CITY AND INDUSTRIAL DEVELOPMENT CORPORATION OF MAHARASHTRA LIMITED

(CIN - U99999 MH 1970 SGC - 014574)

REGD. OFFICE:
"NIRMAL", 2nd Floor, Nariman Point,
Mumbai - 400 021.
PHONE : 00-91-22-6650 0900
FAX : 00-91-22-2202 2509

HEAD OFFICE:
CIDCO Bhavan, CBD Belapur,
Navi Mumbai - 400 614.
PHONE: 00-91-22-6791 8100
FAX : 00-91-22-6791 8166

Ref. No. ***Date :***

CIDCO/GM(ENV&F)/NMIA/2019/794 Date: 24th Jan 2020

The Chief Conservator of Forest (CCF),
Regional Office, Western Region,
Ministry of Environment, Forests & Climate Change (MoEF&CC)
Ground Floor, East Wing, New Secretariat Building,
Civil Lines, Nagpur-440001

Sub: Submission of Six-Monthly Compliance Report (July-Dec 2019) for Environmental and CRZ Clearance in respect of proposed Navi Mumbai International Airport.

Ref: Environmental and CRZ Clearance granted by MoEF, Government of India vide letter No. 10-53/2009-IA.III dated 22nd November 2010 and Extension of Validity granted by MoEF&CC vide letter No. 10-53/2009-IA.III dated 20th December 2017.

Dear Sir,

With reference to the above, we are submitting herewith the six-monthly Environmental Compliance Status report as per the following:

1. EC Compliance Report for the period of **July - December 2019**
2. Environmental Monitoring Reports (**Annexure-I**)
3. Latest Status report of Mangrove afforestation with Photographs (**Annexure -II**)
4. PUC Certificates for few Vehicles used during transportation (**Annexure -III**)

We hope the above is to your satisfaction.

Thanking You,

Yours faithfully,
General Manager(Envt & F)

(D. R. Patil)
General Manager
Environment & Forests
CIDCO Ltd.

Encl.: a/a

CC:

1. The Member Secretary, Maharashtra Pollution Control Board, 3rd Floor, Kalpataru Point, Sion, Mumbai – 400 022.
2. The Zonal Officer, Central Pollution Control Board, Parivesh Bhavan, Opp. VNC ward office No. 10, Subhanpura, Vadodara – 390023.
3. The Chairman, Maharashtra Coastal Zone Management Authority, Room No. 217 (Annex), Mantralaya, Mumbai – 400 032.
4. Monitoring Cell, MoEF&CC, Indira Paryavaran Bhavan, Jor Bagh Road, New Delhi – 3.

HALF YEARLY COMPLIANCE REPORT

1.	**Name of the Project**	:	Navi Mumbai International Airport (NMIA) at Navi Mumbai, Taluka Panvel, Dist. Raigad, Maharashtra.
02	**MoEF & CC Clearance Letter No. & Date**	:	F. No. 10-53/2009-I.A.III dtd. 22.11.10
	Extension of Validity	:	F. No. 10-53/2009-IA.III dt 20.12.17 upto 21.11.2020
03	**Compliance Period**	:	01.07.2019 to 31.12.2019
04	**Project & Statutory Clearances Update**	:	The various conditions of Environment Clearance (EC) are being 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 at Bhopal.
			A copy of letter granting EC by MoEF was sent to office of Commissioner, Konkan Division, Collector, Raigad, C.E.O., Zilha Parishad, B.D.O., Panchayat Samiti and the Sarpanch of Six Villages in the project area and local NGO from whom suggestions/representation were received while processing the proposal.
			The updated EIA study report was submitted to all the concerned departments of GoI and GoM vide letter No. CIDCO/GM/Airport/49 dt. 21st April 2011.
			The land use plan in sanctioned development plan of Navi Mumbai is amended by incorporating 615 Ha. area as No Development Zone vide Govt. Order No.TPS-1711/2495/C.R.202/11/UD-12 dtd.21st March, 2012
			The Govt. of Maharashtra issued Notification bearing No.TPS:17112/475/CR-58/UD/12 dated 10th January, 2013; for an area around proposed International Airport called "Navi Mumbai Airport Influence Notified Area" NAINA and appointed CIDCO to be Special Planning Authority.
			The Wildlife Clearance was recommended in the 29th Meeting of Standing Committee vide letter No.F.No.6-43/2007 WL-I dtd. 1st August, 2013 of Wildlife Division of Ministry of Environment & Forest, Govt. of India.
			The Bombay High Court permitted CIDCO to clear Mangroves for the development of NMIA vide its Order dt.

			29th October, 2013 in NoM.419 of 2011.
			In Principle approval for the first stage Forest Clearance for NMIA project was accorded vide Letter No.F.No.8-95/2012-FC dt. 17th December, 2013 .
			Urban Development Department, Govt. of Maharashtra issued the G.R. No. CID/1812 /P.K.275/UD-10, dt.1st March, 2014 & 28th May 2014 for Land Acquisition & Resettlement & Rehabilitation of families falling in airport site.
			The Ministry of Environment, Forest and Climate Change (MoEF and CC) (Wild life Division) vide its letter no. F No. 6-48/2015 WL (34th meeting) dt 30.06.2015 amended condition (iv) of the earlier NBWL clearance requiring Mangrove Sanctuary adjacent to NMIA site in the interest of human safety.
			Maharashtra Pollution Control Board granted Consent to Establish for Phase I of the NMIA project vide Consent Order No. Consent Order No: - Format 1.0/BO/CAC-cell/EIC-RD-3154-15/CE/CAC- 12955 dt 14.10.2015 valid upto : 14.10.2020
			The CRZ clearance for off-site physical infrastructure of roads, bridges and interchanges has been granted by MCZMA vide letter no. MCZMA-2016/CR-6/TC-4 dated 15th February 2016.
			Final approval / Stage 2 Forest Clearance granted by MoEF & CC vide F. No8-95/2012-FC dt. 24th April 2017 for NMIA project
			Proposal for shifting of Electric High Voltage Tension (EHVT) Lines was cleared by MOEFCC vide letter dt 28.08.17
			The Comprehensive EIA study report was submitted to MoEF & CC, MCZMA and MPCB vide letter No. CIDCO/SE(AP-II)/NMIA/2017/ dt. 29th August, 2017
			MoEF&CC has granted extension of validity to the Environment & CRZ Clearance for 3 years, vide its letter No: F. No. 10-53/2009-IA.III dt. 20.12.17 upto 21.11.2020
			Amendment has been sought for re-routing of EHVT lines in CRZ area so as to save time of execution and reduce impact on mangroves. MoEFCC has sanctioned CRZ

			clearance for the amendment vide its letter No.-F.No. II-38/2016-IA-III dtd 6th Nov. 2018
			Forest Clearance Stage I for shifting of EHVT Lines was received vide letter dt. 02.08.18
			CIDCO has applied for Environmental clearance for Area development Project for Commercial development over 143 Ha area to the south of the airport for Non aeronautical activities. The said case was appraised by the SEAC-2 committee in its meeting dt 26.10.2018 and recommended for SEIAA appraisal. SEIAA granted EC on 11th Sept. 2019.
			MoEF and CC vide its letter F/10-53/2009-IA-III dt 26th Dec 2018 has recommended partial waiver in condition imposed by the EAC in the 112th meeting dt 11 May 2012 to the arterial road along the north boundary that *in mangrove areas the road should be on stilts.* CIDCO has now submitted application to MCZMA for amendment in its letter dt. MCZMA-2016/CR-6/TC-4 dated 15th February 2016. MCZMA issued amendment letter vide no. MCZMA-2019/CR-16/T.C.-4 dated 4th April 2019
			Monitoring Committee for Compliance of Forest Clearance conditions headed by Head of Forest Forces (HOFF) visited the site on 12th Dec. 2018 and checked compliance to the Forest Clearance.
			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.
05	**Present Status of Project**	**:**	Currently, CIDCO is undertaking pre-construction land development works at site and has engaged three contractors to do the task. Concessionaire selected by CIDCO M/s Navi Mumbai International Airport Private Limited (NMIAL) is undertaking Detailed Engineering for the project. Detailed Master Plan is prepared for the project

Present Status of Compliance to Conditions stipulated in E&CRZ Clearance No.10-53/2009-I.A. III dt. 22.11.2010 is given as under:

Sl. No		Particular	Compliance status (July 2019 – December 2019)
	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.**	"Consent for Establishment" obtained from MPCB vide letter dt. 14.10.2015 for Phase 1 of Airport having validity 5 years from date of issue of letter or commissioning of Phase 1 COD, whichever is earlier.
	(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, which ever is more beneficial to the project affected persons.**	R&R package approved vide UDD, GoM G.R.dtd.1st March, 2014 and 28th May 2014 for rehabilitation of families falling in airport site. The package exceeds the requirements of LARR 2013 and also provides special incentives for shifting/relocation. CIDCO has developed seven R and R pockets and given adequate facilities at each R and R pocket. As of 31st Dec. 2019, about 2540 agreements are executed, 2655 structures demolished, and 2320 plots given possession.
	(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.**	The Bombay High Court permitted CIDCO to clear Mangroves for the development of NMIA vide its Order dt. 29th October, 2013 in NoM.419 of 2011 in PIL No. 87/2006.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
	[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 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**	CIDCO has amended the Land Use in Navi Mumbai Development Plan (NMDP) and the same has been approved by Urban Development Department, Government of Maharashtra vide letter dt 21.03.2012 by identifying various pockets as No Development Zone to protect the Mangroves towards the North and West of NMIA site. As required in the EC, area northeast of the airport site between Gadhi River, Mankhurd Panvel Rail corridor and National Highway 4B has been declared as No-development zone in the NMDP. The Plantation and protection of the mangrove patches is being taken up with the support of Mangrove Cell - Forest Department in a phased manner.

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		procedure under MRTP Act to achieve this objective.	
	[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 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**	1. CWPRS, Pune carried out 1D, 2D & physical Model studies based on the MoEF's approved layout plan of airport covering 1160 Ha. CIDCO/ NMIAL is designing the project, including the airport drainage system, as well as the master drainage plan of surrounding areas by incorporating the various recommendations of CWPRS 2. The preliminary drainage plan of the airport site has been prepared by the prime consultant. However, the detailed plan is prepared by the Concessionaire as a part of Master Plan preparation, incorporating CWPRS recommendations and abiding by EC conditions. The whole Storm Water from Airport area is planned to discharge in Gadhi River. CIDCO will be monitoring the same. 3. The master drainage plan for the airport and surrounding area is prepared by CIDCO, considering the core airport area and the various developments around the airport, based on CIDCO's design norms and as per CWPRS recommendations. NMIAL is also integrating the plans with CIDCO plans / CWPRS recommendations 4. The Master plan developed jointly by NMIA and CIDCO has ensured that there will be no discharge into the recourse channel from Airport as mandated in EC. CIDCO has signed long term MOU with CWPRS, so that the drainage plans for all areas in Navi Mumbai prepared by it are checked by CWPRS. This practice is followed for all areas near the proposed airport also.

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		shall be examined by CIDCO in details to avoid the flooding of the low-lying areas besides inducting other hydrological and environmental studies.	
	(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**	Data on the topography of area surrounding the airport is collected. The master drainage plan of airport and surrounding area is prepared for the worst conditions (highest high tide, tidal surge, maximum rainfall condition and flooding in all rivers and a safety factor which is dependent upon climate surge). A 100 year return period has been selected to decide the worst rainfall conditions. NMIAL has also engaged CWPRS for checking the Internal drainage system designed for the airport area so that it ties very well with the Master Drainage system planned for the area. Recommendations of the CWPRS report and submitted to MOEFCC as a part of Comprehensive EIA report.

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		developments. CIDCO 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.**	CIDCO has appointed a Laboratory recognized by MoEF & CC, for monitoring the various environmental parameters of river water and groundwater, on monthly basis around the airport, in order to establish the pre-construction/during construction data. A copy of Environmental Monitoring report is attached as **ANNEXURE I.**
	[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.**	The Master Drainage 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 fairly low and obstructions due to such factors are considered while designing Master Drainage layout.
	[ix]	**On the northern part of the airport there is a secondary channel of the Gadhi River which will be filled up for the airport runway construction.**	The proposed North connecting channel is designed in accordance with the Model studies carried out at CWPRS, Pune.

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		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.	
	[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 of Panvel creek shall be periodically removed.**	All the flow channels in No Development Zone (615 Ha.) are kept undisturbed and any deposition of sediment in Panvel Creek is removed periodically. CWPRS studies show that siltation rates in Gadhi River and Panvel creek are fairly low and obstructions due to such factors are considered while designing Master Drainage layout.

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	[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.**	Mumbai University has quantified the affected Mangrove and same was incorporated in the Updated EIA Report of 2011 and Comprehensive EIA Report 2017. The scheme for regeneration of Mangroves is prepared through a consultant M/s. Lewis Environment Services USA. The regeneration of mangroves is being planned in a phased manner, in consultation with the Mangrove Cell of State Forest Dept, Plantation has already completed in the 310 Ha of NDZ to the North East of airport. , 60 ha in Moha Creek and 20 ha on North of Airport Photographs showing the compensatory mangrove development is enclosed as **Annexure II.** Scheme for river front development is being prepared by CIDCO. In addition to the mangrove protection along the river bank, a river front development plan will be in place, so as to ensure adequate bank protection.
	[xii]	**Whatever EIA data was submitted and presented was related to a situation for "no airport condition". The project proposal has under gone many changes in terms of converting the lagoon as Mangrove Park, shifting of non-aeronautical activities**	Updated EIA report was submitted to MoEF, MPCB and MCZMA on 21 st April, 2011. 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 dtd 29th August, 2017. Environmental Audit will be conducted after commissioning of phase 1 of the airport. The same has been mandated in the Concession Agreement

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		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 MCZMA and shall be uploaded on the website.	for NMIA.

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	[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 Maharashtra State Pollution Control Board.**	Water quality monitoring during on- going pre-construction work is being carried out by CIDCO through MoEF & CC recognized Lab and regular reports are being submitted to MoEF & CC. During construction and operation period also monitoring of the water quality will be carried out by CIDCO as well as Concessionaire. Water quality is being monitored on quarterly basis and reports are being submitted to MoEFCC as a part of Six-Monthly compliance reports.
	[xiv]	**The waste water generated from the aircraft maintenance hangers 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 waste water shall be specified and adopted.**	Provision of silt traps and oil separator chamber will be made by the Concessionaire to separate the Suspended solids and oil and grease from water before discharging surface drains into nearby water bodies. The waste water from the maintenance hangars will be treated by physicochemical treatment and treated effluent sent to Sewage Treatment Plants (2 nos) to be put up within site The treated water will be monitored regularly for parameters as set in Consent granted by MPCB. Environment Cell of CIDCO will continue monitoring of parameters in the surrounding water bodies for any variation.
	[xv]	**Based on the geological profile**	The runway pavement will be designed taking into consideration subsoil condition beneath so as to

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		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 night time and the mitigation measures shall be installed to reduce the (noise/ vibration levels) impacts.	minimize noise/vibration. Necessary actions to reduce noise/vibration levels during the operations phase shall be taken by Concessionaire - The same has been mandated in the Concession Agreement for NMIA. It will be further monitored by CIDCO's Environment Cell.
	[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.**	While designing the SIDs and STARs by AAI/DGCA, consideration will be given to minimize noise level in the funnel during operation of Airport. The Master Plan prepared by NMIA and CIDCO also proposes to have following Noise attenuation measures: • Strict adherence to DGCA/ICAO prescribed environmental Guidelines and Circulars on airport operations • Restricted usage of ground engines run ups to reduce noise • Restricted us of thrust reversal while landing of aircraft to minimize noise in lateral direction • Dual nozzles in the aircraft to reduce the noise levels • Switching off as many engines as possible during idling and taxing

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			• Proper maintenance of ground servicing equipment. • In addition, standard instrument and departure procedure shall also be designed to minimize the noise levels within the permissible limits for the area falling in the funnel near the airport on either side Noise attenuation has been mandated in the Concession Agreement for NMIA
	[xvii]	**Energy conservation to the extent of 20% shall be incorporated in the bidding documents including water conservation (reuse/ recycle, rain water 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.**	Necessary energy conservation and water conservation measures will be adopted by the Concessionaire Concession Agreement (CA) for NMIA mandates the Specifications & Standards to be abided by the Concessionaire while designing the Airport including Energy Conservation Building Code (ECBC) 2007 issued by Bureau of Energy Efficiency and revised from time to time. CA also mandates the Concessionaire to comply with all conditions laid down by the Environment & CRZ clearance granted by MoEF & CC and to carry out checks to ensure conformity of the Airport with the environmental requirements set forth in Applicable Laws and Applicable Permits (which include all clearances, consents and approvals). The energy demand is estimated under the Master Plan and shows that cumulative peak power demand will be much lower than the CEIA estimate, by adhering to ECBC norms.
	[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**	CIDCO carried out a detailed Connectivity Study "Regional and Local Transport Connectivity Plan for Navi Mumbai International Airport" through international consultant M/s. Lea Associates South Asia Pvt Ltd. Lea Associates was given the task of studying the impact of airport in the regional transportation of Mumbai Metropolitan Region (MMR) as well as Navi Mumbai and suggest measures to be taken to enhance the airport connectivity and to manage the increased traffic. Based on the findings of this

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		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.	study, CIDCO has taken up various projects for improving the connectivity through various modes, by giving emphasis to public transport. The Seawoods-Uran Rail link has been recently commissioned as part of this work.
	[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 proposal of Hoverport shall not be taken up on the north part of the airport area as this shall damage the mangroves.**	The National and State Highway surrounding the airport are being 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 upto 10 lanes is completed. Further, additional bridges are being constructed at the Thane Creek bridge on SP Highway
	[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,**	M/s. Lea Associates, in its study has covered this aspect and actions to enhance the Public Transportation facilities to the airport are being initiated by the concerned Stakeholders / Authorities. 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 to the terminal and the provision of metro rail for airport has been mandated in the CA.

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		may be created between the Santa Cruz and the Navi Mumbai Airport in addition to all other links connecting various parts of Mumbai city.	
	[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).**	Traffic Management Plan during construction will be prepared in consultation with Navi Mumbai Traffic Police including installation of noise barriers if required.
	[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**	All the three Contractors selected for the pre-development works have prepared EHSMP (Environmental Health, Safety Management Plan) as part of Tender conditions. The Safety and Emergency protection measures at site to ensure safety at each contractor works include: - Safety Committee - Periodic safety checks - Tool box talk - Periodic Safety audit - System of reporting Near Miss and accidents - Risk assessment - First aid box and trained first aiders - Tie- up with nearby hospitals - Accident and near miss investigation and analysis Risk Assessment and Disaster Management Plan is being prepared for development phase of the Airport Construction particularly to gauge the hazards to the nearby eco-fragile area adjacent to the airport.

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		team/cell to handle disaster and associated risks.	Based on above, a Disaster Management Cell would be put in place by CIDCO to handle disaster and associated risks for the pre-development phase of the project. The updation of Disaster Management Plan for construction and commissioning phases will be done as the project implementation phase. The Concessionaire (NMIAL) also has to abide by the CA and ensure preparedness for disaster management. It mandates the Concessionaire to prepare and publish a Disaster Management Manual before the Commercial Operations Date
	[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.**	Noted- Actions taken as in (xxii) above NMIAL is preparing an ON site Emergency Management Plan for the construction – this will be suitably developed for Operation phase also as the detailed engineering gets completed and the project reaches the commissioning phase
	[xxiv]	**The compliance report of the monitoring committee shall be**	We have uploaded six monthly compliance report along with monitoring report on website of CIDCO and made available for public.

