedule I, II, III & IV annexed to this order:

1. **The consent to establish is granted for a period up to 05/10/2026**
2. **The capital investment of the project is Rs.19647 Crs. (As per undertaking submitted by pp Existing - 16250 + Expansion - 3397. Total CI - 19647)**
3. Construction of Airport of Phase-I & II with passenger capacity of 20 MPPA and cargo capacity of 0.57 MTPA., on total plot area of 1,16,00,000 Sq. Mtr., i.e. 1160 Ha & Construction BUA 6,27,335.678 Sq. mtr., for land development of Terminal Building, Terminal Hotel, Reserved housing & Apartments for staff of AAI, CISF Barracks, Control Tower ATC Building, South runway (3.7 Kms), Air Cargo Building, access roads, associated apron, taxi way, parking area, MLCP, Fuel Farm, area. Drainage system, Airport maintenance hangers, Compound wall, Security fence & Utilities such as power supply, water supply & sanitation STP, Solid waste management facility.

4. **Conditions under Water (P&CP), 1974 Act for discharge of effluent:**

Sr No	Description	Permitted (in CMD)	Standards to	Disposal Path
1.	Trade effluent	400	As per Schedule-I	The overflow of ETP outlet will be further treated in STP
2.	Domestic effluent	4210	As per Schedule-I	60% Recycle for secondary purposes & remaining on land for gardening

5. **Conditions under Air (P& CP) Act, 1981 for air emissions:**

Sr No.	Stack No.	Description of stack / source	Number of Stack	Standards to be achieved
1	S-1 to S-2	DG Set (14 x 880 KVA)-12,320 KVA	2	As per Schedule -II

6. **Non-Hazardous Wastes:**

Sr No	Type of Waste	Quantity	UoM	Treatment	Disposal
1	Food Waste & Garbage from Terminal & PTB	7.671	Ton/D	Bio-gas plant for Bio-gas generation followed by composting facility	The waste generated from Biogas will be used as manure
2	Waste from Flight Catering Facilities	2.192	Ton/D	Bio-gas plant for Bio-gas generation followed by composting facility	The waste generated from Biogas will be used as manure
3	Cargo Handling Waste	5.000	Ton/D	Segregation	Sale to authorized vendor for further treatment & disposal
4	Waste from Aircraft Maintenance	3.557	Ton/D	Segregation	Sale to authorized vendor for further treatment & disposal
5	Waste from GSE Workshop	0.356	Ton/D	Segregation	Sale to authorized vendor for further treatment & disposal
6	STP Sludge	3.335	Ton/D	Drying	Used as manure for gardening
7	Other Solid Waste	5.750	Ton/D	Segregation	Sale to authorized vendor for further treatment & disposal

7. **Conditions under Hazardous & Other Wastes (M & T M) Rules 2016 for treatment and disposal of hazardous waste:**

Sr No	Category No./ Type	Quantity	UoM	Treatment	Disposal
1	5.1 Used or spent oil	10	Ton/Y	Recycle	Sale to authorised party
2	3.3 Sludge and filters contaminated with oil	2	Ton/Y	Incineration	CHWTSDF
3	5.2 Wastes or residues containing oil	310	Ton/D	Incineration	CHWTSDF
4	21.1 Process wastes, residues and sludges	47	Ton/Y	Recycle	CHWTSDF
5	33.1 Empty barrels /containers /liners contaminated with hazardous chemicals /wastes	5	Ton/Y	Recycle	CHWTSDF

8. **Conditions under Batteries (Management & Handling) Rules, 2001:**

Sr No	Type of Waste	Quantity	UoM	Disposal Path
1	Battery Waste	10.00	Ton/Y	Authorized Re-processer.

Specific Conditions for used Batteries:

i. The applicant shall ensure that used batteries are not disposed of in any manner other than by depositing with the authorized dealer/ manufacturer/ registered recycler/ importer/ re-conditioner or at the designated collection center.

ii. The applicant shall file half-yearly return in Form VIII to the M.P.C. Board.

iii. Bulk consumers to their user units may auction used batteries to registered recyclers only.

9. **Conditions under E-Waste Management:**

Sr No	Type of Waste	Quantity	UoM	Disposal Path
1	E-waste	25.00	Ton/Y	Authorized Re-processer.

10. **Treatment and Disposal of Biomedical Waste generated to CBMWTSDF:**

Sr.No	Category	Type of Waste	Quantity not to exceed (Kg/M)	Segregation Color coding	Treatment & Disposal
1	Yellow	a) Soiled Waste	500.00	Yellow colored non-chlorinated plastic bags or containers	CBMWTSDF

11. The Board reserves the right to review, amend, suspend, revoke this consent and the same shall be binding on the industry.

