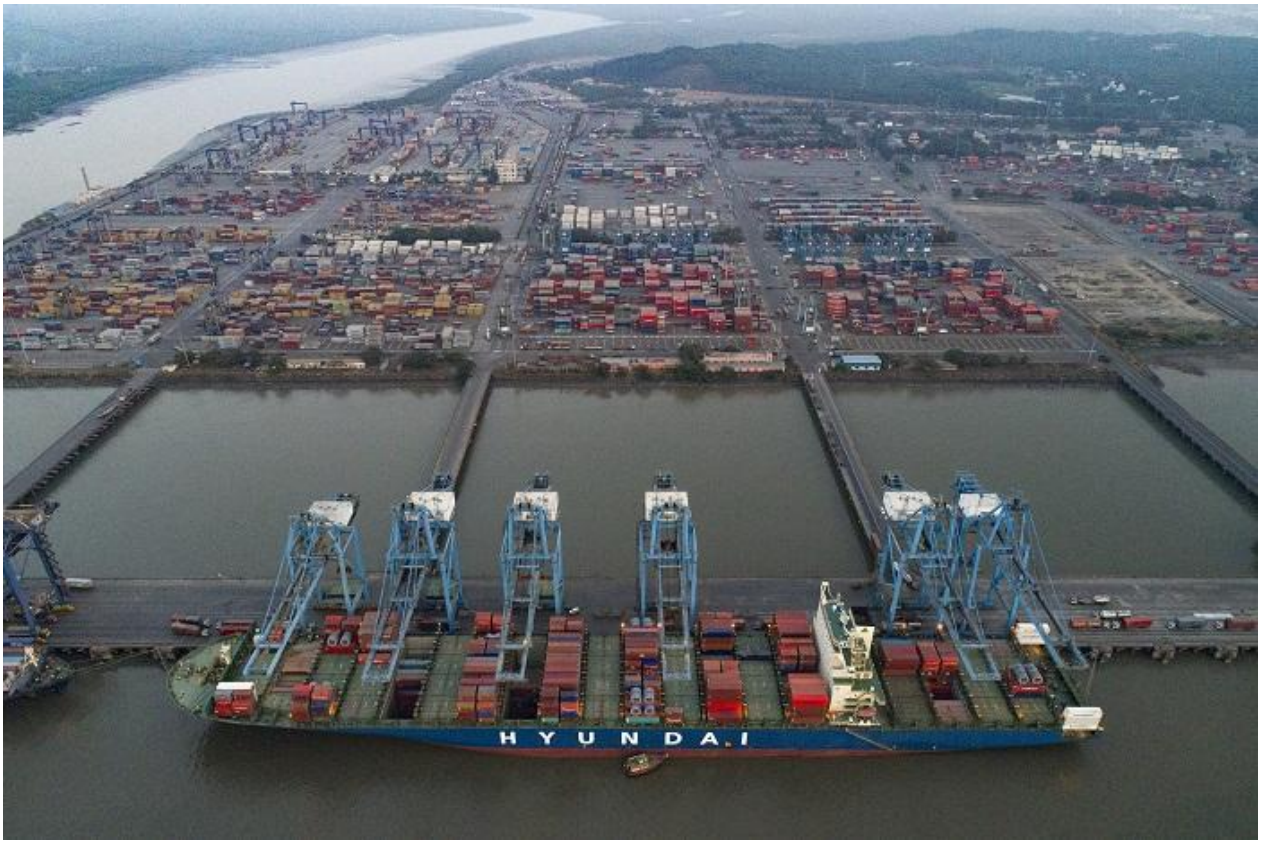

MONITORING OF ENVIRONMENTAL PLAN FOR JN PORT
ENVIRONMENTAL MONITORING REPORT- April, 2025
EXECUTIVE SUMMARY

REPORT NO: AEC/JNPA/Summary-04/Apr-25

MONTH & YEAR: April 2025

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1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during April, 2025.