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		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.	All EC related compliance reports are uploaded on the website at the following link : https://cidco.maharashtra.gov.in/navi_mumbai_airport# under Pre- Development tab
	[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.**	The Environment Management Plan detailing the mitigation measures and the Environmental budget is part of CEIA study report and covering various obligations as prescribed under EC. Roles and responsibilities of various parties and timelines of completion are given therein.
	[xxvi]	**In order to meet all the essential aeronautical requirements and the further airport expansions, no property development shall be undertaken within the proposed aeronautical Airport Zone area (1160 ha).**	Compliance to this condition has been ensured through the CA which mandates the Concessionaire not to create any encumbrance apart from the ones agreed to by the Concession Agreement for the construction and operation of the Airport including Aeronautical and Non – aeronautical services.
	[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**	The Navi Mumbai Development Plan has been revised vide Govt. Order No.TPS-1711/2495/C.R. 202/11/UD-12 dtd. 21st March, 2012. Navi Mumbai development plan has been prepared for a systematic urban growth and prevent haphazard development. To ensure planned development of airport surroundings, the

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		around the airport. The landuse should take care of bird menace including that from the Mangrove Parks.	area around the airport has been designated as Pushpak Node. The land use plan for this area is being prepared in such a manner to complement the airport development and will contain Airport Non-Aeronautical Zone for accommodating ancillary functions of the airport, rehabilitation sites for airport PAPs and a state of the art township called Pushpak Nagar where modern commercial and residential facilities are being planned Further, to avoid haphazard development around the airport, GoM 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. NAINA is now being planned to absorb the potential growth generated by the Navi Mumbai Airport, and regional transport corridors, both road and metro, are linked to the NAINA network in consultation with MMRDA. CIDCO has signed long term MOU with BNHS (Bombay Natural History Society) for studying Bird movement patterns and to guide regarding all round development of areas near to NMIA airport and Navi Mumbai.
	[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.**	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 CIDCO shall finalise the Airport plans**	CIDCO has prepared development plan for airport and surrounding facilities accordingly. Master Plan prepared for NMIA development is in strict compliance of the prevailing CRZ provisions. The requirement for compliance in this regard is already built into the CA and will be appropriately ensured. The same shall be monitored by Environment Cell as well as HLAMC.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		accordingly.	
	[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.**	Turbidity during pre-construction and construction period is being tested and analyzed regularly through MOEF & CC recognized laboratory appointed to carry out regular environmental monitoring at pre-defined locations in surface waters around the airport. The quarterly monitoring of turbidity is being carried out . These results are then submitted to MPCB and also put up on CIDCO web site as a part of Six Monthly Compliance Reports. Similar monitoring will be continued by the Concessionaire in future, and monitored by the Environment Cell.
	[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.**	BNHS is appointed to do the periodic base line survey of avian fauna and quarterly as well as annual reports are being received and placed on CIDCO'S website. CIDCO has also signed a long term MOU (ten year period ending 2028) to track Bird movements and advice regarding overall development of Navi Mumbai to ensure adequate habitats are maintained for the sustenance and growth of birds and do not endanger flight movements.
	[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**	CIDCO has sought separate approval for associated infrastructure of airport. The CRZ clearance for off-site physical infrastructure of roads, bridges and interchanges has been granted by MCZMA vide letter dated 15th February 2016. 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. Forest Clearance Stage I for shifting of EHVT Lines was received vide letter dt. 02.08.18. 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.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		and the CRZ Notification.	Process of obtaining Final Forest Clearance under FC Act has been initiated for Shifting of EHVT lines.
	[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**	Airport safety and security plan will be prepared for submission to DGCA, AAI, BCAS by Concessionaire. The DCA mandates safety requirements and procedures will be followed while developing the plan
	[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**	High Level Advisory and Monitoring Committee (HLAMC) was constituted by Govt. of Maharashtra vide its Order dtd. 13th May, 2011. Further HLAMC meeting is being arranged.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		committee 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**	Regular monitoring of ambient air and noise levels during pre- development stage is in progress and reports are being shared along with six monthly compliance reports with MoEFCC and MPCB. Similar monitoring will be continued
	[xxxvi]	**The solid waste shall be properly collected, segregated and disposed as per the provision of Solid Waste (Management and Handling) Rules, 2000.**	Noted – The Master Plan for NMIA airport gives complete details of Solid waste identification, storage and disposal.
	[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.**	Presently project is in pre-development phase and necessary facilities are provided by contractors as per contract conditions put up by CIDCO. NMIAL is also mandated to give proper labour housing facilities as part of the CA.
	[xxxviii]	**A First Aid Room will be provided in the project both during construction and**	First aid facilities are provided at offices of various contractors doing the pre- development construction works. In addition CIDCO contract mandates each contractor to maintain an

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		operation of the project.	ambulance and have tie up with local Hospital to ensure that in case of emergency necessary facilities are available to working personnel.
	[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.**	Currently, pre-development land development is in progress. Major work ongoing is cutting and filling which is contained within the Airport area. Condition is noted and will be complied when excavation work is undertaken.
	[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.**	CIDCO has appointed a Laboratory recognized by MoEF & CC, for monitoring the various environmental parameters of soil and groundwater, at monitoring stations around the airport, in order to establish the pre-construction/during construction data. A copy of Environmental Monitoring report is attached as **ANNEXURE I.**
	[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.**	CIDCO has appointed a Laboratory recognized by MoEF & CC, for monitoring the various environmental parameters of air, river water and groundwater, at monitoring stations around the airport, in order to establish the pre-construction/during construction data. A copy of Environmental Monitoring report is attached as **ANNEXURE I.**
	[xlii]	**Installation and operation of DG set shall comply with the guidelines of CPCB.**	Currently, contractors engaged for pre-development works have installed DG sets which comply the EP Act standards. The same will be mandated during construction and operation phases

Sl. No		Particular	Compliance status (July 2019 – December 2019)
	[xliii]	**The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.**	Presently project is pre-development phase and low sulfur fuel HSD is procured & used on day to day basis by the respective contractors. DG sets installed during ongoing pre- development phase are complying EP Act norms. Regular monitoring is being carried out as per norms.
	[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.**	Presently project is in the pre-development phase and 90% work is completed Only one of the contractors (M/s Gayatri Infrastructure Projects Pvt. Ltd. has provided underground tanks 2 x 20 KL each) at site. All the other three contractors do not have fuel storage at site and fuel is procured & used on day to day basis by them. DG sets provided for contractor offices have own in built tank. Necessary permissions have been obtained from Petroleum and Explosive Safety Organization (PESO) by M/s Gayatri Infrastructure Pvt Ltd for the underground storage tanks
	[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.**	Vehicles hired for bringing construction material / excavated soil are in good conditions and having valid PUC. Copies of PUC of vehicles handling construction debris is enclosed as **ANNEXURE- III** for ready reference. Ambient & noise levels are being monitored regularly at the site on monthly basis.
	[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**	Ambient & noise levels are being monitored on monthly basis through recognized laboratory during pre- development phase and reports are enclosed as **ANNEXURE - I.** It will be also continued during construction phase.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		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.	
	[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.	Noted and shall be adhered during construction phase.
	[xlviii]	Ready mixed concrete must be used in building construction.	Noted and shall be adhered during construction phase.
	[xlix]	Storm water control and its re-use as per CGWB and BIS standards for various applications.	Noted and shall be adhered during operation phase.
	(l)	Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and This condition need to be incorporated in the Bid Document to be issued to prospective bidders. This condition need to be incorporated in the Bid Document to be issued to prospective bidders. other best practices referred.	Noted and incorporated in the EPC bid document
	(li)	Use of glass may be	Noted and shall be adhered during construction

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		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.	phase.
	(lii)	**The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipment, etc. as per National Building Code including protection measures from lightening etc.**	CA mandates that the Concessionaire shall conform to National Building Code (NBC) and the requisite permissions shall be obtained as per GDCR and also other Applicable Permits
	(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.**	Shall be complied.
	SPECIFIC CONDITION		
II.	**OPERATION PHASE**		
	i)	**Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the**	Noted and shall be adhered during operation phase.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		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.	
	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.**	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.**	Noted and shall be adhered during operation phase.
	iv)	**Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.**	Noted and shall be implemented during construction phase.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
	v]	**Rain water harvesting for roof run- off and surface run- off, should be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease. The borewell for rainwater recharging should be kept at least 5 mts. above the highest ground water table.**	This condition will be complied during construction stage – it is proposed to have Rain Water harvesting ponds to the East and South west of the site and the harvested rain water will be used for irrigation purpose
	vi)	**The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.**	Same as I (vii)
	[vii]	**Energy conservation to the extent of 20% shall be incorporated in the bidding documents including water conservation (reuse/ recycle, rain water 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.**	Noted and shall be adhered during construction/ operation phase.
	[viii]	**CIDCO shall prepare a detailed traffic management plan to**	Transport infrastructure in and around the NMIA site is being upgraded as given in compliance to Construction Phase Sr. No. (xviii) above.

Sl. No		Particular	Compliance status (July 2019 – December 2019)
		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.	The detailed traffic Management will be a continuous effort as the development of NMIA and connecting roads gets frozen.
	ix]	Efforts should be made to use solar energy to the maximum extent possible.	This condition would be complied at appropriate time

No.	EC Condition		Compliance status	Status: Jan 20 Comments to be incorporate
III.	GENERAL CONDITIONS:			
	(i)	In the event of any change in the project profile a fresh reference shall be made to the Ministry of Environment and Forests.	Noted.	Same as previous report.
	(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.	Same as previous report.
	(iii)	This Ministry or any other competent authority may stipulate	Will be complied	Same as previous report.

No.	EC Condition		Compliance status	Status: Jan 20 Comments to be incorporate
		any additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.		
	(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.**	Will be complied	Same as previous report.
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.	Same as previous report.
9.		**All other statutory clearances such as the approvals for 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.**	Ministry of Civil Aviation (MoCA), Defense Clearance, Stage 1 forest clearance, Wildlife and Final Forest clearance, CRZ clearance for off-site physical infrastructure of roads, bridges and interchanges clearance and Hon'ble Bombay High Court permission are	No change

No.	EC Condition	Compliance status	Status: Jan 20 Comments to be incorporate
		obtained and other statutory clearances, if any, shall be obtained as applicable from competent authorities, at appropriate time. Wildlife Clearance was recommended in the 29th Meeting of Standing Committee and communicated vide Minutes No. P.No.6-43/2007 WL-I dtd. 1st August, 2013 of Wildlife Division of Ministry of Environment & Forest, Govt. of India. Later on vide the Minutes of 34th Standing Committee of NBWL, No: 6-48/2015 WL dtd 30th June 2015, amendment to condition no (iv) was issued with respect to development of mangrove sanctuary .	
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**	Complied.	Same as previous report.

No.	EC Condition		Compliance status	Status: Jan 20 Comments to be incorporate
		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.		
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 respective Regional Offices of MoEF by e-mail.**	Will be submitted in Operation Phase of project	Same as previous report.

Compliance to additional conditions stipulated by MoEF while granting Extension of Validity for Environmental and CRZ Clearance to NMIA Project

No.	EC Condition	Compliance Status
1.	**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.**	Water Adequacy Report was already submitted 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.

2.	**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.**	**CIDCO & MMRDA has appointed consultant for carrying out study for Detailed traffic management and traffic decongestion plan for Airport. Draft Final Report has been submitted by consultant. Meeting of stakeholders held on 6th Nov. 2019 overdraft Final Report. Based on above Final report is being prepared & will be Submitted to MoEF.**
3.	**Treated effluents shall also be used for irrigation and Road side plantation after taking due permissions from the concerned authorities/Forest department.**	Shall be complied in Operation Phase
4.	**Project proponent shall satisfactorily address all the complaints that have been received against the project and submit a compliance report to the Ministry.**	Compliance has been submitted to MoEF vide letter No. CIDCO/ GM (ENV & F)/NMIA/2017/1017 dated 2nd November 2017.

5.	**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 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.**	Shall be Complied.

Date: 29 JAN 2020

General Manager (E and F)
CIDCO

(D. R. Patil)
General Manager
Environment & Forests
CIDCO Ltd.

ANNEXURE I

ENVIRONMENTAL COMPLIANCE MONITORING REPORT
for
Navi Mumbai International Airport (NMIA)

Sponsor:

City and Industrial Development Corporation of Maharashtra Ltd (CIDCO)

Period:

July – December 2019

PREPARED BY

ADITYA ENVIRONMENTAL SERVICES PVT.LTD.
MOEFCC Recognized Laboratory under EP Act 1986
Accredited under ISO 9001: 2008 & OHSAS 18001: 2007 by ICQS
www.aespl.co.in

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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. Mumbai is known as the commercial capital of India and MMR is an industrial and technologically advanced region, which has experienced rapid growth in income and employment. The increasing trend in trading, business and financial services, demands highest order of infrastructure. There is need to enhance the capacity of airport as the existing airport in Mumbai experiencing tremendous pressure for meeting the air traffic demands of this vibrant region. Realizing the need of second airport for Mumbai, the Government of Maharashtra granted approval and appointed City & Industrial Development Corporation of Maharashtra Limited (CIDCO) as Nodal agency for implementation.

The site for the airport was selected near Panvel in Raigad district of Maharashtra state with central coordinates 18°59'33.00"N and 73°4'18.00"E. The Director General of Civil Aviation (DGCA) has approved the site. Environmental Impact Assessment (EIA) study was conducted by Centre for Environmental Science and Engineering (CESE), Indian Institute of Technology (IIT) Mumbai and updated report submitted in April 2011. Environmental Clearance was granted by Ministry of Environment and Forests vide F. No. 10-53/2009- IA.III dt 22.11.2010 and validity extended vide letter dt 20.12.2017.

Pre-development works for the site has started and as compliance to the Environmental clearance, CIDCO appointed Aditya Environmental Services Pvt. Ltd. (AESPL) to conduct Compliance Environmental Monitoring for the New Mumbai International Airport (NMIA) vide Tender No. C. A. No. 01 / CIDCO/ T&C/ CGM (T&A) / STE (S& A) / 2017-18 (2nd call – 1st Extension) & its Work Order No. CIDCO / T&C / CGM (T & A)/ STE (S-I& A)/2018/1383 dated 07.06.2018.

The sampling locations fixed by CIDCO for compliance monitoring once in month for Ambient Air Quality and Noise Level Monitoring; and once in each season (Post, pre & during monsoon) for Soil, ground water and marine/Surface water quality as per Tender are as given in Chapter II for month from July to December 2019. The assignment comprises monitoring of following parameters in and around the surrounding project area:

- Ambient air monitoring
- Ambient noise level monitoring
- Soil
- Ground/surface water
- Marine water for biological and physicochemical parameters.

2. SCOPE OF MONITORING WORK

2.1 Scope of Monitoring Work as per CIDCO Tender:

Scope of monitoring work as per CIDCO tender are as given below:

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

Sr. No.	Parameters – as per Annexure B	Location	Frequency	Samples/ Year	Samples/ 2 years
1.	**Ambient Air Quality:** $PM_{2.5}$, PM_{10}, SO_2, NO_X, CO, Lead, Ammonia, Hydrocarbon (nMHC).	12	12 Stations per Month	144	288
2.	**Noise: Parameters: Leq Noise level** - Day time & Nighttime separately.	12	Same as per Air Quality	144	288
3.	**Soil: Parameters:** pH, Texture, EC, Na, Mg, K, Sodium Absorption Ratio (SAR), Permeability (cm/sec), Water Holding Capacity (%), Calcium, Cation Exchange Capacity & Porosity (%).	10	10 Stations per season (Post, Pre-& During Monsoon)	30	60
4.	**Ground Water Quality (35):** **Physical Parameters - p**H, Temperature, Turbidity, EC, Salinity, TSS, TDS. **Chemical Parameters:** DO, BOD, COD, Magnesium, Hardness, Alkalinity, Chloride, Sulphate, Fluoride, Sodium, Potassium, Phenol, Total Phosphorous, Total Nitrogen, Sodium Absorption Ratio (SAR), Nitrite-N, Nitrate-N, Calcium. **Heavy Metals:** Fe, Zn, Mg, Mn, Cd, Cr, Hg. **Bacteriological Parameters**; Coliform Count. Total Heterotrophic Bacteria. SPC/100ML.	10	10 Stations per season (Post, Pre-& During Monsoon)	30	60
5.	**Marine/Surface Water Quality parameters (35):** **Physico Chemical parameters:** PH, Temperature, Turbidity, EC, Salinity (ppt), TSS, TDS. **Chemical Parameters:** Nitrate-N, Nitrite N, Phosphate-P, Silicate, DO, BOD, COD, O&G, Magnesium, Hardness, Alkalinity, Chloride, Sulphate, Fluoride, Sodium, Potassium, Phenol, Total phosphorus, Total Nitrogen. **Heavy Metals:** Fe, Zn, Mg, Mn, Cd, Cr, Hg **Bacteriological parameters:** Coliform Count. Marine Biology: Phytoplankton & Zooplankton	13	13 stations per season (Post, Pre-& During Monsoon)	39	78

2.2 Locations of Monitoring:

Sampling Locations have been specified by CIDCO in its Tender. The monitoring was carried out at the same locations as fixed by CIDCO. Details of monitoring stations for Ambient Air Quality, Ambient Noise, Soil, Ground Water, Marine Water- physicochemical & biological and along with location maps showing station locations are as given below:

Table 2-2: Details of Ambient Air Quality Monitoring Stations as per CIDCO Tender

Station Code	Station	Remarks
A1	Panvel CIDCO Office	Location of meteorological station and in approach path of airport (residential zone)
A2	Khandeshwar Railway Station	Commercial activity center
A3	Kalamboli CIDCO Office	Receptor oriented as it is in residential zone
A4	Kharghar Nodal Office	Receptor oriented as it is in residential zone
A5	Belapur CIDCO Bhavan	Major commercial activity center, heavy traffic movement
A6	Pargaon High School	Receptor oriented - 400m from proposed runway
A7	Gavanphata Water Tank	Near to main traffic junction and hence heavy traffic movement
A8	Ambuja Cement Ltd	Industrial activity center
A9	Kille Gaothan Guest House	Receptor oriented – on main access road
A10	Panchsheel Guest House	Receptor oriented – on main access road
A11	Airport Entry – West (July to September 2019) GVK Office (October to December 2019)	High vehicular movement at the entry / exit at the west side, near Aamra Marg
A12	Airport Entry – East (July to September 2019) Karnala Sport Academy (October to December 2019)	High vehicular movement at the entry / exit at the east side, near NH4B