12. This consent should not be construed as exemption from obtaining necessary NOC/ permission from any other Government authorities.

13. PP shall comply with the conditions stipulated in EC/CRZ clearance & consent.

14. PP shall provided STP of adequate capacity to achieve the consented parameter BOD - 10 mg/l.

15. PP shall provide separate treatment facility for the treatment of wastewater generated from the aircraft maintenance hangers including for the contaminated surface runoff from the airport area containing oils, grease, etc.
16. The treated effluent shall be 60% recycled for secondary purposes such as toilet flushing, air conditioning, cooling tower makeup, firefighting, etc., and remaining shall be utilized on land for gardening with water metering system.
17. PP shall provide organic waste digester followed by composting facility/bio-digester followed by composting facility for the treatment of biodegradable waste.
18. PP shall carryout carbon audit & submit the report.
19. PP shall submit the plan for plastic recycling before 1st Operate.
20. PP shall submit the management plan towards the disposal of cargo waste disposal.
21. PP shall submit the plan/commitment towards adoption of E-Vehicle policy.
22. PP shall submit BG of Rs. 25.0 Lakh towards compliance of EC & consent conditions.
23. PP shall comply with revalidation of Environment Clearance conditions obtained on 28.11.2021
24. This consent is issued with the overriding effect to earlier consider isssued vide No.:-Format1.0/CAC/UAN No.0000100222/CE-2110000162 dated 05.10.2021
25. This consent is issued pursuant to the decision of the 3rd Consent Appraisal Committee Meeting held on 24.05.2022.
26. The applicant shall obtain Consent to Operate from Maharashtra Pollution Control Board before actual commencement of the Unit/Activity.

Received Consent fee of -

Sr.No	Amount(Rs.)	Transaction/DR.No.	Date	Transaction Type
1	6794000.00	MPCB-DR-9776	13/01/2022	RTGS

Copy to:

1. Regional Officer, MPCB, Raigad and Sub-Regional Officer, MPCB, Raigad I

- They are directed to ensure the compliance of the consent conditions.

2. Chief Accounts Officer, MPCB,Sion, Mumbai
3. CAC Desk - for record & updation purposes.

SCHEDULE-I

Terms & conditions for compliance of Water Pollution Control:

1. A] As per your application, you have proposed to provide ETP comprising primary treatment of capacity 400 CMD to treat the effluent generated to the tune of 400 CMD. This primary treated effluent further treated in STP of combine capacity 5500 CMD.

   B] The Applicant shall operate the effluent treatment plant (ETP) to treat the trade effluent so as to achieve the following standards prescribed by the Board or under EP Act, 1986 and Rules made there under from time to time, whichever is stringent:

Sr.No	Parameters	Limiting concentration not to exceed in mg/l, except for pH
(1)	pH	6.0 -8.5
(2)	BOD (3 days 27°C)	10
(3)	COD	50
(4)	TSS	20
(5)	Oil & Grease	10
(6)	TDS	2100
(7)	Chloride	600
(8)	Sulphate	1000

   C] The treated effluent shall be 60% recycled for secondary purposes such as toilet flushing, air conditioning, cooling tower makeup, firefighting, etc., and remaining shall be discharged on land for gardening within premise after confirming above standards. In no case, effluent shall find its way outside premises.

2. A] As per your application, you have proposed to provide 2 Nos of Sewage Treatment Plants of designed capacity 4500 CMD & 1000 CMD with SBR technology for the treatment of 4210 CMD of sewage.

   B] Industry shall comply prescribed standards & disposal path as prescribed at Sr. No. 1 B & C of schedule I.

3. The Board reserves its rights to review plans, specifications or other data relating to plant setup for the treatment of waterworks for the purification there of & the system for the disposal of sewage or trade effluent or in connection with the grant of any consent conditions. The Applicant shall obtain prior consent of the Board to take steps to establish the unit or establish any treatment and disposal system or an extension or addition thereto.

4. The industry shall ensure replacement of pollution control system or its parts after expiry of its expected life as defined by manufacturer so as to ensure the compliance of standards and safety of the operation thereof.
5. The Applicant shall comply with the provisions of the Water (Prevention & Control of Pollution) Act, 1974 and as amended, by installing water meters and other provisions as contained in the said act:

Sr. No.	Purpose for water consumed	Water consumption quantity (CMD)
1.	Industrial Cooling, spraying in mine pits or boiler feed	1972.00
2.	Domestic purpose	4880.00
3.	Processing whereby water gets polluted & pollutants are easily biodegradable	430.00
4.	Processing whereby water gets polluted & pollutants are not easily biodegradable and are toxic	0.00
5.	Gardening	0

6. The Applicant shall provide Specific Water Pollution control system as per the conditions of EP Act, 1986 and rule made there under from time to time/ Environmental Clearance/ CREP guidelines.