Parameters		Port (Port Operation) Area								Residential area	Eco Sensitive area
	NAAQS	IMC	NSFT-NG	SEZ	APM	BMCT	NSDT-CB	DP World	BPCL	RC	EC
PM_{10}	100	117.74	124.22	105.99	57.06	104.99	96.63	76.40	91.53	99.47	77.08
$PM_{2.5}$	60	35.14	36.49	40.77	32.67	42.33	43.45	37.94	35.05	29.17	21.94
SO_2	80	9.62	9.79	2.17	4.18	7.23	6.56	5.17	2.91	5.88	4.91
NO_2	80	27.64	22.85	25.42	30.42	28.53	25.39	24.70	30.97	21.23	11.06
NH_3	400	23.76	21.12	21.80	25.18	29.72	34.19	21.35	21.54	40.41	25.825
O^3	100	50.25	82.91	29.07	26.85	38.42	25.39	33.40	26.39	31.16	8.44
Pb	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
As	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ni	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C_6H_6	5	1.96	2.08	1.92	1.97	2.19	2.00	1.60	1.46	1.08	0.49
B(a)P	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CO	4	0.85	0.92	0.67	0.76	0.81	0.78	0.87	0.81	0.61	0.23
AQI		**112**	**116**	**104**	**57**	**103**	**97**	**76**	**92**	**99**	**77**

Date	PM_{10}	$PM_{2.5}$	SO_2	NO_2	NH_3	O_3	C_6H_6	CO	C_7H_8	NO	NO_x	AQI
	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	µg /m³	Remarks:
NAAQS	100	60	80	80	400	100	5	2	--	--	--	
Mar-25	**84.87**	**24.90**	**2.03**	**38.12**	**6.17**	**13.64**	**1.15**	**1.16**	**2.33**	**8.68**	**46.80**	**85**

IMC - Indian Molasses Company, NSFT-NGC –Nhava Sheva Free Port Terminal- North Gate Complex, SEZ Special Economic Zone, APM- A.P. Moller, BMCT- Bharat Mumbai Container Terminals, NSDT CB- Nhava Sheva Distribution Terminal-Coastal Berth, DP World - Dubai Ports International, BPCL- Bharat Petroleum Corporation Limited, RC- Residential Complex, EC- Elephanta Caves

Conclusion:

- The air quality monitoring results from various locations across the port operation areas, residential zones, and eco-sensitive regions reflect an overall positive environmental outlook. Most of the key air pollutants are well within the permissible limits set by the National Ambient Air Quality Standards (NAAQS), which indicates that air quality is being managed effectively. This shows that regulatory practices and pollution control mechanisms at the port and surrounding areas are functioning efficiently and contributing to a healthier environment.
- A particularly encouraging finding is the consistently low levels of gaseous pollutants such as SO_2, NO_2, NH_3, CO, and O_3. These pollutants are typically associated with vehicular and Port emissions, yet all were recorded well below the national limits across all sites. he low values also reflect well on urban planning and environmental policies that prioritize air quality.
- Heavy metal pollutants such as lead (Pb), arsenic (As), and nickel (Ni) were found to be below detectable limits in all areas, which is a significant positive indicator. These metals, even at low concentrations, can have serious health and ecological effects, and their absence points to strong control measures in place. This ensures that there is minimal risk of bioaccumulation or exposure to toxic elements for both human and wildlife populations.
- Furthermore, the levels of carcinogenic pollutants like benzene (C_6H_6) and benzo(a)pyrene [B(a)P] were either very low or undetectable, which is a very positive outcome. This highlights the effectiveness of emission regulations, particularly concerning hydrocarbon-related pollutants. Maintaining such low concentrations of these harmful substances contributes to long-term public health and demonstrates a proactive approach to managing air quality risks.

- The eco-sensitive area stands out with the cleanest air quality among all monitored locations, with the lowest AQI score of 77. This positive outcome shows that protective zoning and conservation measures are working effectively.
- Overall, the AQI values across residential and port areas mostly fall within the 'Moderate' to 'Satisfactory' range, indicating an acceptable level of air quality that poses minimal health risks. This demonstrates a well-balanced approach to Port activity and environmental responsibility. With sustained monitoring and gradual enhancements in mitigation practices, these areas have the potential to achieve even better air quality, further reinforcing the region's commitment to sustainable development.

Solution towards the Green port:

- Implement shore power (cold ironing) to reduce ship emissions at berth.
- Promote use of cleaner fuels like LNG or biofuels in port operations.
- Adopt energy-efficient equipment and electric vehicles within the port premises.
- Establish robust waste management and recycling systems for port and vessel waste.
- Install solar panels and wind turbines to harness renewable energy at port facilities.
- Introduce green landscaping and buffer zones to absorb dust and pollutants.
- Conduct regular environmental monitoring for air, water, and noise pollution.
- Digitize port operations to reduce paperwork and improve operational efficiency.
- Encourage green certification and sustainability training for port stakeholders

2.0 Marine Water Quality:

Observed concentration ranges of Marine Water for various parameters for JNP area during tidal cycle (For April, 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	°C	27.8-28.5	
2	pH	-	7.01-7.97	**6.5 - 9.0**