Figure 2-1: Map of Ambient Air Quality Monitoring Stations as per CIDCO Tender

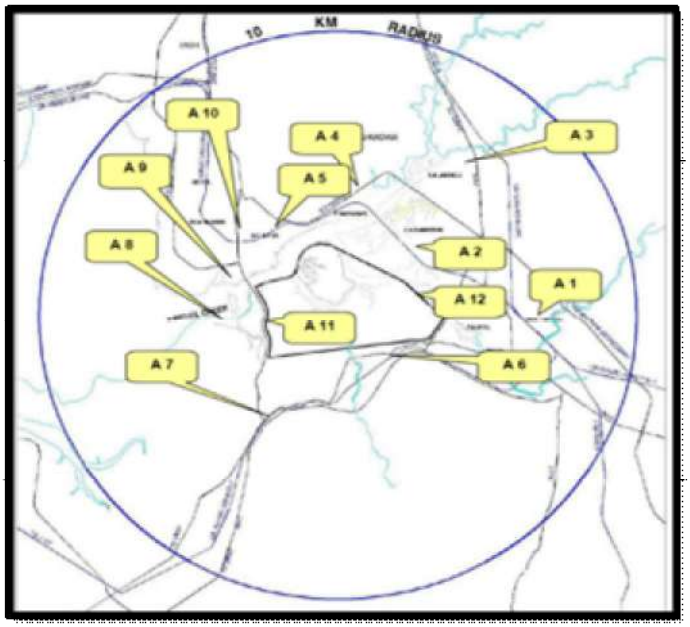


Table 2-3: Ambient Noise Level Monitoring Stations as per CIDCO Tender

Sr. No.	Station Name	Category of area
N1	Ambuja Cement Limited	Industrial area
N2	CIDCO Bhavan, CBD Belapur	Commercial area
N3	Palaspa Junction	Commercial area
N4	Teen Tank Gavanphata	Commercial area
N5	Panvel CIDCO Office	Residential Area (Mixed category)
N6	Kharghar Nodal Office	Residential Area
N7	Panchsheel Guest House	Residential Area
N8	Pargaon School	Sensitive area (Mixed category)
N9	MES School	Sensitive area (Mixed category)
N10	MGM Hospital, Kalamboli	Sensitive area (Mixed category)
N11	Swapna Nagari	Residential Area (Mixed category)
N12	Karnala Bird Sanctuary	Sensitive area

Figure 2-2: Map of Noise Level Monitoring Stations as per CIDCO Tender

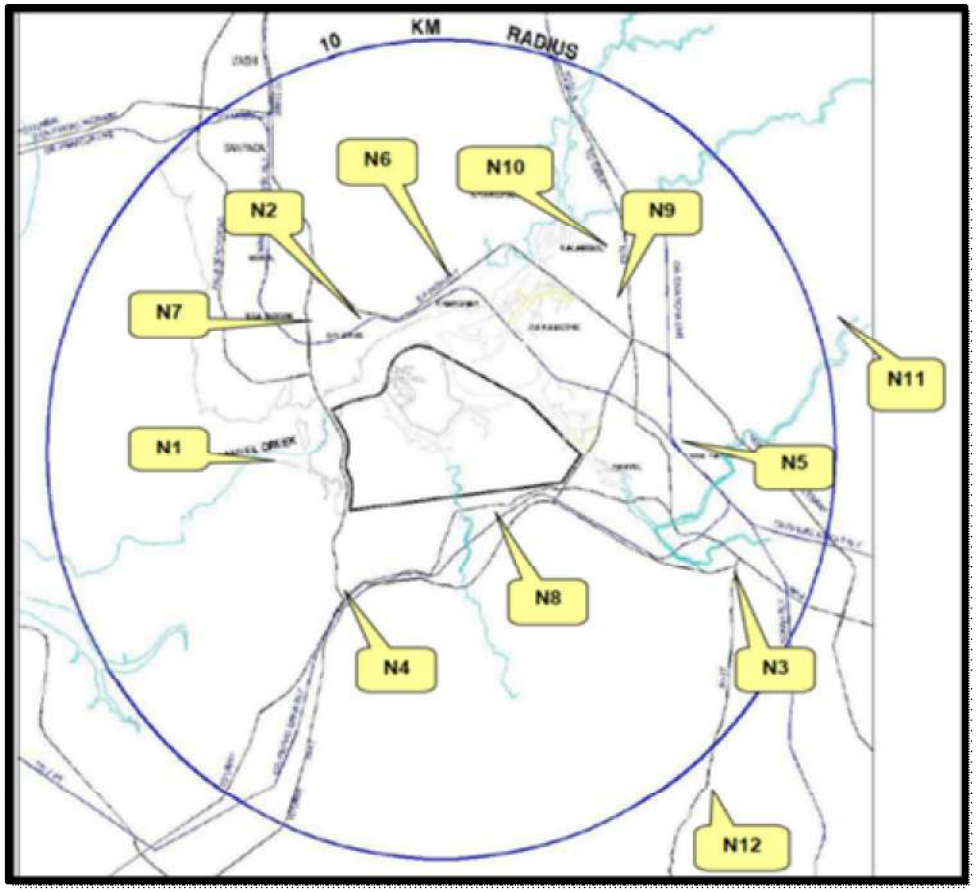


Table 2-4: Soil Quality Monitoring Stations as per CIDCO Tender

Station Code	Stations Name
S1	Targhar
S2	Kopar
S3	Kombadbhuje
S4	Koli
S5	Vaghivali
S6	Ganeshpuri
S7	Ulwe
S8	Pargaon
S9	Vaghivalivada
S10	Chinchpada

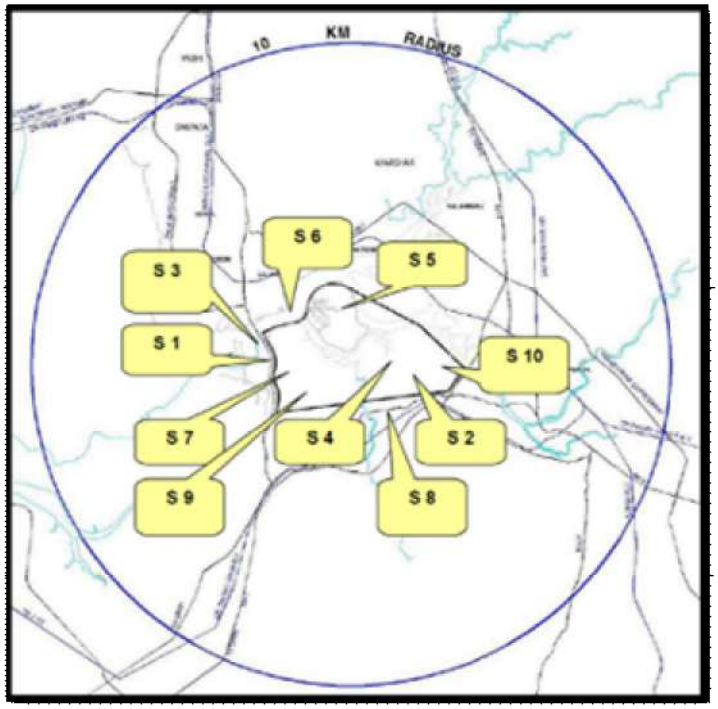


Figure 2-3: Map of Soil Quality Monitoring Stations as per CIDCO Tender

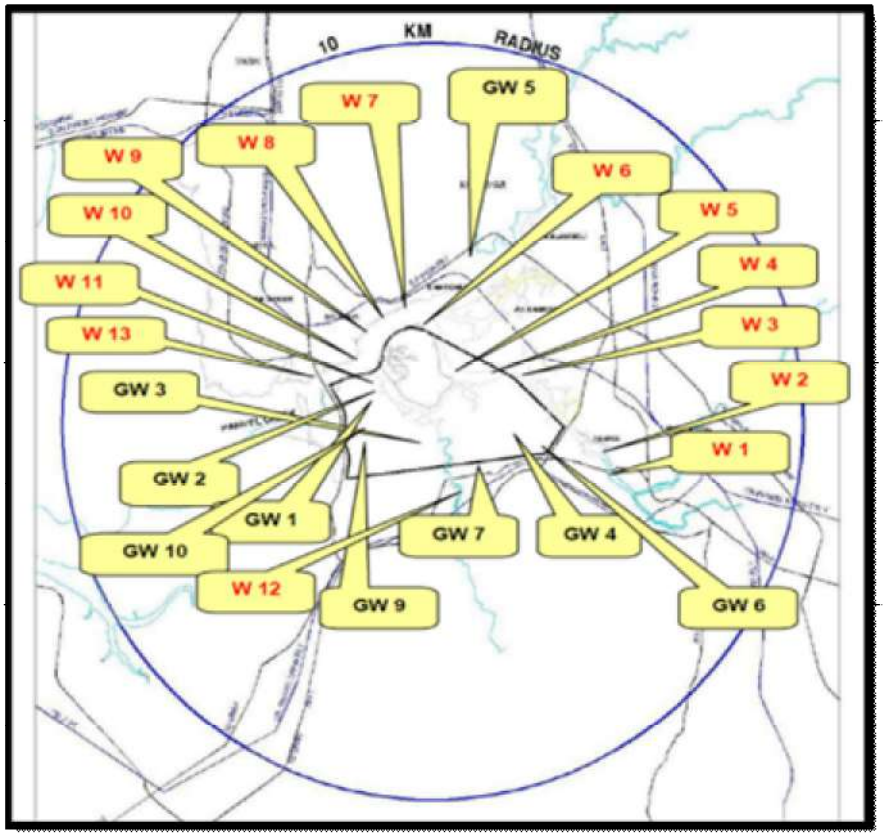
Table 2-5: Details of Ground Water Quality Monitoring Stations as per CIDCO Tender

Station Code	Stations Name
GW1	Open well at Kombadbhuje
GW2	Open well at Ganeshpuri
GW3	Open well at Vaghivalivada
GW4	Open well at Koli
GW5	Open well at Kopar
GW6	Open well at Chinchpada
GW7	Open well at Pargaon
GW8	Open well at Vaghivali
GW9	Open well at Ulwe
GW10	Open well at Targhar

Table 2-6: Details of Marine Water Quality Monitoring Stations as per CIDCO Tender

Station Code	Station details / Location
W1	Extreme end of Gadhi River (upstream side)
W2	Near Pargaon village (200m from W1) in Gadhi River
W3	Near Jui Village (300m from W2) in Gadhi River
W4	Near Kopar Khadi (300m from W3) in Gadhi River
W5	Near Vaghivali village (500m from W4) in Gadhi River
W6	Vaghivali creek junction (300m from W5) in Gadhi River
W7	Near Kharghar Rly Station (300m) in Gadhi River
W8	Near Belpada (300m from W7) in Gadhi River
W9	Near Konkan Bhavan (300m from W8) in Gadhi River
W10	Near Divala village (300m from W10) in Gadhi River
W11	At Junction of Ulwe and Gadhi Rivers in Panvel Creek
W12	In Ulwe River
W13	Near Rathi bander in Panvel Creek

Figure 2-4: Map of Surface Marine, Ground Water & Sediment Monitoring Stations as per CIDCO Tender



2.3 Period / Time of Sampling (July to December 2019):

The sampling survey was carried out as per following schedule during July to December 2019. Ambient Air quality, Noise Level Monitoring, Soil, Ground Water and Marine Water samples collected for monsoon season (July 2019) and Post monsoon (November 2019) and for the monthly sampling for July to December samples were collected only for Ambient Air and Noise as per scope of work as per CIDCO tender.

Table 2-7: Period/Time of Sampling for this Survey

Month	Parameter	Sampling Stations	Dates of Sampling	Time Period
July 2019	AAQ	A1, A2, A3	22.07.19	24 hours starting from 10:00am
		A4, A5, A10	23.07.19	
		A7, A9, A11	24.07.19	
		A6, A8, A12	25.07.19	
	NLS	N5, N6, N7, N11	22-23.07.19	
		N8, N9, N10, N12	23-24.07.19	
		N1, N2, N3, N4	24-25-07.19	
	Soil	S1, S2, S3, S4, S5, S6, S7, S8, S9, S10	30.07.19	Grab Sample
	GW	GW1, GW3, GW4, GW6, GW7, GW8, GW9, GW10	30.09.19	Grab Sample
	Marine Water	W7, W8, W9, W10, W11, W12, W13	29.07.19	Grab Sample
		W1, W2, W3, W4, W5, W6	30.07.19	
August 2019	AAQ	A1, A2, A3	19.08.19	24 hours starting from 10:00am
		A4, A5, A10	20.08.19	
		A8, A9, A11	21.08.19	
		A6, A7, A12	22.08.19	
	NLS	N5, N6, N7, N11	19-20.08.19	
		N8, N9, N10, N12	20-21.08.19	
		N1, N2, N3, N4	21-22.08.19	
September 2019	AAQ	A1, A2, A3	17.09.19	24 hours starting from 10:00am
		A4, A5, A10	18.09.19	
		A8, A9, A11	19.05.19	
		A6, A7, A12	20.09.19	
	NLS	N5, N6, N7, N11	17-18.09.19	
		N8, N9, N10, N12	18-19.09.19	
		N1, N2, N3, N4	19-20.09.19	
October 2019	AAQ	A3, A4, A5	19.10.19	24 hours starting from 10:00am
		A1, A2, A12	22.10.19	

Month	Parameter	Sampling Stations	Dates of Sampling	Time Period
		A9, A10, A11	23.10.19	
		A6, A7, A8	24.10.19	
	NLS	N5, N6, N7, N11	19-20.10.19	
		N8, N9, N10, N12	20-21.10.19	
		N1, N2, N3, N4	21-22.10.19	24 hours starting from 10:00am
November 2019	AAQ	A1, A2, A3	25.11.19	
		A4, A5, A10	26.11.19	
		A8, A9, A11	27.11.19	
		A6, A7, A12	28.11.19	
	NLS	N5, N6, N7, N11	25-26.11.19	
		N8, N9, N10, N12	26-27.11.19	
		N1, N2, N3, N4	27-28.11.19	
	Soil	S1, S2, S3, S4, S5, S6, S7, S8, S9, S10	28.11.19	Grab Sample
	GW	GW1, GW3, GW4, GW6, GW7, GW8, GW9, GW10	28.11.19	Grab Sample
	Marine Water	W1, W2, W3, W4, W5, W12	29.11.19	Grab Sample
		W6, W7, W8, W9, W10, W11, W13	30.11.19	
December 2019	AAQ	A7, A9, A10, A11	25.12.19	24 hours starting from 10:00am
		A2, A6, A8, A12	26.12.19	
		A1, A3, A4, A5	27.12.19	
	NLS	N5, N6, N7, N11	25-26.12.19	
		N8, N9, N10, N12	26-27.12.19	
		N1, N2, N3, N4	27.28.12.19	

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:

- heavy traffic along Amara Marg, NH4B and Uran / JNPT Road
- construction activity
- industries in Panvel industrial estate (private)
- burning of poor quality fuels in villages within proposed site and nearby

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. Therefore, Central Pollution Control Board had published guideline for measurement of Ambient Air Pollutants Quality Monitoring (NAAQM) in November 2009 at national level.

3.1.2 Methodology for Ambient Air Quality Monitoring:

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

S N	Parameter	Sampling Equipment	Method of Analysis	Reference
1.	PM_{10}	RSPM Sampler/ Glass Fiber filter paper.	Gravimetric analysis	CPCB Guidelines Manual 2011
2.	$PM_{2.5}$	$PM_{2.5}$ Sampler/Filter – PTFE, Teflon membrane	Gravimetric analysis	CPCB Guidelines Manual 2011
3.	SO_2	Absorption in TCM	West & Gaeke Method	CPCB Guidelines Manual 2011
4.	NO_X	Absorption in NaOH	Jacob – Hochheiser (Sodium Arsenic)	CPCB Guidelines Manual 2011
5.	CO	Sampling in Tedler bags / CO Meter	GC with Methaniser	CPCB Guidelines Manual 2011
6.	Lead	Sampling using EPM 2000 equivalent Glass Fiber Filter paper	AAS Method	CPCB Guidelines Manual 2011
7.	NH_3	Absorption in sulfuric acid	Indophenol Method	CPCB Guidelines Manual 2011
8.	nMHC	Collection Activated Carbon	Gas Chromatography	APHA

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:

- heavy traffic along Amara Marg, NH4B and Uran/JNPT Road
- construction activity
- industries in Panvel industrial estate (private)
- noise from human habitats/villages within proposed site and nearby

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 for the area.

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 the soil fertility that the plants or crop, in a given area will experience.

3.3.1 Reconnaissance Survey:

The 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.

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 in study area use ground water from open/bore well and use it 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 study area represents complex hydrodynamic system. The Ulwe river flows down through the mountains (to the south) in the centre of project site and joins the Panvel creek. The Gadhi river flows from the East to the West. The Ulwe river will be diverted/retrained as part of the project and the Gadhi river will be 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 which drains into the Arabian sea to the west. The Panvel creek also received effluents from CETP at MIDC Taloja and sewage from NMMC STPs in Nerul.

3.5.2 Methodology of Sampling:

3.5.2.1 Niskin Bottle - Marine Water Sampler

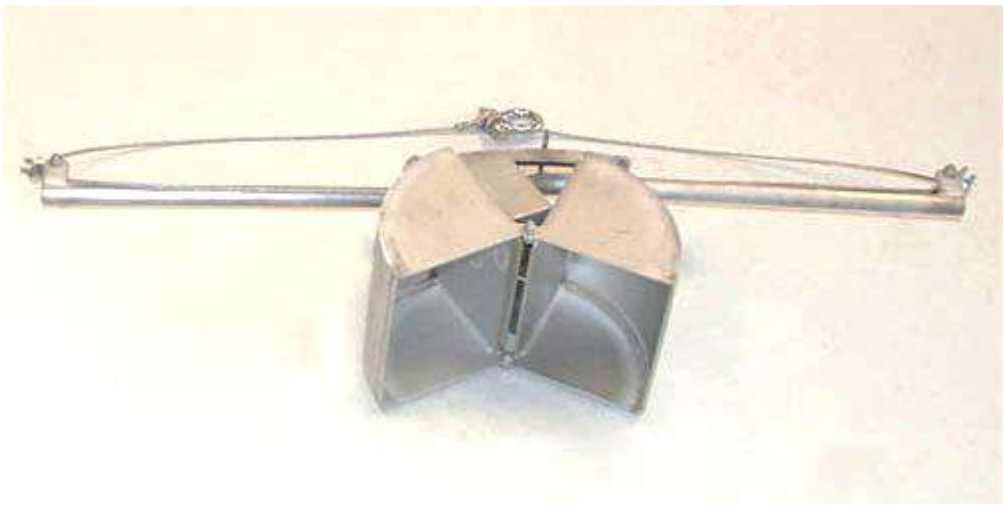
This Water Sampler is used to collect samples at various water depths and can operate at any depth on a cable or line with a messenger.

3.5.2.2 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)

3.5.2.3 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

3.5.2.4 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 CIDCO – in all, 13 samples were collected from 13 sampling locations for physicochemical and Biological samples (Stations 1 to 10 are located in Gadhi River & Station 11 & 13 are Panvel Creek while station 12 in Ulwe River. A good amount of mangrove vegetation was noted on either side of stream 4 to 6. Sampling locations were approached by boats (wherever possible) and collection done irrespective of tide. Sampling were 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.