SCHEDULE-II

Terms & conditions for compliance of Air Pollution Control:

1. As per your application, you have proposed to provide the Air pollution control (APC) system and also to erect following stack (s) to observe the following fuel pattern:

Stack No.	Source	APC System provided/proposed	Stack Height(in mtr)	Type of Fuel	Sulphur Content(in %)	Pollutant	Standard
S-1 to S-2	DG Set (14 x 880 KVA)	Stack	6.00	HSD 135 Kg/Hr	1.0	SO2	64.8 Kg/Day

2. The Applicant shall provide Specific Air Pollution control equipments as per the conditions of EP Act, 1986 and rule made there under from time to time/ Environmental Clearance / CREP guidelines.
3. The Applicant shall obtain necessary prior permission for providing additional control equipment with necessary specifications and operation thereof or alteration or replacement/alteration well before its life come to an end or erection of new pollution control equipment.
4. The Board reserves its rights to vary all or any of the condition in the consent, if due to any technological improvement or otherwise such variation (including the change of any control equipment, other in whole or in part is necessary).

SCHEDULE-III

Details of Bank Guarantees:

Sr. No.	Consent (C2E/ C2O /C2R)	Amt of BG Imposed	Submission Period	Purpose of BG	Compliance Period	Validity Date
1	C2E	Rs. 25.0 Lakh	15 days/To be extended	Towards compliance of EC & consent conditions	31.05.2026	30.11.2026

The above Bank Guarantee(s) shall be submitted by the applicant in favour of Regional Officer at the respective Regional Office within 15 days from the date of issue of Consent.

BG Forfeiture History

Srno.	Consent (C2E/C2O/C2R)	Amount of BG imposed	Submission Period	Purpose of BG	Amount of BG Forfeiture	Reason of BG Forfeiture
NA						

BG Return details

Srno.	Consent (C2E/C2O/C2R)	BG imposed	Purpose of BG	Amount of BG Returned
NA				

SCHEDULE-IV

General Conditions:

1. Consumers or bulk consumers of electrical and electronic equipment listed in Schedule I shall ensure that e-waste generated by them is channelised through collection centre or dealer of authorised producer or dismantler or recycler or through the designated take back service provider of the producer to authorised dismantler or recycler
2. Bulk consumers of electrical and electronic equipment listed in Schedule I shall maintain records of e-waste generated by them in Form-2 and make such records available for scrutiny by the concerned State Pollution Control Board
3. Consumers or bulk consumers of electrical and electronic equipment listed in Schedule I shall ensure that such end-of-life electrical and electronic equipment are not admixed with e-waste containing radioactive material as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and rules made there under;
4. Bulk consumers of electrical and electronic equipment listed in Schedule I shall file annual returns in Form-3, to the concerned State Pollution Control Board on or before the 30th day of June following the financial year to which that return relates. In case of the bulk consumer with multiple offices in a State, one annual return combining information from all the offices shall be filed to the concerned State Pollution Control Board on or before the 30th day of June following the financial year to which that return relates.

5. Specific Conditions for storage, Handling and Disposal of Waste from Electrical & Electronic equipment (WEEE):

    1. **Collection of WEEE** - The applicant must provide appropriate and dedicated vehicles duly identified as per the norms for transportation of Hazardous Waste. The applicant shall obtain all the required permits for transportation of WEEE from competent authority. The applicant shall ensure the safe transport of the WEEE without any spillage during transportation.

       Storage for disassembled parts: The applicant must provide appropriate storage for disassembled spare parts from WEEE. Some spare parts (e.g. motors and compressors) will contain oil and/or other fluids. Such part must be appropriately segregated and stored in containers that are secured such that oil and other fluids cannot escape from them. These containers must be stored on an area with an area with an impermeable surface and a sealed drainage system.

    2. **Storage for other components and residues:**Other components and residues arising from the treatment of WEEE will need to be contained following their removal for disposal or recovery. Where they contain hazardous substances they should be stored on impermeable surface and in appropriate containers or bays with weatherproof covering. Containers should be clearly labelled to identify their contents and must be secured so that liquids, including rain water cannot enter them. Components should be segregated having regard to their eventual destinations and the compatibility of the component types. All batteries should be handled and stored having regard to the potential fire risk associated with team.