3	Salinity	ppt	34.08-35.64	
4	Turbidity	NTU	20.06-125	
5	TDS	mg/L	11343-40469	**-**
6	TSS	mg/L	175-297	**-**
7	TS	mg/L	11600-40728	**-**
8	DO	mg/L	3.53-4.82	**3.0 mg/L(min.) or 40% of saturation value**
9	COD	mg/L	27.1-89	**-**
10	BOD	mg/L	1.26-2.89	**5 (max.)**
11	NH_3-N	mg/L	(BLQ: <1)	**-**
12	Phenol	mg/L	(BLQ: <0.001)	**-**
13	Oil & Grease	mg/L	(BLQ: <4.0)	**10 (max.)**
14	Total Plate Count	CFU/ml	164-474	**-**
15	Fecal Coliforms	MPN/100 ml	177-691	**500 (max.)**

The observed water quality parameters indicate generally favorable environmental conditions with most values falling within acceptable or desirable ranges. The physicochemical characteristics such as pH, dissolved oxygen, and biological oxygen demand reflect a stable aquatic environment conducive to sustaining marine life. Minimal presence of pollutants like ammonia, phenols, and oil & grease further suggests low levels of port or domestic contamination. The microbiological indicators are within or close to permissible limits, pointing to a relatively clean water body with limited fecal contamination. Overall, the results reflect effective natural assimilation and dilution processes at play. The water quality is suitable for aquatic ecosystems

and poses minimal immediate ecological risk. Continued monitoring will help maintain these conditions and support sustainable resource management.

3.0 Continuous Marine Water Quality Monitoring;

A Continuous Marine Water Quality Monitoring system was installed at the JNPA berth bridge location to monitor parameters such as Temperature, pH, Dissolved Oxygen, Ammonia, Conductivity, Nitrate, Salinity, Turbidity, and Total Dissolved Solids. These parameters are found satisfactory as per prescribed limits.

3.0 Marine Ecology (Flora and Fauna):

Sr. No.	Parameter	Observed Range	Criteria
1	Net Primary Productivity	The observed values falls under 66.3-125.4 mgC/m^3/day	<1500 mg C/m3/day at surface
2	Chlorophyll A	The observed values falls under 1.121-1.322 mg/m3	<4 mg/m3 (Oligotrophic class), 4-10 mg/m3 (Mesotrophic class), >10 mg/m3 (Eutrophic class)
3	Phosphate	34.50-90.3	0.1-90 µg/L
4	Nitrate	9.76-34.68 mg/m^3	1.0-500 µg/L
5	Nitrite	38.2 – 58.10	<125 µg/ L
6	Particulate Organic Carbon	The observed values falls under 25-88 µg /L	10-100 mg/m3
7	Silicate	The observed values falls under 231-625µg/L	10-5000 µg/L

The observed nutrient and productivity parameters reflect a positive ecological status of the water body. Net primary productivity and chlorophyll-a values fall within the oligotrophic category, indicating low nutrient levels and a healthy, balanced aquatic ecosystem. Nutrients such as phosphate, nitrate, nitrite, and silicate are well within the prescribed limits, supporting optimal conditions for phytoplankton growth without promoting excessive algal proliferation. The presence of particulate organic carbon in acceptable concentrations further reinforces the low impact of organic pollution. These findings highlight a clean and productive environment with minimal anthropogenic

stress, suggesting that the water body is in good health and capable of sustaining its ecological functions.

4.0 Drinking Water Quality:

The assessment of drinking water quality conducted at 22 stations within the JNPA Port confirms full compliance with IS 10500:2012 standards, ensuring the availability of safe, clean, and palatable water. Analytical results indicate the absence of chemical and microbiological contamination, with heavy metals and toxic elements detected at negligible levels. These findings reflect the efficiency of existing water treatment and distribution systems. Furthermore, the non-detection of pathogenic organisms underscores a high level of hygiene and effective environmental management practices. Overall, the evaluation confirms that the drinking water supplied within the port premises is of high quality and suitable for regular human consumption.

5.0 Monitoring Performance of Sewage Treatment Plant

The performance evaluation of the JNPA and POC Sewage Treatment Plants (STPs) for April 2025 confirms their continued efficient operation. The treatment systems effectively removed organic load, toxic pollutants, and heavy metals, with all treated effluents complying with the applicable discharge standards. Bioassay results further validated the non-toxic nature of the final effluents, ensuring no harmful impact on the receiving environment. These outcomes reflect the reliability of the treatment infrastructure and the port's proactive approach to environmental management. Overall, the assessment highlights JNPA Port's ongoing commitment to sustainability and regulatory compliance.