- Our 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 (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 manufacturer & are regularly calibrated.
- Chemicals used are Analytical Reagent grade and from reputed manufacturer.
- Analytical Instrumentation used in the laboratory is regularly calibrated.
- We have 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.
- We have CRMs (Certified Reference Material) for heavy metals from reputed manufacturers for heavy metals and Standard sea water which we use for analysis.
- We are 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 considering that the present project is for development of International Airport for Navi Mumbai area. Data is compiled and presented below:

Table 4-1: Ambient Air Quality monitoring at various stations during **July 2019**

Sampling Locations	Panvel CIDCO Office (A1)	Khandeshwar Railway Station (A 2)	Kalamboli CIDCO Office (A3)	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Panchsheel guest House (A10)	Gavanphata Water Tank (A7)	Kille Gaothan Guest House (A9)	Airport Entry (West) (A11)	Pargaon High School (A 6)	Ambuja Cement Ltd (A8)	Airport Entry (East) (A12)	Limit #	Unit
Sampling Date	**22.07.19**				**23.07.19**		**24.07.19**			**25.07.19**				
$PM_{2.5}$	18.3	15.1	10.5	18.1	17.3	16.1	16.6	16.3	15.9	15.8	17.2	15.5	60	µg/m³
PM_{10}	50.5	51.3	54.3	50.8	49.7	47.7	46.8	45.8	47.4	45.1	46.6	42.8	100	µg/m³
SO_2	11.7	10.4	10.5	10.9	10.5	10.4	10.1	9.8	9.5	9.5	9.9	9.3	80	µg/m³
NO_X	16.3	15.7	15.3	16.0	15.9	16.2	14.9	15.2	15.6	14.4	14.8	14.1	80	µg/m³
CO	0.16	0.17	0.17	0.19	0.20	0.16	BDL	BDL	BDL	BDL	BDL	BDL	4	mg/m³
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m³
NH_3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m³
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

Table 4-2: Ambient Air Quality monitoring at various stations during **August 2019**

Sampling Locations	Panvel CIDCO Office (A1)	Khandeshwar Railway Station (A 2)	Kalamboli CIDCO Office (A3)	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Panchsheel guest House (A10)	Ambuja Cement Ltd (A8)	Kille Gaothan Guest House (A9)	Airport Entry (West) (A11)	Pargaon High School (A 6)	Gavanphata Water Tank (A7)	Airport Entry (East) (A12)	Limit #	Unit
Sampling Date	**19.08.19**			**20.08.19**			**21.08.19**			**22.08.19**				
$PM_{2.5}$	17.9	18.6	18.2	18.4	18.1	17.3	17.8	17.4	16.8	16.9	18.1	17.2	60	µg/m³
PM_{10}	51.7	54.0	52.9	56.2	53.6	52.7	56.1	53.0	53.0	52.0	55.2	53.4	100	µg/m³
SO_2	11.2	11.5	10.9	11.7	11.7	10.9	10.9	11.1	11.3	10.6	11.4	10.9	80	µg/m³
NO_X	16.0	17.2	15.7	18.0	16.9	16.7	16.6	16.8	16.8	16.1	16.7	16.6	80	µg/m³
CO	0.18	0.20	0.19	0.20	0.18	0.18	0.19	0.18	0.17	0.18	0.20	0.17	4	mg/m³
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m³
NH_3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m³
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

Table 4-3: Ambient Air Quality monitoring at various stations during **September 2019**

Sampling Locations	Panvel CIDCO Office (A1)	Khandeshwar Railway Station (A 2)	Kalamboli CIDCO Office (A3)	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Panchsheel guest House (A10)	Ambuja Cement Ltd (A8)	Kille Gaothan Guest House (A9)	Airport Entry (West) (A11)	Pargaon High School (A 6)	Gavanphata Water Tank (A7)	Airport Entry (East) (A12)	Limit #	Unit
Sampling Date	**17.09.19**			**18.09.19**			**19.09.19**			**20.09.19**				
PM2.5	18.3	17.5	17.9	18.3	19.1	17.5	20.0	18.7	17.0	17.3	16.6	17.8	60	µg/m3
PM10	55.0	52.5	54.5	54.5	57.5	53.3	60.5	54.0	52.9	54.9	51.7	55.1	100	µg/m3
SO2	11.1	10.8	10.8	10.9	11.5	11.4	11.7	11.6	11.9	11.1	10.7	11.3	80	µg/m3
NOX	16.3	18.4	16.3	18.4	17.3	15.3	17.8	17.2	17.0	17.2	15.2	17.6	80	µg/m3
CO	0.20	0.18	0.17	0.22	0.20	0.20	0.21	0.21	0.20	0.20	0.18	0.20	4	mg/m3
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m3
NH3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m3
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

Table 4-4: Ambient Air Quality monitoring at various stations during **October 2019**

Sampling Locations	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Kalamboli CIDCO Office (A3)	Panvel CIDCO Office (A1)	Khandeshwar Railway Station (A 2)	Karnala Sports Academy (A12)	Kille Gaothan Guest House (A9)	Panchsheel guest House (A10)	GVK Office (A11)	Pargaon High School (A 6)	Gavanphata Water Tank (A7)	Ambuja Cement Ltd (A8)	Limit #	Unit
Sampling Date	**19.10.19**				**22.10.19**		**23.10.19**			**24.10.2019**				
$PM_{2.5}$	19.7	19.5	20.0	18.7	19.5	19.1	19.0	19.1	19.5	20.4	20.0	20.8	60	µg/m3
PM_{10}	60.8	60.8	61.2	58.7	60.4	58.3	59.1	59.3	59.5	62.5	60.4	63.3	100	µg/m3
SO_2	12.2	12.0	12.3	11.6	11.8	11.7	11.9	11.9	12.1	11.3	12.3	12.7	80	µg/m3
NO_X	17.6	17.4	17.2	16.9	17.9	17.1	17.9	17.6	18.0	18.1	17.9	18.9	80	µg/m3
CO	0.18	0.23	0.20	0.18	0.21	0.22	0.23	0.22	0.21	0.21	0.20	0.23	4	mg/m3
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m3
NH_3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m3
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

Table 4-5: Ambient Air Quality monitoring at various stations during **November 2019**

Sampling Locations	Panvel CIDCO Office (A1)	Khandeshwar Railway Station (A 2)	Kalamboli CIDCO Office (A3)	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Panchsheel guest House (A10)	Ambuja Cement Ltd (A8)	Kille Gaothan Guest House (A9)	GVK Office (A11)	Pargaon High School (A 6)	Gavanphata Water Tank (A7)	Karnala Sports Academy (A12)	Limit #	Unit
Sampling Date	**25-11-2019**			**26-11-2019**			**27-11-2019**			**28-11-2019**				
$PM_{2.5}$	20.1	20.6	20.	20.0	20.4	19.8	21.6	19.8	20.8	20.7	20.8	19.4	60	µg/m3
PM_{10}	61.7	62.7	64.6	62.4	63.8	61.0	64.8	61.1	64.2	64.2	62.4	57.5	100	µg/m3
SO_2	12.8	12.5	12.8	12.9	12.6	12.5	13.0	12.4	12.7	12.5	12.8	12.0	80	µg/m3
NO_X	20.2	19.8	20.1	20.6	20.0	19.5	20.1	19.7	19.9	19.8	19.6	17.9	80	µg/m3
CO	0.20	0.24	0.23	0.22	0.21	0.21	0.21	0.22	0.24	0.23	0.22	0.20	4	mg/m3
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m3
NH_3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m3
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

Table 4-6: Ambient Air Quality monitoring at various stations during **December 2019**

Sampling Locations	Gavanphata Water Tank (A7)	Kille Gaothan Guest House (A9)	Panchsheel guest House (A10)	GVK Office (A11)	Khandeshwar Railway Station (A 2)	Pargaon High School (A 6)	Ambuja Cement Ltd (A8)	Karnala Sport Academy (A12)	Panvel CIDCO Office (A1)	Kalamboli CIDCO Office (A3)	Kharghar Nodal Office (A4)	Belapur CIDCO Office (A5)	Limit #	Unit
Sampling Date	**25-12-19**				**26-12-19**				**27-12-19**					
$PM_{2.5}$	21.2	20.6	20.7	21.2	21.8	20.1	21.8	20.3	20.7	21.6	21.3	21.8	60	µg/m³
PM_{10}	64.5	63.4	63.5	62.6	64.5	62.6	65.5	61.1	63.0	65.0	64.7	64.0	100	µg/m³
SO_2	13.1	12.9	13.7	13.2	13.0	12.9	13.8	12.7	13.3	13.7	13.4	13.0	80	µg/m³
NO_X	20.4	20.6	21.8	20.8	20.9	20.7	21.5	18.9	21.5	21.4	21.8	21.4	80	µg/m³
CO	0.24	0.25	0.24	0.22	0.22	0.20	0.24	0.22	0.23	0.25	0.24	0.23	4	mg/m³
Lead	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	µg/m³
NH_3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	400	µg/m³
nMHC	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	ppm

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

4.1.2 Inference of AAQM Data

The concentration of Particulate Matter – 10 μ (PM_{10}) was observed in range of 42.8 – 65.5 $\mu g/m^3$ - at all sampling locations monitored and level of Particulate Matter - 2.5 μ (PM 2.5) were noted under NAAQS limit i.e. in range of 10.5 - 21.8 $\mu g/m^3$ at all stations monitored. Gaseous pollutants - Nitrogen Oxide, Sulfur Dioxide and Carbon Monoxide are under NAAQS norms during collection period (July to December 2019). Lead, Ammonia and nMHC 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 2.3).
Results of analysis are compiled below:

Table 4-7: Ambient Noise Level monitoring during July to December 2019

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
N 5	Panvel CIDCO Office	22-23.07.19	87.4	38.6	65.8	72.8	30.6	50.3	55	45
N6	Kharghar CIDCO Office		109.7	57.3	72.5	71.9	38.2	61.6	55	45
N 7	Panchsheel Guest House		78.9	37.7	67.2	79.3	37.3	60.7	55	45
N11	Swapna Nagari		85.7	58.1	63.6	80.7	54.8	62.8	55	45
N8	Pargaon School	23-24.07.19	95.9	57.5	69.3	95.8	54.3	67.7	50	40
N9	MES School		104.8	46.4	71.9	73.6	35.4	60.6	50	40
N10	MGM Hospital, Kalamboli		91.7	38.2	70.7	85.5	48.3	69.2	50	40
N 12	Karnala bird Sanctuary		80.2	36.3	53.7	75.7	32.3	56.6	50	40
N1	Ambuja Cement Limited	24-25.07.19	100.6	39.1	72.4	76.7	33.2	56.7	75	70
N 2	CIDCO Bhavan Belapur		77.8	57.7	62.9	76.9	50.4	63.7	65	55
N3	Palaspa		81.4	36.3	72.4	78.2	37.1	60.2	65	55

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
	junction									
N 4	Teen Tank Gavanphata		76.5	31.7	61.9	92.2	38.6	58.0	**65**	**55**
N 5	Panvel CIDCO Office	19-20.08.19	91.8	57.0	66.0	81.1	53.3	60.2	**55**	**45**
N 6	Kharghar Nodal Office		102.8	59.4	66.5	91.0	57.5	61.7	**55**	**45**
N 7	Panchsheel Guest House		95.1	55.3	62.3	81.7	56.3	60.2	**55**	**45**
N 11	Swapna Nagari		77.5	57.0	66.0	86.2	51.8	65.9	**55**	**45**
N 8	Pargaon High School	20-21.08.19	78.3	55.1	63.2	71.0	40.0	50.4	**50**	**40**
N 9	MES School		83.7	36.2	53.8	70.3	45.3	54.4	**50**	**40**
N 10	MGM Hospital Kalamboli		85.1	30.5	59.9	78.3	40.6	55.0	**50**	**40**
N 12	Karnala Bird Sanctuary		82.2	39.4	52.1	69.5	36.6	54.7	**75**	**70**
N 1	Ambuja Cement Ltd	21-22.08.19	78.1	43.2	68.1	70.5	44.8	59.4	**75**	**70**
N 2	CIDCO Bhavan CBD Belapur		101.8	40.1	67.0	64.7	35.4	54.8	**65**	**55**
N 3	Palaspa Junction		83.1	39.4	66.9	71.4	34.8	63.0	**65**	**55**
N 4	Teen Tank Gavan Phata		86.8	44.1	66.6	75.0	49.6	54.1	**65**	**55**
N 5	Panvel CIDCO Office	17-18.09.19	88.8	43.9	66.5	66.1	39.5	54.2	**55**	**45**
N 6	Kharghar Nodal Office		79.2	45.5	69.8	82.5	45.0	58.9	**55**	**45**
N 7	Panchsheel Guest House		77.9	44.8	69.0	79.7	36.6	59.3	**55**	**45**
N 11	Swapna Nagari		74.5	51.2	60.2	73.4	40.5	58.7	**55**	**45**
N 8	Pargaon High School	18-19.09.19	69.8	39.9	59.8	69.2	31.6	57.9	**50**	**40**
N 9	MES School		75.6	41.6	62.4	65.7	40.1	54.3	**50**	**40**

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
N 10	MGM Hospital Kalamboli		66.8	32.5	55.4	62.5	44.8	59.6	**50**	**40**
N 12	Karnala Bird Sanctuary		64.3	38.2	50.1	62.4	31.7	45.6	**50**	**40**
N 1	Ambuja Cement Ltd	19-20.09.19	74.6	43.7	65.3	66.5	41.3	57.2	**75**	**70**
N 2	CIDCO Bhavan CBD Belapur		98.4	43.7	64.3	69.8	40.0	56.2	**65**	**55**
N 3	Palaspa Junction		88.2	43.6	68.1	67.1	35.4	57.9	**65**	**55**
N 4	Teen Tank Gavan Phata		72.1	53.4	64.8	71.2	32.6	54.5	**65**	**55**
N 5	Panvel CIDCO Office	19-20.10.19	96.6	42.5	68.6	70.2	40.3	68.7	**55**	**45**
N 6	Kharghar Nodal Office		82.0	59.6	64.1	71.0	57.7	60.9	**55**	**45**
N 7	Panchsheel Guest House		79.5	30.0	63.7	78.5	55.5	61.4	**55**	**45**
N 11	Swapna Nagari		78.5	34.7	68.4	70.8	31.6	54.3	**55**	**45**
N 8	Pargaon High School	20-21.10.19	74.5	34.8	65.2	66.9	30.1	52.4	**50**	**40**
N 9	MES School		77.3	32.5	57.8	63.8	31.7	53.6	**50**	**40**
N 10	MGM Hospital Kalamboli		78.7	42.2	65.0	60.7	32.6	46.5	**50**	**40**
N 12	Karnala Bird Sanctuary		81.5	31.1	45.6	51.9	27.8	35.5	**50**	**40**
N 1	Ambuja Cement Ltd	21-22.10.19	83.6	52.3	63.1	84.8	49.9	60.9	**75**	**70**
N 2	CIDCO Bhavan CBD Belapur		88.1	55.1	68.6	80.3	56.3	63.0	**65**	**55**
N 3	Palaspa Junction		78.5	40.6	66.7	62.3	34.0	53.8	**65**	**55**
N 4	Teen Tank Gavan Phata		70.8	50.7	62.5	60.8	30.6	52.1	**65**	**55**
N 5	Panvel CIDCO Office	25-26.11.19	75.3	47.4	55.5	68.5	52.7	55.3	**55**	**45**
N 6	Kharghar Nodal Office		72.7	59.3	62.5	68.7	56.4	60.0	**55**	**45**
N 7	Panchsheel Guest House		77.8	51.3	63.8	72.9	52.1	60.5	**55**	**45**
N 11	Swapna Nagari		75.8	35.1	65.2	68.3	33.0	52.4	**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
N 8	Pargaon High School	26-27.11.19	78.2	38.3	40.6	58.8	37.8	41.7	**55**	**45**
N 9	MES School		78.8	40.2	59.6	65.1	33.5	52.5	**55**	**45**
N 10	MGM Hospital Kalamboli		82.5	55.9	68.6	85.2	67.8	68.8	**55**	**45**
N 12	Karnala Bird Sanctuary		84.3	28.8	43.9	52.9	28.2	33.0	**55**	**45**
N 1	Ambuja Cement Ltd	27-28.11.19	80.8	54.5	60.7	79.5	52.1	56.8	**75**	**70**
N 2	CIDCO Bhavan CBD Belapur		90.5	56.8	66.3	77.6	55.1	62.7	**65**	**55**
N 3	Palaspa Junction		72.2	41.7	64.0	63.7	35.5	51.2	**65**	**55**
N 4	Teen Tank Gavan Phata		68.5	52.2	61.1	58.6	33.7	50.6	**65**	**55**
N 5	Panvel CIDCO Office	25-26.12.19	76.3	32.9	49.5	52.1	32.2	40.5	**55**	**45**
N 6	Kharghar Nodal Office		92.6	38.5	55.2	59.9	32.9	41.9	**55**	**45**
N 7	Panchsheel Guest House		95.6	33.0	42.8	61.0	31.8	38.7	**55**	**45**
N 11	Swapna Nagari		74.2	37.2	61.9	66.3	32.2	51.3	**55**	**45**
N 8	Pargaon High School	26-27.12.19	89.7	33.6	46.5	57.0	31.8	42.0	**55**	**45**
N 9	MES School		80.8	41.7	60.3	67.7	34.6	48.6	**55**	**45**
N 10	MGM Hospital Kalamboli		94.1	36.9	54.4	58.3	32.7	38.4	**55**	**45**
N 12	Karnala Bird Sanctuary		84.9	35.0	50.2	59.0	32.5	44.2	**55**	**45**
N 1	Ambuja Cement Ltd	27-28.12.19	80.7	45.3	57.8	73.7	46.5	56.7	**75**	**70**
N 2	CIDCO Bhavan CBD Belapur		87.9	44.6	67.0	76.1	54.8	60.6	**65**	**55**
N 3	Palaspa Junction		76.0	37.1	53.0	59.0	34.0	48.2	**65**	**55**
N 4	Teen Tank Gavan Phata		76.9	35.5	42.1	59.1	32.0	38.0	**65**	**55**

4.2.2 Inference of Noise Data

During daytime, the average Noise level was observed in the range of 40.6 -72.5 dB(A) & Nighttime levels were observed at 33.0 – 69.2 dB(A) during sampling period. Following observations are made about average Noise levels in the monitoring carried out in different months:

- In July 2019 average Noise level exceeded the EP Act Standards during day time as well as night time at Panvel CIDCO Office (65.8 & 50.3 dBA), Kharghar CIDCO Office (72.5 & 51.4 dBA), Panchsheel Guest house (67.2 & 61.6 dBA), Swapna Nagari (63.6 & 62.8 dBA), Pargaon High School (69.3 & 67.7 dBA), MES School (71.9 & 60.6 dBA), MGM Hospital Kalamboli (70.7 & 69.2 dBA), Karnala Bird Sanctuary (53.7 & 56.6d BA), Palspha Junction (72.4 & 60.2 dBA) respectively. Karnala Bird Sanctuary (dBA), CIDCO Bhavan (63.7 dBA), and Teen Tank Gavanphata (58.0 dBA) were higher only during nighttime than NAAQS limits respectively.
- In August 2019 average Noise level exceeded the EP Act Standards during day time as well as night time at Panvel CIDCO Office (66.0 & 60.2 dBA), Kharghar Nodal Office (66.5 & 61.7 dBA), Panchsheel Guest house (62.3 & 60.2 dBA), Swapna Nagari (66.0 & 65.9 dBA), Pargaon High School (63.2 & 50.4 dBA), MES School (53.8 & 54.4 dBA), MGM Hospital (59.9 & 55.0 dBA), CIDCO Bhavan (67.0 dBA), Palaspa Junction (66.9 & 63.0 dBA) & Teen Tank Gavanphata (66.6 dBA) during day time; respectively due to high vehicular movement.
- In September 2019 average Noise level exceeded the EP Act Standards during day time as well as night time at Panvel CIDCO office (66.5 & 54.2 dBA), Kharghar Nodal Office (69.8 & 58.9 dBA), Panchsheel Guest House (69.0 & 59.3 dBA), Swapna Nagari (60.2 & 58.7 dBA), Pargaon High School (59.8 & 57.9 dBA), , MES School (62.4 & 54.3 dBA), MGM Hospital (55.4 & 59.0 dBA), Karnala Bird Sanctuary (50.1& 45.6 dBA); Palaspa junction (68.1 & 57.9 dBA) and CBD Belapur only during night time (56.3 dBA), respectively were higher than NAAQS limits.
- In October 2019 average Noise level exceeded the EP Act Standards during day time as well as night time at Panvel CIDCO Office (68.6 & 68.7 dBA), Kharghar Nodal Office (64.1 & 60.9 dBA), Panchsheel Guest House (63.7 & 61.4 dBA), Swapna Nagari (68.4 & 54.3 dBA), Pargaon High School (65.2 & 52.4 dBA), MES

School (57.8 & 53.6 dBA), MGM Hospital Kalamboli (65.0 & 46.5 dBA), CIDCO Bhavan (68.6 & 63.0 dBA), only during day time at Palaspa Junction (55.7 dBA) respectively were higher than NAAQS limits.