    3. **Balances :** WEEE Guidelines also requires that sites for handling of WEEE have “balances to measure the weight of the segregated waste’. The objective is to ensure that a record of weights can be maintained of WEEE entering a facility and components and materials leaving each site (together with their destinations). The nature of the weighing equipment should be appropriate for the type and quantity of WEEE being processed.

    4. Plastic, which cannot be recycled and is hazardous in nature, is recommended to be land filled in nearby CHWTSDF.

    5. Ferrous and nonferrous metal recycling facilities fall under the purview of existing environmental regulations for air, water, noise, land and soil pollution and generation of hazardous waste and the same should be followed.

    6. CFCS should be either reused or incinerated in common hazardous waste Incineration facilities at CHWTSDF.

    7. Waste Oil should be either reused or incinerated in common hazardous waste incineration facilities.

    8. PCB's containing capacitors shall be incinerated in common hazardous waste incineration facilities at CHWTSDF.

    9. Mercury recovery and lead recycling facilities from batteries fall under the Hazardous & Other Wastes (M & TM) Rules, 2016.

    10. Existing environmental regulations for air; water; noise, land and soil pollution and generation of hazardous waste and the same should be followed. In case Mercury or lead recovery is very low, they can be temporarily stored at e-waste recycling facility and later disposed in TSDF.

    11. The industry shall maintain records of the e-waste purchased, processed in Form-2 and shall file annual returns of its activities of previous year in Form-3 as per Rules 11(9) & 13(3)(vii) of the E-Waste(M) Rules, 2016; on or before 30th day of June of every year.

6. The Energy source for lighting purpose shall preferably be LED based

7. The PP shall harvest rainwater from roof tops of the buildings and storm water drains to recharge the ground water and utilize the same for different industrial applications within the plant
8. Conditions for D.G. Set
   a) Noise from the D.G. Set should be controlled by providing an acoustic enclosure or by treating the room acoustically.
   b) Industry should provide acoustic enclosure for control of noise. The acoustic enclosure/ acoustic treatment of the room should be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on higher side. A suitable exhaust muffler with insertion loss of 25 dB (A) shall also be provided. The measurement of insertion loss will be done at different points at 0.5 meters from acoustic enclosure/room and then average.
   c) Industry should make efforts to bring down noise level due to DG set, outside industrial premises, within ambient noise requirements by proper sitting and control measures.
   d) Installation of DG Set must be strictly in compliance with recommendations of DG Set manufacturer.
   e) A proper routine and preventive maintenance procedure for DG set should be set and followed in consultation with the DG manufacturer which would help to prevent noise levels of DG set from deteriorating with use.
   f) D.G. Set shall be operated only in case of power failure.
   g) The applicant should not cause any nuisance in the surrounding area due to operation of D.G. Set.
   h) The applicant shall comply with the notification of MoEFCC, India on Environment (Protection) second Amendment Rules vide GSR 371(E) dated 17.05.2002 and its amendments regarding noise limit for generator sets run with diesel.
9. The applicant shall maintain good housekeeping.
10. The non-hazardous solid waste arising in the factory premises, sweepings, etc. be disposed of scientifically so as not to cause any nuisance / pollution. The applicant shall take necessary permissions from civic authorities for disposal of solid waste.
11. The applicant shall not change or alter the quantity, quality, the rate of discharge, temperature or the mode of the effluent/emissions or hazardous wastes or control equipments provided for without previous written permission of the Board. The industry will not carry out any activity, for which this consent has not been granted/without prior consent of the Board.
12. The industry shall ensure that fugitive emissions from the activity are controlled so as to maintain clean and safe environment in and around the factory premises.
13. The industry shall submit quarterly statement in respect of industries obligation towards consent and pollution control compliance's duly supported with documentary evidences (format can downloaded from MPCB official site).
14. The industry shall submit official e-mail address and any change will be duly informed to the MPCB.
15. The industry shall achieve the National Ambient Air Quality standards prescribed vide Government of India, Notification No. B-29016/20/90/PCI-L dated. 18.11.2009 as amended.
16. The Board reserves its rights to review plans, specifications or other data relating to plant setup for the treatment of waterworks for the purification thereof & the system for the disposal of sewage or trade effluent or in connection with the grant of any consent conditions. The Applicant shall obtain prior consent of the Board to take steps to establish the unit or establish any treatment and disposal system or an extension or addition thereto.
17. The industry shall ensure replacement of pollution control system or its parts after expiry of its expected life as defined by manufacturer so as to ensure the compliance of standards and safety of the operation thereof.
18. The PP shall provide personal protection equipment as per norms of Factory Act