- In November 2019 average Noise level exceeded the EP Act Standards during day time as well as night time at Panvel CIDCO Office (55.5 & 55.3 dBA), Kharghar Nodal Office (62.5 & 60.0 dBA), Panchsheel Guest House (63.8 & 60.5 dBA), Swapna Nagari (65.2 & 52.4 dBA), MES School (59.6 & 52.5 dBA), MGM Hospital Kalamboli (68.6 & 68.8 dBA), only during day time at CIDCO Bhavan (62.7 dBA) respectively were higher than NAAQS limits.
- In December 2019 average Noise level exceeds the EP Act Standards during daytime as well as nighttime at Swapna Nagari (61.9 & 51.3 dBA), MES School (60.3 & 48.6 dBA), CIDCO Bhavan (67.0 & 60.6 dBA), only during night time at Kharghar Nodal Office (55.2 dBA) respectively were higher than NAAQS limits.

All other stations show the noise below the EP Act Standard during study period from July to December 2019.

4.3 SOIL QUALITY MONITORING REPORT

4.3.1 Soil Analysis Data

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

Table 4-8: Soil analysis of various stations in study area during monsoon **July 2019**

Sr. No.	Locations		Targhar (S1)	Kopar (S2)	Kombadbhuje (S3)	Koli (S4)	Vaghivali (S5)	Ganeshpuri (S6)	Ulwe (S7)	Pargaon (S8)	Vaghivalivada (S9)	Chinchpada (S10)	Unit
	Sampling Date		**30.07.19**										
1.	pH		6.89	6.85	6.89	6.70	6.80	6.70	6.85	6.40	6.85	6.80	--
2.	Texture	Clay	69.0	70.0	72.0	70.0	71.0	75.0	72.0	72.0	65.0	70.0	%
		Silt	20.0	18.0	18.0	20.0	18.0	15.0	18.0	20.0	21.0	15.0	
		Fine Sand	11.0	12.0	10.0	10.0	11.0	10.0	10	8.0	14.0	5.0	
3.	Conductivity		340	480	420	300	335	280	380	523	410	450	µS/cm
4.	Sodium (Na)		8	8	8	10	10	8	8	10	8	9	Kg/hectare
5.	Magnesium (Mg)		12	9	11	12	12	12	11	10	11	12	meq/l
6.	Potassium (K)		80	100	100	90	100	100	100	90	100	120	Kg/hector
7.	Sodium Absorption Ratio (SAR)		2.13	1.91	1.75	17.1	2.13	4.8	1.75	2.29	1.75	2.02	%
8.	Permeability		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	Cm/sec
9.	Water Holding Capacity (WHC)		42	40.8	42.0	38.0	38	40.5	40.2	42.0	46.0	40.5	%
10.	Calcium (Ca)		32	26	31	32	32	32	31	28	31	28	meq/l
11.	Cation Exchange Capacity (CEC)		16	16	16	20	20	16	16	16	16	18	Cmol/Kg
12.	Porosity		14.2	13.8	13.5	14.2	12.8	13.8	13.5	13.4	13.5	12.4	%

4.3.2 Soil Data Inference during Monsoon July 2019:

The texture composition of soil is changed due to land filling activities at all villages. There was marginal high level of metals like Sodium at Koli, Vaghivali and Pargaon; and Potassium at Kopar, Kombadbhuje, Vaghivali, Ganeshpuri, Ulwe, Vaghivalivada and Chinchpada respectively. Slightly high level of Calcium was observed at Targhar, Koli, Vaghivali and Ganeshpuri. The metal concentration increased in soil due to ongoing landfilling activities. The soil project site is low permeable and has low porosity. Overall soil quality was observed fertile in nature and suitable to grow local plants varieties at all locations.

4.4 SOIL QUALITY MONITORING REPORT

4.4.1 Soil Analysis Data

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

Table 4-9: Soil analysis of various stations in study area during post monsoon **November 2019**

Sr. No.	Locations		Targhar (S1)	Kopar (S2)	Kombadbhuje (S3)	Koli (S4)	Vaghivali (S5)	Ganeshpuri (S6)	Ulwe (S7)	Pargaon (S8)	Vaghivalivada (S9)	Chinchpada (S10)	Unit
	Sampling Date		28-11-2019										
13.	pH		6.92	6.82	6.82	6.94	6.85	6.90	6.87	6.84	6.80	6.80	--
14.	Texture	Clay	68	75	81	69	74	68	72	80	80	69	%
		Silt	25	14	10	20	18	23	22	10	10	19	
		Fine Sand	10	11	9	11	08	09	06	10	10	12	
15.	Conductivity		280.9	340	280.8	250.8	340.8	290.4	298.4	299.4	280.8	290.8	µS/cm
16.	Sodium (Na)		40	50	50	30	60	60	20	80	40	60	Kg/hectare
17.	Magnesium (Mg)		11	12	11	13	11	12	12	11	13	12	meq/l
18.	Potassium (K)		90	100	80	100	80	80	100	80	80	80	Kg/hector
19.	Sodium Absorption Ratio (SAR)		8.7	10.7	10.7	6.3	13.1	12.8	4.3	17.1	8.3	12.8	%
20.	Permeability		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	Cm/sec
21.	Water Holding Capacity (WHC)			42.4	42.6	42	45.8	44.6	40.8	44.5	42.3	40.5	%
22.	Calcium (Ca)		31	32	33	33	31	32	32	33	33	32	meq/l
23.	Cation Exchange Capacity (CEC)		80	100	100	60	120	120	40	160	80	20	Cmol/Kg
24.	Porosity		16.8	12.4	12.9	12.8	14.8	14.8	14.2	15.2	12.3	14.2	%

4.4.2 Soil Data Inference during Post Monsoon November 2019:

The texture composition of soil is changed due to land filling activities at all villages. There was marginal high level of metals like Sodium at Vaghivali, Pargaon, Ganeshpuri and Chinchpada; and Potassium at Kopar, Ulwe and Targhar respectively. Slightly high level of Calcium was observed at Kombadbhuje, Koli, Pargaon and Vaghivalivada. The metal concentration increased in soil due to ongoing landfilling activities. The soil project site is low permeable and has low porosity. Overall soil quality was observed fertile in nature and suitable to grow local plants varieties at all locations.

4.5 GROUND WATER QUALITY ANALYSIS REPORT

4.5.1 GW Analysis Data during monsoon (July 2019)

The physicochemical analysis of ground water study showed considerable variation and is compiled and presented below:

Table 4-10: Ground Water analysis at various stations during **July 2019**

Sr. No.	Sampling Locations	GW 1	GW 2	GW 3	GW 4	GW 5	GW 6	GW 7	GW 8	GW 9	GW 10
	Sampling month	29.03.19									
1	pH	7.05		7.32	7.11		7.17	7.05	7.90	8.19	7.08
2	Turbidity	2		2	2		3	4	3	3.2	2
3	Temperature	27.4		26.7	27.0		27.4	26.8	26.2	27.0	27.0
4	Conductivity	136.3		209.1	180.1		180.3	195.6	44.7	120.4	136.6
5	Salinity	0.07		0.14	1.04		0.03	0.07	0.02	0.06	0.07
6	SS	38		44	34		48	38	12	28	34
7	Total Dissolved Solid	90		140	120		120	130	30	80	90
8	Dissolved Oxygen	6.4		6.4	6.0		6.0	6.2	5.2	5.6	6.0
9	BOD	4		4	12		8	12	2	2	4
10	COD	20		20	40		20	30	10	10	20
11	Magnesium (as Mg)	4.32		27.2	17.5		12.2	19.9	15.3	34.0	4.32
12	Hardness (as CaCO3)	50		250	194		90	226	98	216	50
13	Alkalinity	46		210	211		100	230	90	166	48
14	Chlorides (as Cl)	38		62	25		17	56	13	34	39
15	Sulphate (as SO4-2)	14		58	59		91	48	10	40	18
16	Fluoride (as F)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
17	Sodium (as Na)	3	Village Reclaimed	5	6	Village Reclaimed	3	5	2	1	3
18	Potassium (as K)	4		3	6		3	8	1	6	4
19	Phenolic Compound	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
20	Total phosphorous	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
21	TKN	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
22	Sodium absorption ratio	0.6		0.7	0.72		0.56	0.72	0.6	0.59	0.56
23	Nitrate (as NO3-)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
24	Nitrite (as NO-2)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
25	Calcium (as Ca)	12.8		52.2	48.8		16.0	57.6	14.4	31.2	12.8
26	Iron (as Fe)	0.06		0.06	0.02		0.12	0.09	0.09	0.04	0.03
27	Zinc (as Zn)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
28	Manganese (as Mn)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
29	Cadmium (as Cd)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
30	Chromium (as Cr)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
31	Mercury (as Hg)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
32	Coliform (MPN/ 100ml)	>1600		>1600	>1600		>1600	>1600	>1600	>1600	>1600
33	Heterophilic Bacteria (SPC/100ml)	108×10^{-3}		133×10^{-3}	102×10^{-3}		110×10^{-3}	118×10^{-3}	118×10^{-3}	99×10^{-3}	105×10^{-3}

GW1: Open Well at Kombadbhuje; GW2: Well near pond at Ganeshpuri; GW3: Open well at Vaghivalivada; GW4: Open Well at Koli; GW5: Open well at Kopar; GW6: Open well at Chinchpada; GW7: A well Near Pargaon; GW8: Well near Vaghivali; GW9: Open well at Ulwe; GW10: Well near pond at Targhar

BDL: Below Detectable Limit

4.5.2 GW Analysis Inference:

The ground water quality showed considerable variation. Some ground water parameters were within desirable limit, some between desirable and permissible limit and few exceeded the permissible limit. The ground water not fully complied the quality requirements as per IS 10500 revised in 2012 for purpose of drinking water.

The quality of collected ground water was not suitable for drinking purpose due to the presence of coliform & heterotrophic bacteria at all locations i.e. Koli, Pargaon, Chinchpada, Vaghivalivada, Ulwe, Vaghivali, Targhar & Kombadbhuje. Proper treatment of ground water required before consumption. At present Ganeshpuri and Kopar villages reclaimed and there is no water source available for ground water analysis.

4.5.3 GW Analysis Data during Post monsoon (November 2019)

The physicochemical analysis of ground water study showed considerable variation and is compiled and presented below:

Table 4-11: Ground Water analysis at various stations during **November 2019**

Sr. No.	Sampling Locations	GW 1	GW 2	GW 3	GW 4	GW 5	GW 6	GW 7	GW 8	GW 9	GW 10
	Sampling month	28.11.19									
1	pH	6.91	Village Reclaimed	6.82	6.82	Village Reclaimed	6.83	7.12	7.81	7.72	7.08
2	Turbidity	2.0		2.0	2.0		2.0	3.0	2.0	2.8	2.0
3	Temperature	27.2		27.6	27.2		28.0	27.3	27.3	27.4	27.5
4	Conductivity	155.2		195.2	184.9		170.6	201.3	56.3	136.5	142.5
5	Salinity	1.4		1.3	1.2		1.2	0.10	0.02	0.09	0.06
6	SS	16		22	14		28	34	18	42	30
7	Total Dissolved Solid	120		120	110		140	150	40	80	110
8	Dissolved Oxygen	6.3		6.6	6.4		6.3	6.5	5.6	6.0	6.3
9	BOD	14		18	4.0		20	16	4.0	04	6.0
10	COD	50		50	10		60	50	10	20	20
11	Magnesium (as Mg)	7.68		11	15.8		6.72	22.08	14.4	26.8	3.84
12	Hardness (as CaCO3)	194		140	222		92	240	92	198	46
13	Alkalinity	190		132	250		80	228	84	172	42
14	Chlorides (as Cl)	35		80	22		88	69	16	32	42
15	Sulphate (as SO4-2)	65.8		18	72.87		50	51	15	10	22
16	Fluoride (as F)	BDL		BDL	0.2		BDL	BDL (DL-0.02)	BDL(DL-0.2)	BDL (DL-0.05)	BDL(DL-0.2)
17	Sodium (as Na)	3.0		4.0	2.0		2.0	4.0	4.0	3.0	5.0
18	Potassium (as K)	4.0		5.0	3.0		2.0	6.0	2.0	5.0	4.0
19	Phenolic Compound	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
20	Total phosphorous	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
21	TKN	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
22	Sodium absorption ratio	0.3		0.3	0.3		0.3	0.72	0.56	0.59	0.56
23	Nitrate (as NO3-)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
24	Nitrite (as NO-2)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
25	Calcium (as Ca)	64.8		34.4	37.4		28.8	59.2	12.8	34.4	12.0
26	Iron (as Fe)	0.05		0.07	0.06		0.05	0.07	0.04	0.06	0.02
27	Zinc (as Zn)	BDL		BDL	BDL		BDL	BDL (DL-0.01)	BDL	BDL	BDL
28	Manganese (as Mn)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
29	Cadmium (as Cd)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
30	Chromium (as Cr)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
31	Mercury (as Hg)	BDL		BDL	BDL		BDL	BDL	BDL	BDL	BDL
32	Coliform (MPN/ 100ml)	>1600		>1600	>1600		>1600	>1600	>1600	>1600	>1600
33	Heterophilic Bacteria (SPC/100ml)	113×10^{-3}		125×10^{-3}	118×10^{-3}		110×10^{-3}	126×10^{-3}	140×10^{-3}	121×10^{-3}	113×10^{-3}

GW1: Open Well at Kombadbhuje; GW2: Well near pond at Ganeshpuri; GW3: Open well at Vaghivalivada; GW4: Open Well at Koli; GW5: Open well at Kopar; GW6: Open well at Chinchpada; GW7: A well Near Pargaon; GW8: Well near Vaghivali; GW9: Open well at Ulwe; GW10: Well near pond at Targhar

BDL: Below Detectable Limit

4.5.4 GW Analysis Inference:

The ground water quality showed considerable variation. Some ground water parameters were within desirable limit, some between desirable and permissible limit and few exceeded the permissible limit. The ground water not fully complied the quality requirements as per IS 10500 revised in 2012 for purpose of drinking water.

The quality of collected ground water was not suitable for drinking purpose due to the presence of coliform & heterotrophic bacteria at all locations i.e. Koli, Pargaon, Chinchpada, Vaghivalivada, Ulwe, Vaghivali, Targhar & Kombadbhuje. Proper treatment of ground water required before consumption. At present Ganeshpuri and Kopar villages reclaimed and there is no water source available for ground water analysis.

4.6 MARINE WATER QUALITY ANALYSIS REPORT DURING MONSOON

Surface Marine water samples were collected for different Physiochemical and Biological parameters from 13 stations during 29th to 30st July 2019 (monsoon). Analysis part is mentioned in subsequent sections below.

Collection of water samples

4.6.1 Analytical Data - Physicochemical Parameters during Monsoon

Table 4-12: Marine Water physicochemical analysis at various stations during **July 2019**

Sr. No.	Parameter	W 1	W 2	W 3	W 4	W 5	W 6	W7	W 8	W9	W 10	W11	W12	W13	Unit
		S	S	S	S	S	S	S	S	S	S	S	S	S	
1.	pH	6.62	6.58	6.74	6.68	6.57	6.52	6.56	6.61	6.56	6.66	6.58	6.56	6.57	--
2.	Turbidity	7.2	6.5	5.3	4.6	3.2	2.8	3.2	4.3	3.2	2.2	3.4	3.6	4.3	NTU
3.	Temperature	28.0	30.0	29.2	28.5	29.4	29.8	29.9	29.9	30.0	29.4	29.2	29.0	29.8	℃
4.	Salinity	6.2	8.4	18.1	26.3	26.8	29.4	30.1	31.4	32.8	31.6	32.1	12.4	32.6	ppt
5.	TSS	112	104	122	108	96	86	106	114	130	98	124	124	128	mg/l
6.	TKN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
7.	Total phosphorous	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
8.	DO	2.2	2.8	2.8	3.2	2.8	2.0	2.8	2.8	3.1	2.8	2.8	2.9	3.2	mg/l
9.	BOD	0.8	1.0	1.2	1.8	1.6	1.4	2.5	1.6	2.0	1.5	1.8	1.8	1.6	mg/l
10.	TDS	4420	5420	4830	4910	4660	4590	4820	4960	4910	4650	4660	4990	4620	mg/l
11.	Oil & Grease	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
12.	Nitrate as NO3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
13.	Nitrite as NO2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
14.	Sulphate as SO4	62.0	90.6	72.0	38	42.0	47	42.0	88.3	69	84.0	74.0	62.0	79.5	mg/l
15.	Iron as Fe	0.15	0.18	0.11	0.08	0.11	0.10	0.12	0.06	0.08	0.06	0.14	0.10	0.14	mg/l
16.	Magnesium as Mg	38.4	42	53.3	44.2	36.5	49.9	59.5	52.3	68.6	54.2	52.3	52.3	52.3	mg/l
17.	Chromium as Cr	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
18.	Cadmium as Cd	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
19.	Mercury as Hg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
20.	Zinc as Zn	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
21.	Manganese Mn	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
22.	Sodium, Na	23	40	42	23	20	18	18	20	18	14	18	22	26	mg/l
23.	Potassium K	24	21	30	18	16	16	22	26	28	25	24	32	32	mg/l
24.	Silicate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
25.	Hardness	662	426	462	392	368	366	374	396	392	422	368	428	378	mg/l
26.	Alkalinity	542	372	386	384	354	260	370	386	380	392	372	414	482	mg/l
27.	Chloride	3527	4779	4609	4779	4552	4440	4779	4666	4780	4552	4438	4893	4438	mg/l
28.	Electrical Conductivity	659	809	720.8	732.8	695.8	685.1	719.4	740.3	732.8	694	695.5	744.7	689.5	µS/Cm
29.	COD	120	140	160	100	90	90	120	90	100	100	80	100	80	mg/l
30.	Phenol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
31.	Fluoride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l

4.6.2 Inference - Physicochemical Parameters during Monsoon:

The pH value ranged from 6.52 to 6.74 at surface basic nature of water. Salinity was low station W1, W2 and W12 due to influx of fresh water during collection Period of monsoon. The total suspended solids were found quite high.

Dissolved Oxygen level was observed low during collection of time due to seasonal variation. COD and BOD value suggests the presence of chemically and biologically oxidizable 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, Sodium and Iron were low.

4.7 MARINE WATER QUALITY ANALYSIS REPORT (BIOLOGICAL PARAMETERS)

4.7.1 Analytical Data - Biological Parameters during Monsoon:

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

Table 4-13: Marine Water biological analysis of stations (W1 to W7) during **July 2019**

Parameter	W 1	W 2	W3	W4	W5	W6	W7
	S	S	S	S	S	S	S
Phytoplankton							
Population (nox10³/L)	22.4	11.2	13.6	13.6	15.2	16.0	7.2
Total Genera	11	8	10	8	9	8	12
Major Genera	**Leptocylindrus, Nitzschia, Navicula, Thalassiosira**	**Nitzschia, Navicula, Pleurosigma, Gyrosigma**	**Nitzschia, Navicula, Synedra, Pleurosigma**	**Navicula, Synedra, Thalassiosira, Nitzschia**	**Cyclotella, Navicula, Nitzschia, Coscinodiscus**	***Cyclotella, Coscinodiscus, Leptocylindrus, Navicula***	***Leptocylindrus, Navicula, Coscinodiscus, Thalassiosira***
Diversity Index	2.01	1.85	2.20	1.59	1.84	1.89	1.91
Zooplankton							
Population (no x 10³/100	35.9	19.2	21.5	4.0	14.5	11.8	5
Total Group	11	14	9	5	7	8	10
Major Groups	Copepods Gastropods	Copepods Decapods	Copepods Decapods	Copepods Decapods	Gastropods, foraminiferans	Copepods Gastropods	**Copepods**
Biomass (ml/100m³)	5.2	2.6	6.6	0.6	2.1	2.3	**Gastropods**
Diversity Index	2.01	0.48	2.10	0.20	0.48	0.56	1.6
Microbiology							
Coliform/100 ml	>1600	>1600	>1600	>1600	>1600	>1600	>1600

Table 4-14: Marine Water biological analysis of stations (W8 to W13) during **July 2019**

Parameter	W8	W9	W10	W11	W12	W13
	S	S	S	S	S	S
Phytoplankton						
Population (nox10³/L)	8.8	6.4	8.8	10.4	36.8	16.0
Total Genera	6	6	8	7	18	9
Major Genera	***Cyclotella, Coscinodiscus, Nitzschia, Navicula***	***Navicula, Cyclotella, Pleurosigma, Gyrosigma***	***Leptocylindrus, Navicula, Gyrosigma, Pleurosigma***	***Thalassiosira Navicula, Pleurosigma, Coscinodiscus***	***Scenedesmus, Cosmarium, Thalassiosira, Navicula***	***Thalassiosira, Pleurosigma, Navicula, Skeletonema***
Diversity Index	1.67	1.73	1.96	1.19	2.08	1.82
Zooplankton						
Population (no x 10³/100m³)	60.0	38.0	17.0	30.2	68.4	24.6
Total Group	9	3	10	5	12	7
Major Groups	**Copepods, Mysids**	**Copepods Decapods**	**Copepods Acetes sp.**	**Copepods Gastropods**	Copepods,	**Copepods Decapods**
Biomass (ml/100m³)	18.6	4.6	5.6	17.4	Decapods	10.6
Diversity Index	1.02	1.06	1.24	0.46	8.2	0.68
Microbiology						
Coliform/100 ml	>1600	>1600	>1600	>1600	>1600	>1600

4.7.2 Inferences - Biological Parameters during Monsoon:

4.7.2.1 Phytoplankton

In July 2019, Phytoplankton population density ranges from 6.4-36.8 x 10^3/l at surface water of all 13 stations. Highest phytoplankton population at surface water of station 12 may be due to influx of domestic water from surrounding villages; total generic groups ranges from 6-18 nos. at surface water of all 13 stations. Maximum generic diversity 18 no. is observed at surface water of Station W12 during July 2019.

Nitzschia, *Navicula, Pleurosigma and Cyclotella* are most common ones, followed by rest of observed genera like *Thalassiosira*, Coscinodiscus and Gyrosigma. The other freshwater phytoplankton genera found are *Scenedesmus*, *Cosmarium and Pediastrum* in Gadhi River (Station 1) and Ulwe River (Station 12) respectively. *Nitzschia*, *Navicula and Thalassiosira* are common Genera noted in all stations. Graphical representations of phytoplankton population and total genera is represented in **Figure 4.1**.

The graph below represents the population of phytoplankton is more at station 12; and less at station 9, which represents there is discharge of sewage and domestic waste. The phytoplankton trend with respect to total number of genera is almost same throughout all stations. Some of the major genera seen were photographed and shown in **Figure 4.2**.

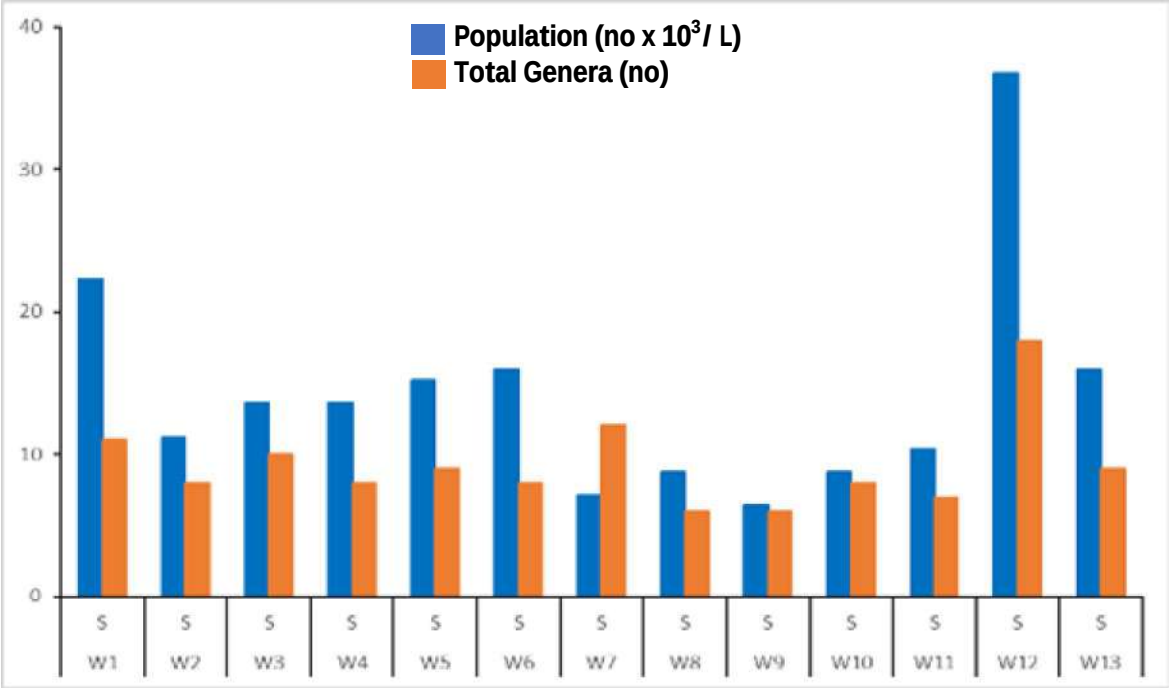


Figure 4-1 : Representation of phytoplankton population & Total genera for July 2019

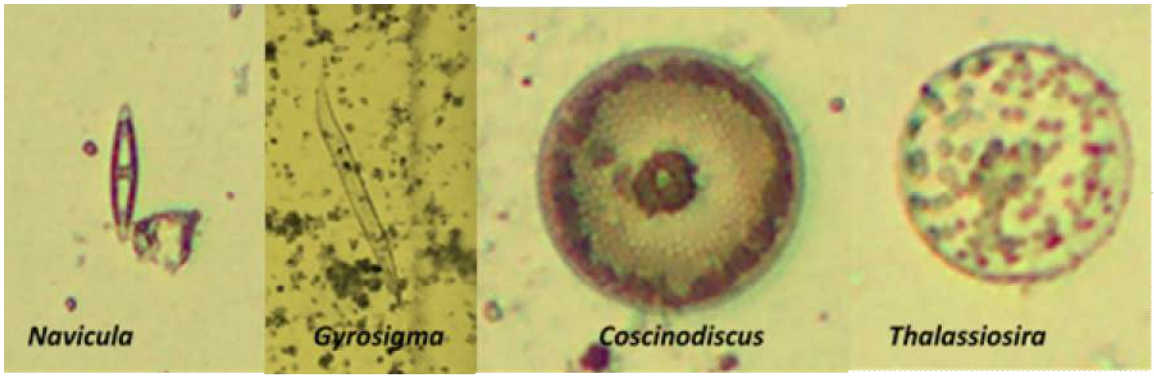


Figure 4-2: Phytoplankton found in samples for **July 2019**

4.7.2.2 Zooplankton

In July 2019, the zooplankton biomass ranged from 0.6 to 18.6 ml/100 m^3 with population density of 4.0 to 68.4 no x 10^3/100m^3 while having faunal group ranging from 3-14 nos. The zooplankton was noted with good population and group diversity. Copepods, Gastropods & decapods were common groups observed, **Figure 4.3** represents zooplankton standing stock graphically.

The graph below represents that average standing stock reported from all stations; Station 4 shows lowest population as compared to Station 12 with highest population; and station 4 shows lowest biomass and Station 8 shows highest biomass respectively.

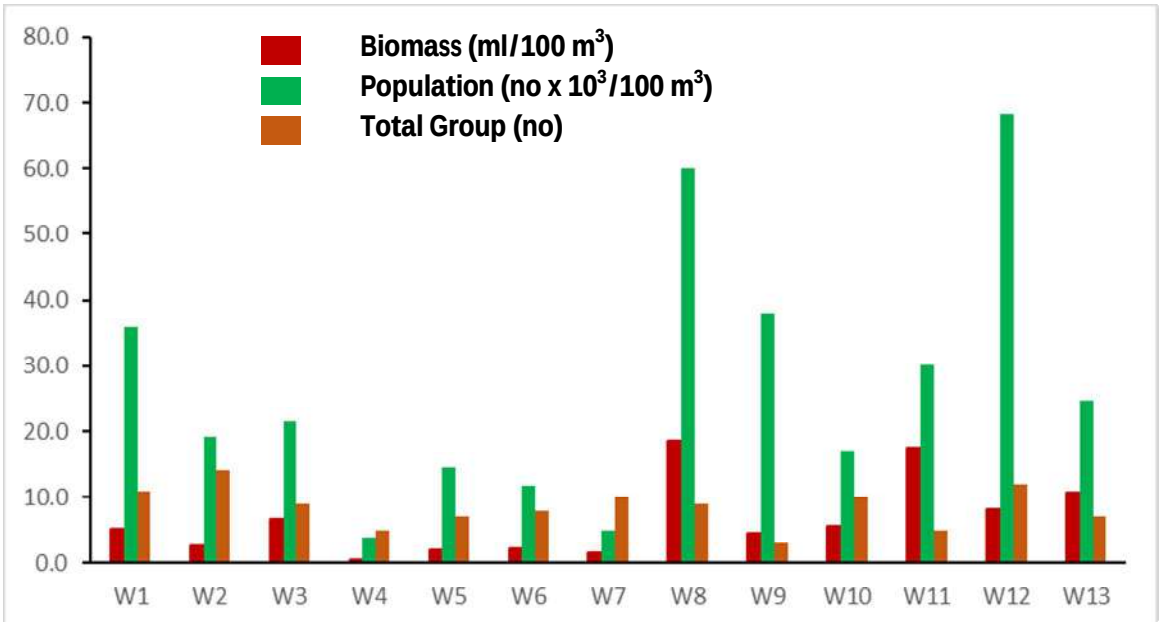


Figure 4-3: Representations of Zooplankton Biomass, Population & Total group for **July 2019**

Figure 4-4: Zooplankton found in samples for **July 2019**

4.7.2.3 Microbiology

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

4.8 MARINE WATER QUALITY ANALYSIS REPORT DURING POST MONSOON

Surface Marine water samples were collected for different Physiochemical and Biological parameters from 13 stations during 29th to 30st November 2019 (post monsoon). Analysis part is mentioned in subsequent sections below.

Collection of Water samples

4.8.1 Analytical Data - Physicochemical Parameters during Post Monsoon

Table 4-15: Marine Water physicochemical analysis at various stations during **November 2019**

Sr. No.	Parameter	W 1	W 2	W 3	W 4	W 5	W 6	W7	W 8	W9	W 10	W11	W12	W13	Unit
		S	S	S	S	S	S	S	S	S	S	S	S	S	
32.	pH	6.82	6.54	6.70	6.62	6.52	6.58	6.64	6.68	6.78	6.66	6.64	6.62	6.50	--
33.	Turbidity	7.6	7.3	7.3	5.6	8.2	6.8	8.6	7.6	7.8	7.6	9.4	8.2	6.8	NTU
34.	Temperature	29.1	29.4	31.6	30.5	30.2	29.4	29.6	30.2	30.6	29.8	30.4	28.7	30.1	°C
35.	Salinity	6.0	24.2	32.4	33.1	34.2	32.3	33.4	31.4	32.1	33.7	33.2	8.6	33.6	ppt
36.	TSS	126	116	134	126	112	98	123	128	128	112	128	124	120	mg/l
37.	TKN	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
38.	Total phosphorous	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
39.	DO	2.1	2.1	2.2	2.6	2.1	2.0	2.4	2.4	2.2	2.4	2.4	2.4	2.6	mg/l
40.	BOD	0.8	1.2	1.0	1.6	1.0	0.8	1.0	1.1	0.8	1.1	1.1	1.1	1.6	mg/l
41.	TDS	4530	4960	4790	4960	4680	4590	4860	4980	4580	4720	4670	4960	4860	mg/l
42.	Oil & Grease	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
43.	Nitrate as NO3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
44.	Nitrite as NO2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
45.	Sulphate as SO4	68	92	78	42	48	58	54	94	78	92	78	76	75	mg/l
46.	Iron as Fe	0.16	0.12	0.10	0.09	0.11	0.09	0.10	0.08	0.14	0.08	0.11	0.10	0.10	mg/l
47.	Magnesium as Mg	42.3	40.3	50.6	44.2	38.2	46.8	60.8	50.4	38.4	52.9	50.6	51.8	52.3	mg/l
48.	Chromium as Cr	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
49.	Cadmium as Cd	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
50.	Mercury as Hg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
51.	Zinc as Zn	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
52.	Manganese Mn	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
53.	Sodium, Na	24	42	46	28	20	24	18	22	20	18	20	21	26	mg/l
54.	Potassium K	30	28	32	20	16	18	26	28	28	25	28	36	30	mg/l
55.	Silicate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
56.	Hardness	674	428	466	392	356	374	380	412	658	420	372	432	380	mg/l
57.	Alkalinity	560	364	392	384	340	368	372	398	562	398	378	422	480	mg/l
58.	Chloride	3546	4762	4616	4786	4567	4386	4820	4678	4261	4620	4560	4824	4532	mg/l
59.	Electrical Conductivity	666.2	802.3	724.3	738.2	698.8	689.1	724.3	748.6	664.2	698	698.3	732.1	696.2	µS/Cm
60.	COD	160	120	140	140	120	140	120	100	120	100	100	120	100	mg/l
61.	Phenol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l
62.	Fluoride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	mg/l

4.8.2 Inference - Physicochemical Parameters during Post Monsoon:

The pH value ranged from 6.50 to 6.82 at surface basic nature of water. Salinity was low station W1, W2 and W12 due to influx of fresh water during collection Period of post monsoon due to vicinity of Gadhi (W1& W2) and Ulwe river (W12). The total suspended solids were found quite high.

Dissolved Oxygen level was observed low during collection of time due to seasonal variation. COD and BOD value suggests the presence of chemically and biologically oxidizable 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, Sodium and Iron were low.

4.9 MARINE WATER QUALITY ANALYSIS REPORT (BIOLOGICAL PARAMETERS)

4.9.1 Analytical Data - Biological Parameters during Post Monsoon:

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

Table 4-16: Marine Water biological analysis of stations (W1 to W7) during **November 2019**

Parameter	W 1	W 2	W3	W4	W5	W6	W7
	S	S	S	S	S	S	S
Phytoplankton							
Population (nox10³/L)	73.6	19.2	44.8	38.4	25.6	33.6	31.2
Total Genera	22	12	16	10	14	11	15
Major Genera	***Scenedesmus, Pediastrum, Cosmarium, Thalassiosira***	***Thalassiosira, Nitzschia, Navicula, Pleurosigma***	***Pleurosigma, Navicula, Coscinodiscus, Biddulphia***	***Nitzschia, Navicula, Thalassionema, Thalassiosira***	***Thalassiosira, Pleurosigma, Cyclotella, Navicula***	***Coscinodiscus, Gramatophora, Thalassiosira, Ditylum***	***Navicula, Pleurosigma, Synedra, Melosira***
Diversity Index	1.78	1.82	1.96	2.02	1.56	1.62	1.94
Zooplankton							
Population (no x 10³/100m	42.6	16.4	28.2	6.8	19.4	18.7	9.2
Total Group	8	12	15	7	9	10	12
Major Groups	**Copepods foraminiferans**	**Copepods Gastropods**	**Copepods Decapods**	**Copepods amphipods**	**Gastropods, foraminiferans**	**Copepods Isopods**	**Copepods Gastropods**
Biomass (ml/100m³)	7.8	4.6	9.4	1.2	3.6	2.7	4.2
Diversity Index	1.90	0.68	1.84	0.72	1.34	1.86	2.32
Microbiology							
oliform/100 ml	>1600	>1600	>1600	>1600	>1600	>1600	>1600

Table 4-17: Marine water biological analysis of stations (W8 to W13) during November 2019

Parameter	W8	W9	W10	W11	W12	W13
	S	S	S	S	S	S
Phytoplankton						
Population (nox10³/L)	34.4	49.6	20.8	41.6	81.6	22.4
Total Genera	9	13	16	12	23	14
Major Genera	***Pleurosigma, Navicula, Skeletonema, Coscinodiscus***	***Nitzschia, Pleurosigma, Cyclotella, Gyrosigma***	***Guinardia, Leptocylindrus, Biddulphia, Pleurosigma***	***Thalassionema, Pleurosigma, Pleurosigma, Thalassiothrix***	***Scenedesmus, Oscillatoria, Actinastrum, Navicula***	***Thalassiosira, Skeletonema, Navicula, Pleurosigma***
Diversity Index	1.88	1.62	2.08	1.36	2.04	1.64
Zooplankton						
Population (no x 10³/100m³)	54	26	12	26.2	45.2	17.8
Total Group	7	2	11	6	8	10
Major Groups	**Copepods, Mysids**	**Copepods Decapods**	**Copepods Acetes sp.**	**Copepods Acetes sp.**	**Copepods, Acetes sp.**	**Copepods Acetes sp.**
Biomass (ml/100m³)	12.8	4.6	7.2	19.8	16.8	8.4
Diversity Index	2.16	1.58	1.94	0.32	0.38	0.56
Microbiology						
Coliform/100 ml	>1600	>1600	>1600	>1600	>1600	>1600

4.9.2 Inferences - Biological Parameters during Post Monsoon:

4.9.2.1 Phytoplankton

In July 2019, Phytoplankton population density ranges from 19.2-81.6 x 10^3/l at surface water of all 13 stations. Highest phytoplankton population at surface water of station 12 may be due to influx of domestic water from surrounding villages; total generic groups ranges from 9-23 nos. at surface water of all 13 stations. Maximum generic diversity 24 no. is observed at surface water of Station W12 during December 2019.

Nitzschia, *Navicula, Thalassiosira, Pleurosigma and Cyclotella* are most common ones, followed by rest of observed genera like *Biddulphia*, Skeletonema and *Coscinodiscus*. The other freshwater phytoplankton genera found are *Scenedesmus*, *Cosmarium, Oscillatoria and Pediastrum* in Gadhi River (Station 1) and Ulwe River (Station 12) respectively. *Nitzschia*, *Navicula and Thalassiosira* are common Genera noted in all stations. Graphical representations of phytoplankton population and total genera is represented in **Figure 4.5**. The graph below represents the population of phytoplankton is more at station 12 and station 1; and less at station 8, which represents there is discharge of sewage and domestic waste. The phytoplankton trend with respect to total number of genera is almost same throughout all stations except station 1 and 12, where total genera were noted high in number. Some of the major genera seen were photographed and shown in **Figure 4.6**.