19. Industry should monitor effluent quality, stack emissions and ambient air quality monthly/quarterly.
20. Whenever due to any accident or other unforeseen act or even, such emissions occur or is apprehended to occur in excess of standards laid down, such information shall be forthwith Reported to Board, concerned Police Station, office of Directorate of Health Services, Department of Explosives, Inspectorate of Factories and Local Body. In case of failure of pollution control equipments, the production process connected to it shall be stopped.
21. The applicant shall provide an alternate electric power source sufficient to operate all pollution control facilities installed to maintain compliance with the terms and conditions of the consent. In the absence, the applicant shall stop, reduce or otherwise, control production to abide by terms and conditions of this consent.
22. The industry shall recycle/reprocess/reuse/recover Hazardous Waste as per the provision contain in the Hazardous and Other Wastes (M & TM) Rules 2016, which can be recycled /processed /reused /recovered and only waste which has to be incinerated shall go to incineration and waste which can be used for land filling and cannot be recycled/reprocessed etc. should go for that purpose, in order to reduce load on incineration and landfill site/environment.
23. An inspection book shall be opened and made available to the Board's officers during their visit to the applicant.
24. Industry shall strictly comply with the Water (P&CP) Act, 1974, Air (P&CP) Act, 1981 and Environmental Protection Act, 1986 and industry specific standard under EP Rules 1986 which are available on MPCB website (www.mpcb.gov.in).
25. Separate drainage system shall be provided for collection of trade and sewage effluents. Terminal manholes shall be provided at the end of the collection system with arrangement for measuring the flow. No effluent shall be admitted in the pipes/sewers downstream of the terminal manholes. No effluent shall find its way other than in designed and provided collection system.
26. Neither storm water nor discharge from other premises shall be allowed to mix with the effluents from the factory.
27. The industry should not cause any nuisance in surrounding area.
28. The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standard in respect of noise to less than 75 dB (A) during day time and 70 dB (A) during night time. Day time is reckoned in between 6 a.m. and 10 p.m. and night time is reckoned between 10 p.m. and 6 a.m.
29. The industry shall create the Environmental Cell by appointing an Environmental Engineer, Chemist and Agriculture expert for looking after day to day activities related to Environment and irrigation field where treated effluent is used for irrigation.
30. The applicant shall provide ports in the chimney/(s) and facilities such as ladder, platform etc. for monitoring the air emissions and the same shall be open for inspection to/and for use of the Board's Staff. The chimney(s) vents attached to various sources of emission shall be designated by numbers such as S-1, S-2, etc. and these shall be painted/ displayed to facilitate identification.
31. The industry should comply with the Hazardous and Other Wastes (M & TM) Rules, 2016 and submit the Annual Returns as per Rule 6(5) & 20(2) of Hazardous and Other Wastes (M & TM) Rules, 2016 for the preceding year April to March in Form-IV by 30th June of every year.

32. The applicant shall install a separate meter showing the consumption of energy for operation of domestic and industrial effluent treatment plants and air pollution control system. A register showing consumption of chemicals used for treatment shall be maintained.
33. The applicant shall bring minimum 33% of the available open land under green coverage/ plantation. The applicant shall submit a yearly statement by 30th September every year on available open plot area, number of trees surviving as on 31st March of the year and number of trees planted by September end.
34. The Board reserves its rights to review plans, specifications or other data relating to plant setup for the treatment of waterworks for the purification thereof & the system for the disposal of sewage or trade effluent or in connection with the grant of any consent conditions.
35. The firm shall submit to this office, the 30th day of September every year, the Environment Statement Report for the financial year ending 31st March in the prescribed FORM-V as per the provisions of Rule 14 of the Environment (Protection) (second Amendment) Rules, 1992.
36. The Applicant shall obtain necessary prior permission for providing additional control equipment with necessary specifications and operation thereof or alteration or replacement/alteration well before its life come to an end or erection of new pollution control equipment.
37. The Board reserves its rights to vary all or any of the condition in the consent, if due to any technological improvement or otherwise such variation (including the change of any control equipment, other in whole or in part is necessary).
38. The applicant shall provide facility for collection of environmental samples and samples of trade and sewage effluents, air emissions and hazardous waste to the Board staff at the terminal or designated points and shall pay to the Board for the services rendered in this behalf.

This certificate is digitally & electronically signed.