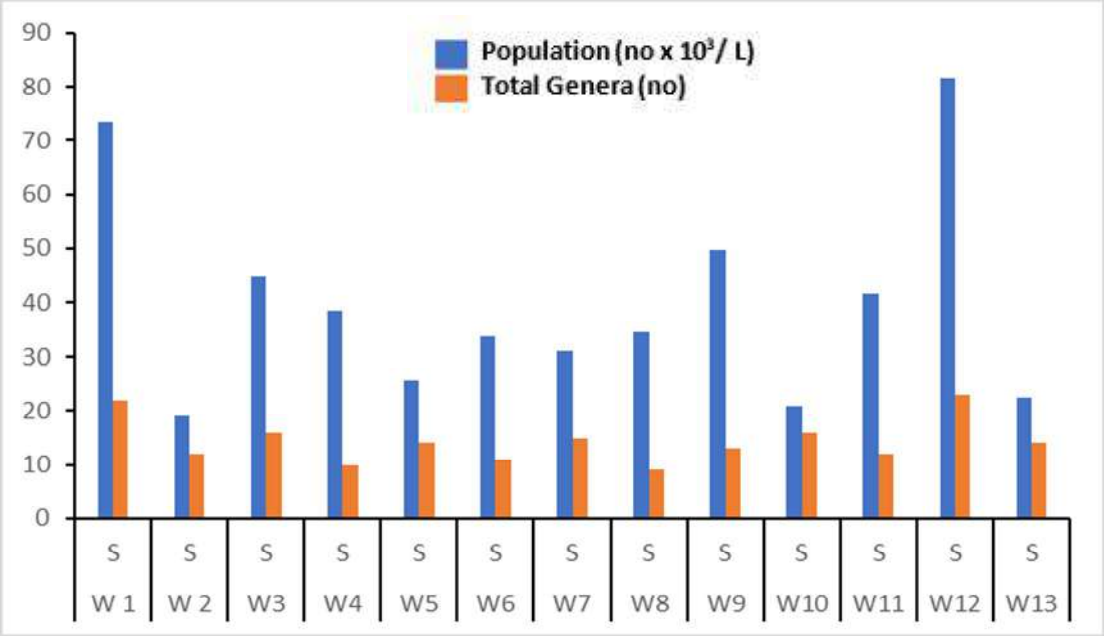


Figure 4-5 : Representation of phytoplankton population & Total genera for **November 2019**

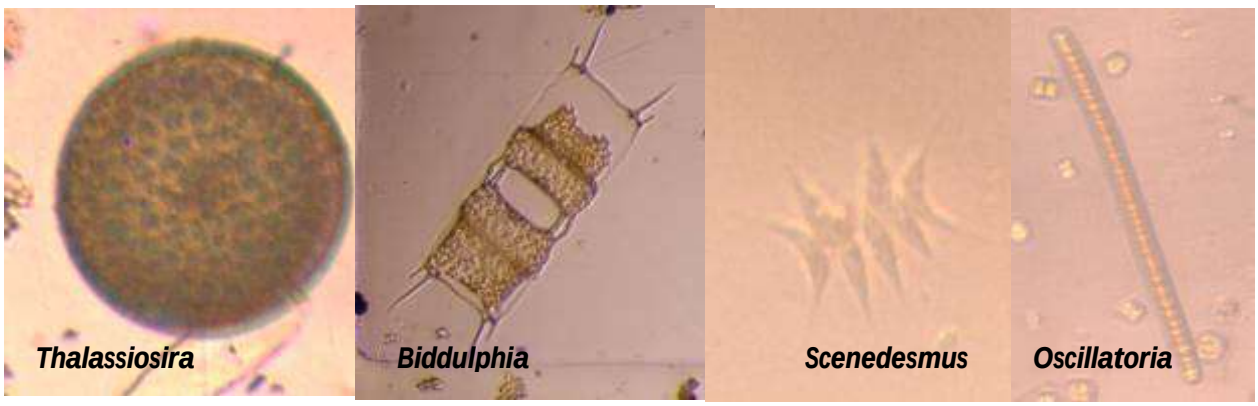


Figure 4-6: Phytoplankton found in samples for **November 2019**

4.9.2.2 Zooplankton

In July 2019, the zooplankton biomass ranged from 1.2 to 19.8 ml/100 m^3 with population density of 6.8 to 54.0 no x 10^3/100m^3 while having faunal group ranging from 2-15 nos. The zooplankton was noted with good population and group diversity. Copepods, Gastropods & Acetes were common groups observed, **Figure 4.7** represents zooplankton standing stock graphically. The graph below represents that average standing stock reported from all stations; Station 9 shows lowest population as compared to Station 8 with highest population; and station 4 shows lowest biomass and Station 11 shows highest biomass respectively.

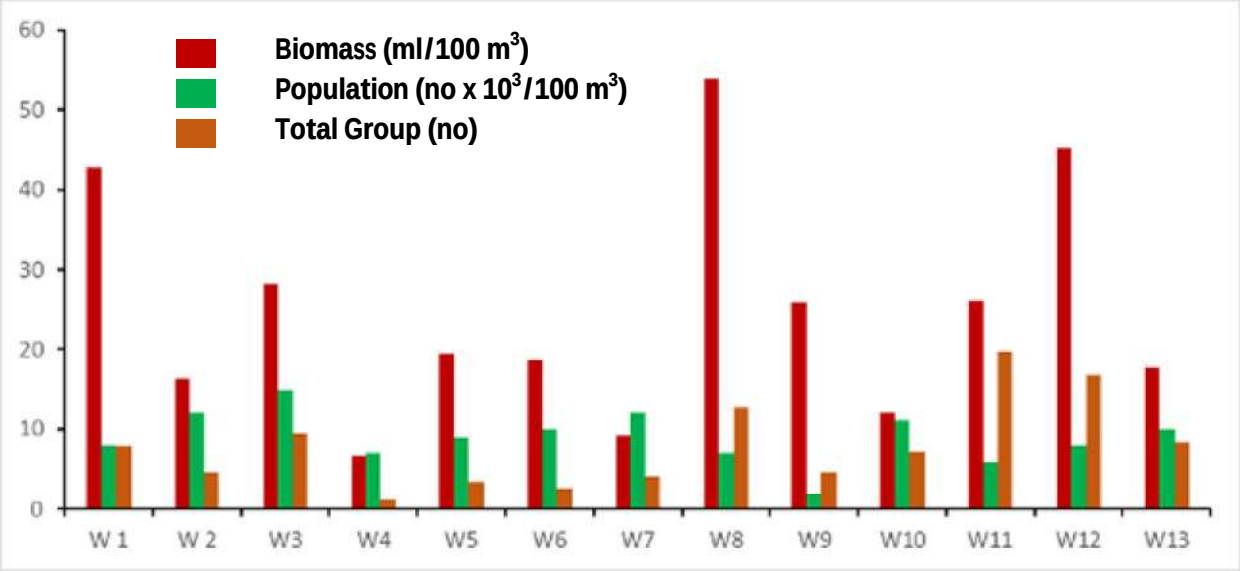


Figure 4-7: Representations of Zooplankton Biomass, Population & Total group for **November 2019**

Figure 4-8: Zooplankton found in samples for **November 2019**

4.9.2.3 Microbiology

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

5. CHAPTER V: CONCLUSION & RECOMMENDATION

Based on the study of activities planned during pre-development works and on the basis of the environmental baseline monitoring results, certain issues are identified, and steps taken to mitigate the environmental impacts. These mitigation measures need to be under constant watch through continuous vigilance, auditing and monitoring of air quality:

5.1 Ambient Air Quality

5.1.1 Observations

As can be seen from analysis data, **Table 4.1 to 4.6**, the ambient air monitoring results are within NAAQS limit.

5.1.2 NMIA Pre - development Activities and impacts on Air Quality:

Construction activities at NMIA during pre-development works which contribute to pollution of ambient air include:

- demolition of hill and excavation of large quantity of material like murum and rock which is being utilized within site and balance taken to fill up nearby areas.
- Controlled blasting to demolish the hill
- Rehabilitation and re-settlement of nearly 3000 households in 7 villages within NMIA site is in progress and about 58% works is completed. This activity results in generation of traffic
- Demolition of structures vacated results in dust emissions
- Plying of trucks, dumpers, ripper dozer, excavators etc. for handling of materials
- Operation of DG sets used for site offices

The air gets polluted by activities like excavation, land filling, controlled blasting, construction, material handling and transportation during construction phase due to traffic and high dust levels.

5.1.3 Mitigation Measures Taken and Proposed:

Contractors engaged by CIDCO for pre-development works have been asked to take up following mitigation measures to ensure minimal impacts on ambient air quality:

- Use temporary screens of tin or fabric to create barriers against dust.
- Provision of water sprinkling at the construction site and along roads for dust suppression.
- Wheel wash system on roads leading out of site to ensure that truck tyres do not spew out dust.
- Cover Trucks carrying earth, sand or stone with tarpaulin to avoid spillage. Avoid overloading of such trucks.

- Provide workers working in high dust areas and on earth moving machineries with face masks/goggles for their protection.
- Use high tech equipment for controlled (delayed) blasting with proper blast pattern along with cover on rock surface being excavated which will generate minimal noise as well as dust.
- The blasting is being undertaken under guidance of Indian Institute of Technology (IIT) previously known as Indian School of Mines, Dhanbad) and M/s Deeptec who guide regarding appropriate operation control, blast design, quantity of explosives, blasting pattern, watering of blasting area etc.
- Maintain construction machinery and equipment in good working condition with PUC Certification for all transport vehicles used. Vehicles & construction equipment which do not meet vehicular pollution standards are not allowed within construction site.

  It is proposed to reinforce the same through continuous vigilance, auditing and monitoring of air quality.

5.2 Ambient Noise:

5.2.1 Observations from Data:

Ambient Noise levels exceed the limits prescribed under Schedule II of Environmental Protection Act 1986 for various locations including Panvel CIDCO Office, Kharghar Nodal Office, Panchsheel Guest House, MES School, Swapna Nagari, Pargaon High School, MGM Hospital Kalamboli etc. due to heavy vehicular movement during sampling period (table 4.7).

5.2.2 NMIA Pre- Development Activities and impacts on Ambient Noise Levels:

Construction activities at NMIA during pre-development works which contribute to ambient noise include:

- demolition of hill and excavation of large quantity of material like murum and rock which is being utilized within site and balance taken to fill up nearby areas.
- Controlled blasting to demolish the hill
- Rehabilitation and re-settlement of nearly 3000 households in 7 villages within NMIA site is in progress and about 58% works is completed. This activity results in generation of traffic
- Demolition of structures vacated results in noise generation
- Plying of trucks, dumpers, ripper dozer, excavators, wheel loaders etc. for handling and re-handling of excavated material handling of materials
- Operation of DG sets used for site offices

5.2.3 Mitigation Measures Proposed:

Contractors engaged by CIDCO for pre-development works have been asked to take up following mitigation measures to ensure minimal impacts on ambient noise levels:

- Use of temporary screens of tin to create barriers against noise propagation in active construction areas.
- Workers working in high noise areas and on earth moving machineries are provided with earmuffs/ear plugs for their protection
- Trucks and construction machinery used on site to be well maintained to ensure low noise generation. Norms of Noise levels for Construction machinery as specified under EP Act should be strictly followed.
- High tech equipments are used for controlled (delayed) blasting with proper blast pattern along with cover on rock surface being excavated which will generate minimal noise.
- The blasting is being undertaken under guidance of Indian Institute of Technology (IIT) previously known as Indian School of Mines, Dhanbad) and M/s Deeptec who guide regarding appropriate operation control, blast design, quantity of explosives, blasting pattern, watering of blasting area, prevention of fly rock etc.
- construction activities are not be carried out nighttime hours
- construction machineries and DG sets used are provided with silencers
- DG sets used should conform to EP Act norms for air pollution and noise
- Before controlled blasting the surrounding villages are informed, so that they can go to a safe place away from the project site

5.3 Soil

5.3.1 Observations from Data:

Land use at NMIA site prior to pre-development works included agriculture, vacant land and inter- tidal area (partially under mangrove cover). Soil is fertile and can support vegetation (Table 4.8 and 4.9).

5.3.2. NMIA Pre – Development Activities and impacts anticipated on soil:

Construction activities at NMIA during pre-development works include:

- demolition of hill which will generate of material like murum and rock which will be utilized within site and balance will be taken to fill up nearby areas
- Site level is currently low and is being increased to +6 to +7m above existing GL by using excavated material.
- The area of the site is partially inundated during high tide. This area will be filled up to make available land for airport development

The soil will get affected by above activities.

5.3.3 Mitigation measure proposed:

Contractors engaged by CIDCO for pre-development works have been asked to take up following mitigation measures to ensure minimal impacts on land environment:

- removal of existing topsoil within site by excavating and storing the same for future use.
- Such excavated soil should be stored separately and used as final top layer after landfilling is completed-particularly in areas of proposed green belt development

5.4 Ground Water:

5.4.1 Observations from Data:

Ground Water quality is poor and fails to meet IS 10500:2012 norms at number of locations. The area of the site is low lying and partially inundated during high tide. Ground water table is high and mostly open dug wells are seen in rural areas (Table 4.10 and Table 4.11).

5.4.2 NMIA Pre - Development Activities and impacts anticipated on Ground Water Quality:

Construction activities at NMIA during pre-development works include:

- demolition of hill which will generate of material like murum and rock which will be utilized within site and balance will be taken to fill up nearby areas
- Site level is currently low and will be increased to +6 to +7m above existing GL by using excavated material.
- The area of the site is partially inundated during high tide. This area will be filled up to make available land for airport development

The ground water quality will get affected by above activities.

5.4.4 Mitigation Measures for Rehabilitated Settlements:

CIDCO needs to make adequate and clean piped water supply available for people to be accommodated in Rehabilitated settlements.

5.5 Marine Water:

5.5.1 Observations from Data:

Marine Water quality is moderate, may be due to hindrances.

5.5.2 NMIA Pre- Development Activities and impacts anticipated on Marine Water Quality:

Construction activities at NMIA during pre-development works include:

- demolition of hill which will generate of material like murum and rock which will be utilized within site and balance will be taken to fill up nearby areas.
- Site level is currently low and will be increased to +6 to +7m above existing GL by using excavated material.
- The area of the site is partially inundated during high tide. This area will be filled up to make available land for airport development

The marine water quality may get affected by activities such as land filling, diversion of courses of Ulwe and training of Gadhi rivers.

ANNEXURE II

महाराष्ट्र वन विभाग

वनपरिक्षेत्र अधिकारी कांदळवन संधारण घटक, नवी मुंबई यांचे कार्यालय

रो.हाऊस नं 26 ब भारत बिजली मार्ग. श्रीराम महाविद्यालय मागे, सेक्टर 04, ऐरोली नवी मुंबई 400 708

Email:rfomnm@gmali.com

विषय:- सिडको कोंबडभुजे तरघर रोपवनाबाबत...
जा.क्र./न.मुं.का.संघ/रोपवन/ २६९ /२०१९-२०
नवी मुंबई दि. 10 / 01 /२०२०

प्रति,

मा.महाव्यवस्थापक,
पर्यावरण व वने सिडको
बेलापूर.

मा.महोदय,

उपरोक्त विषयान्वये वनपरिक्षेत्र नवी मुंबई कडील असलेल्या नवी मुंबई आंतराष्ट्रीय विमानतळ प्राधिकरण, सिडको अंतर्गत 33 कोटी वृक्ष लागवड योजने अंतर्गत सिडकोचे मालकीचे जागेवर पर्यायी वनीकरण करणेकामी मौजे- तरघर कोंबडभुजे येथे २०.०० हे रोपवन ३० सप्टेंबर २०१९ ला पुर्ण करण्यात आले असून एकुण ८८८८० रोपांची लागवड केलेली आहे. माहितीस्तव सविनय सादर.

(डी.एस.कुकडे)
वनपरिक्षेत्र अधिकारी
कांदळवन संधारण घटक, नवी मुंबई

प्रतिलिपी:- मा.विभागीय वनअधिकारी, मुंबई कांदळवन संधारण घटक यांना माहितीस्तव सविनय सादर.

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Longitude: 73.038995
Elevation: -18.71m
Accuracy: 47.2m
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Longitude: 73.032226
Accuracy: 1100.0m
Time: 12-23-2019 10:56
Note: कोंबडभुजे

Latitude: 19.00129
Longitude: 73.039059
Elevation: 12.46m
Accuracy: 20.4m
Time: 12-23-2019 10:53
Note: कोंबडभुजे

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Longitude: 73.039059
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Accuracy: 12.9m
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Note: कोंबडभुजे

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Longitude: 73.034809
Accuracy: 800.0m
Time: 12-23-2019 10:55
Note: कोंबडभुजे


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Longitude: 73.046518
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Accuracy: 10.0m
Time: 21-11-2019 11:18
Note: kombad.bhuje
Powered by NoteCam


Latitude: 19.001294
Longitude: 73.039066
Elevation: 11.92m
Accuracy: 15.0m
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Note: कोंबडभुजे
Powered by NoteCam

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Longitude: 73.046566
Elevation: -3.46m
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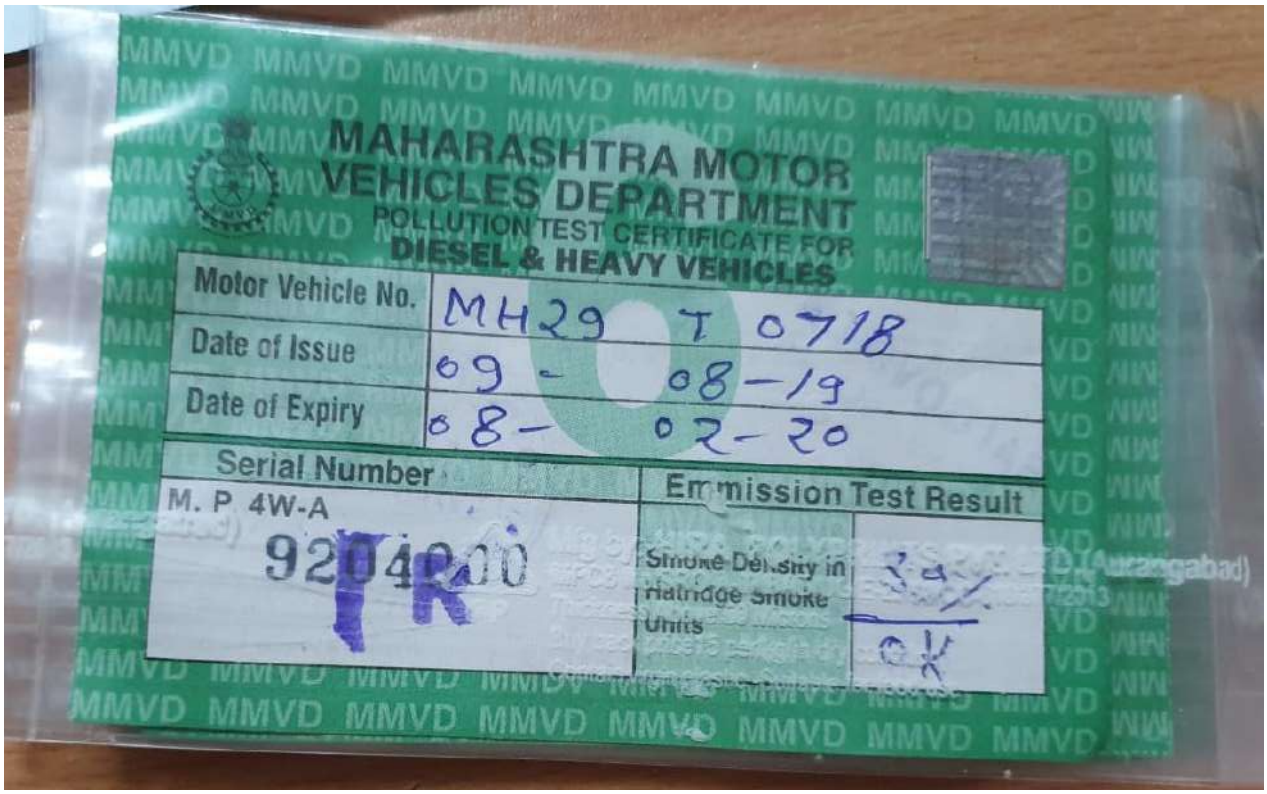
Powered by NoteCam

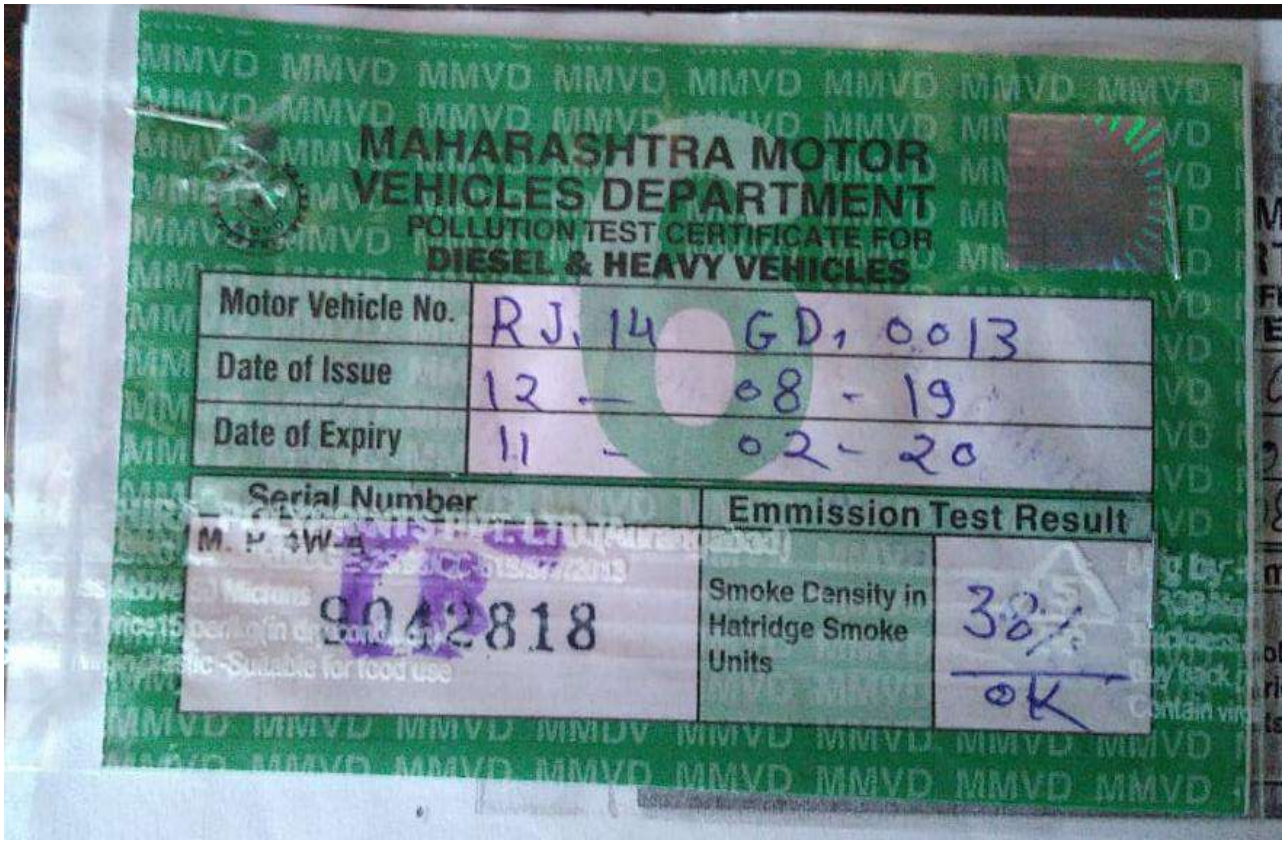
ANNEXURE III

ANNEXURE- III

Project Site Construction Vehicles

PUC Copies





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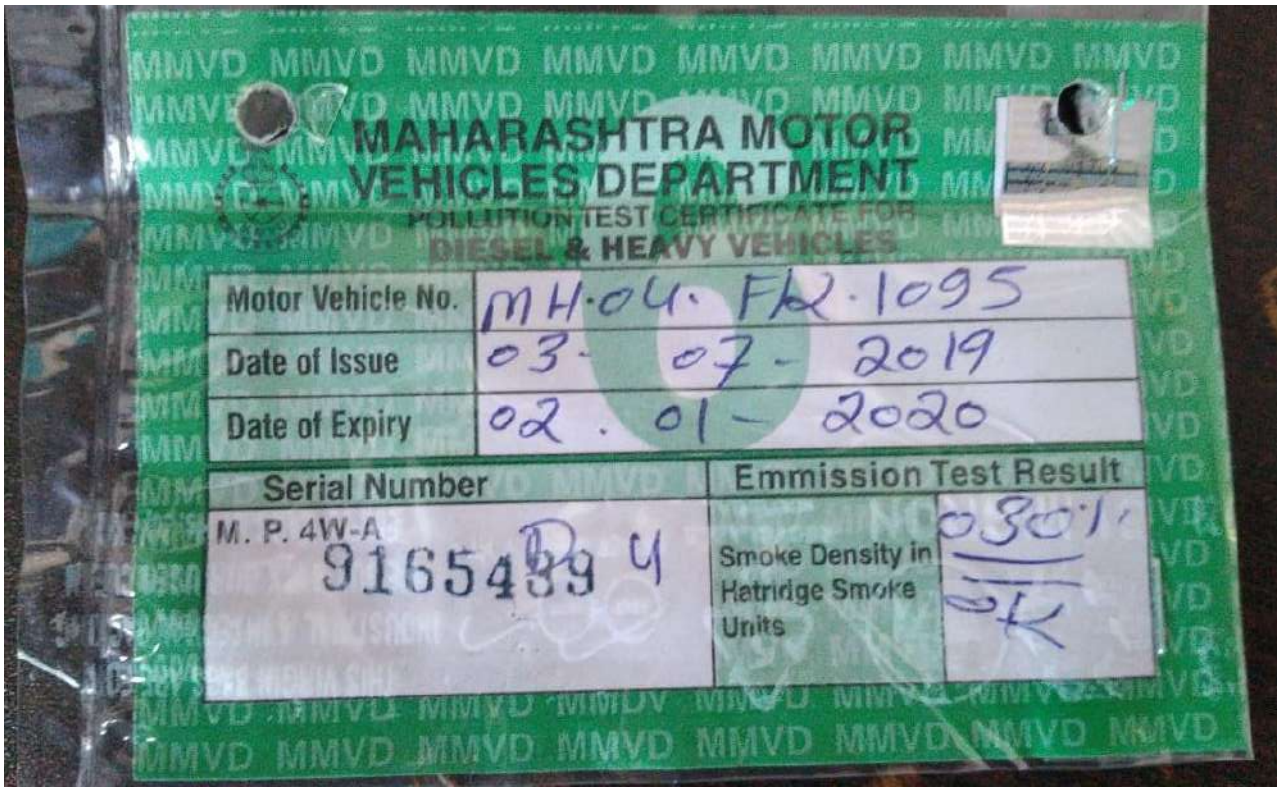

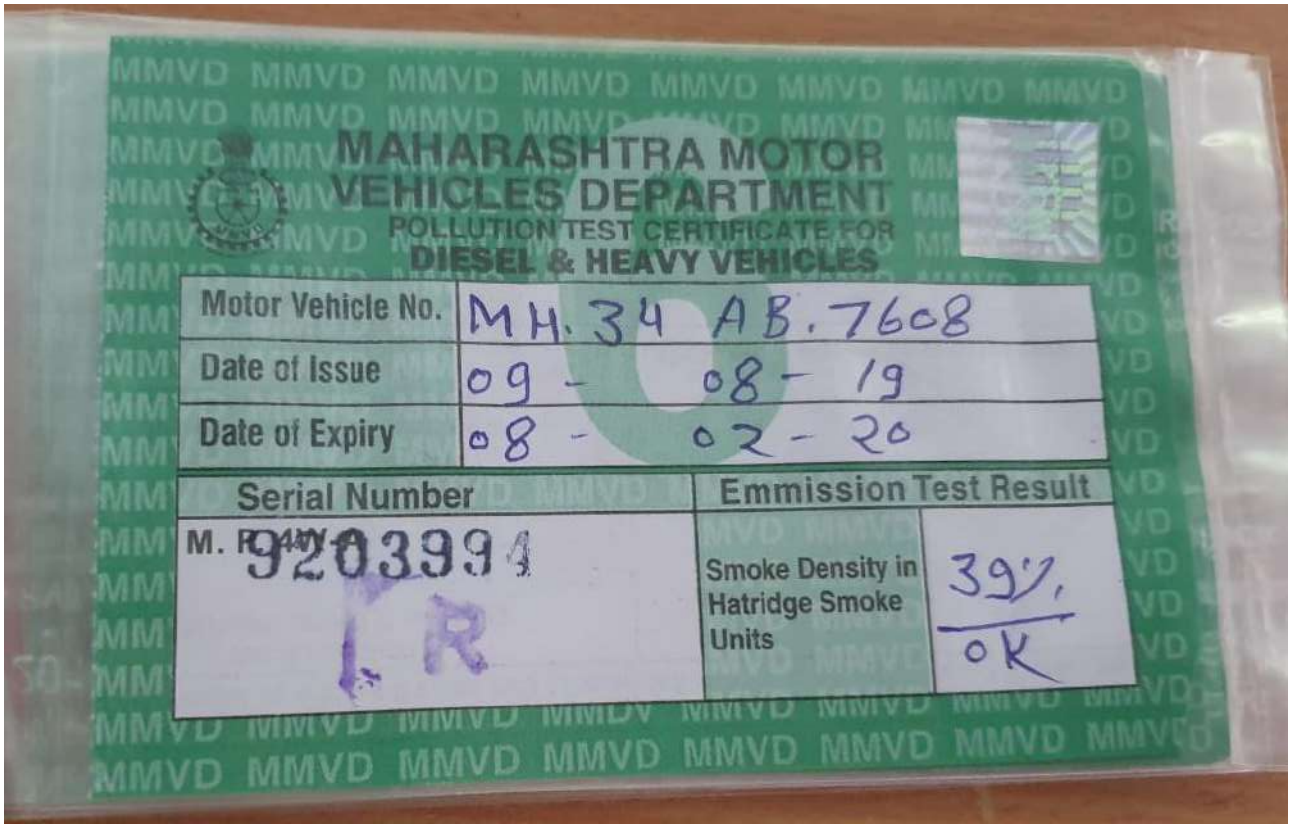

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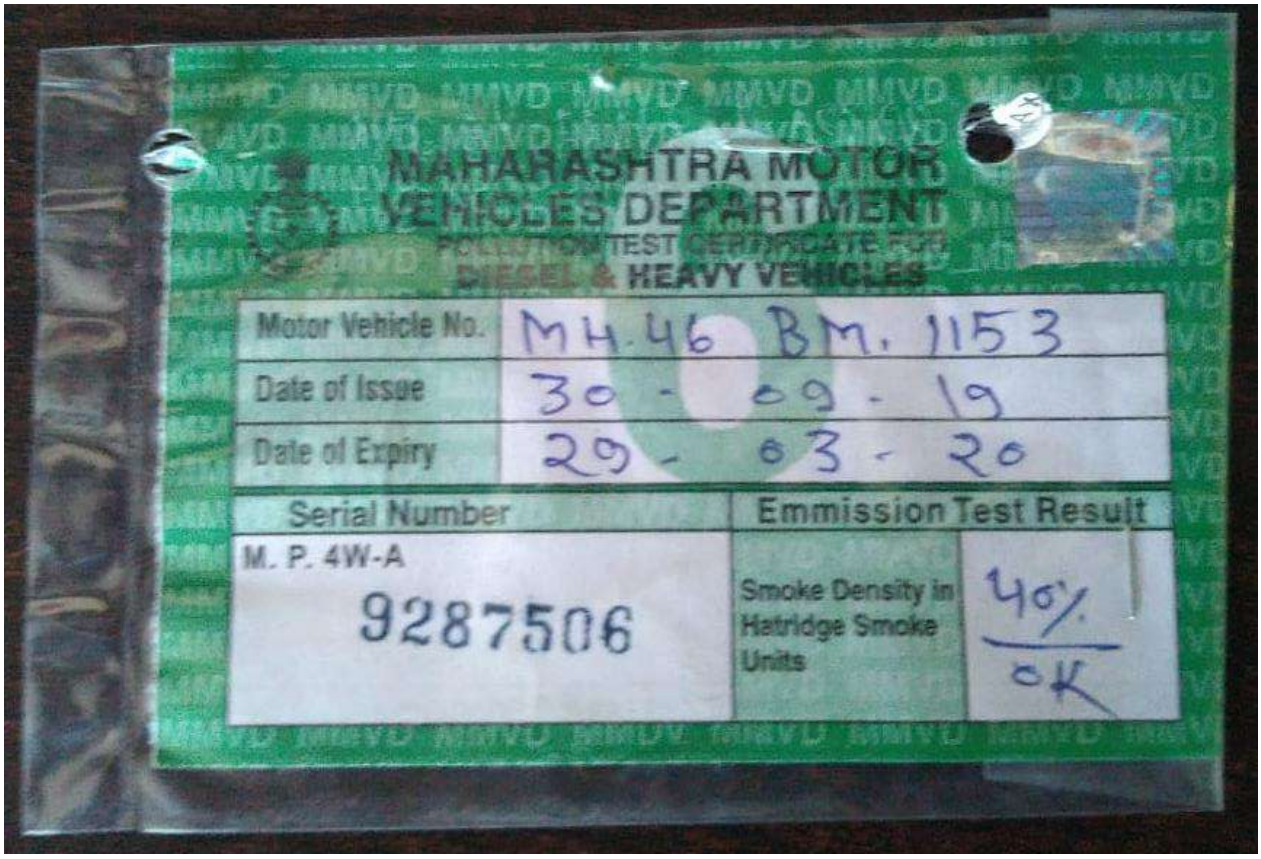
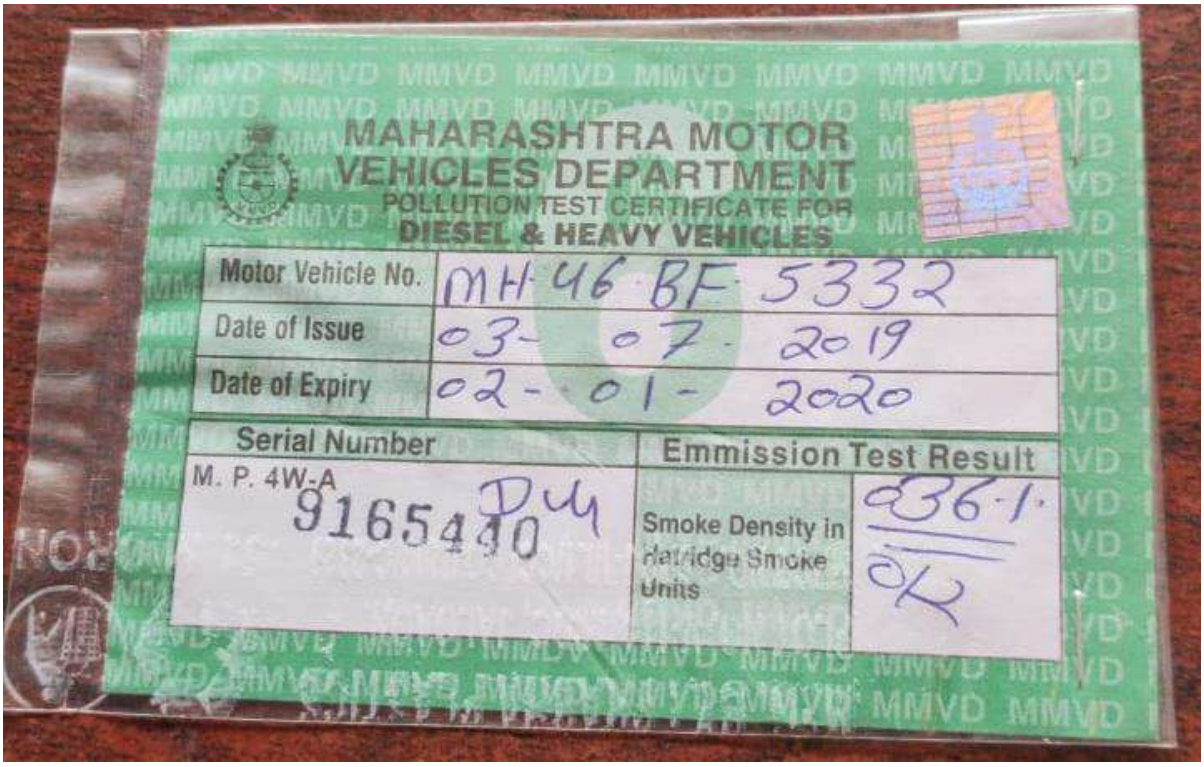

MAHARASHTRA MOTOR VEHICLES DEPARTMENT
POLLUTION TEST CERTIFICATE FOR DIESEL & HEAVY VEHICLES

Motor Vehicle No.	MH 46 BM 1153
Date of Issue	30 - 09 - 19
Date of Expiry	29 - 03 - 20

Serial Number	Emmission Test Result	
M. P. 4W-A 9287506	Smoke Density in Hatridge Smoke Units	40% OK


MAHARASHTRA MOTOR VEHICLES DEPARTMENT
POLLUTION TEST CERTIFICATE FOR DIESEL & HEAVY VEHICLES

Motor Vehicle No.	MH 46 BF 5332
Date of Issue	03 - 07 - 2019
Date of Expiry	02 - 01 - 2020

Serial Number	Emmission Test Result	
M. P. 4W-A 9165440 DU	Smoke Density in Hatridge Smoke Units	36.1 OK

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MAHARASHTRA MOTOR VEHICLES DEPARTMENT
POLLUTION TEST CERTIFICATE FOR
DIESEL & HEAVY VEHICLES

Motor Vehicle No.	MH34 AB. 8719
Date of Issue	09 - 08 - 19
Date of Expiry	08 - 02 - 20

Serial Number	Emmission Test Result	
M. P. 4W-A 9203998 (R)	Smoke Density in Hatridge Smoke Units	39% OK

MAXIMUM PERMISSIBLE SMOKE DENSITY	
Light absorption Co-efficient (1/m)	Hartridge Units
2.45	65
Authorisation Number & Address (D)	A
SAI GOVINDA PUC CENTRE H. No. 1067, Kunhi (Katkarwadi) Pargaon Sec - Ph 1, 410206 23 / Panvel / Prosc / Diesel / Petrol / 2012	SAI GOVINDA PUC CENTRE R.T.O. PANVEL APPROVED Signature of person authorised to conduct the test

Note : Holding a Valid PUC Certificate does not give immunity from checking a vehicle for pollution and levy of fine thereafter during the validity period of PUC Certificate in case of excessive emission.

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