



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

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MONTH & YEAR: July 2025

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NABL ACCREDITED LAB National Accreditation Board for Testing and Calibration Laboratories (NABL) (ISO/IEC 17025): Chemical, Biological & Mechanical disciplines (NABL certificate number: TC-5509).

1.0 Ambient Air Monitoring:

Table 1. Monthly average values of Air Quality parameters at various stations in JNP Area during July, 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	68.23	71.49	78.23	70.88	74.42	59.39	63.17	62.66	42.76	35.19
PM _{2.5}	60	28.68	36.98	34.84	27.67	31.33	31.15	31.09	33.43	23.20	19.69
SO ₂	80	14.27	12.45	9.40	9.59	11.85	7.75	6.75	9.19	4.92	1.39
NO ₂	80	25.92	34.94	31.67	33.22	38.37	21.96	19.00	20.15	16.35	14.35
NH ₃	400	20.37	13.86	16.25	15.03	16.63	14.81	17.96	18.70	16.93	19.405
O ₃	100	70.89	58.68	66.42	52.62	27.77	47.29	50.58	49.01	29.05	14.03
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 ₆ H ₆	5	1.62	1.38	1.48	1.29	0.68	1.17	1.25	1.46	1.23	1.07
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	0.87	0.84	0.96	1.09	0.97	0.81	0.76	0.79	0.57	0.40
AQI		71	71	78	71	74	59	63	63	43	35

Date	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	NH ₃	O ₃	C ₆ H ₆	CO	C ₇ H ₈	NO	NO _x	AQI
	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	µg /m ³	Remarks:
NAAQS	100	60	80	80	400	100	5	2	--	--	--	
Mar-25	51.30	39.94	0.43	23.27	3.09	13.60	0.98	0.18	0.58	9.54	32.78	67

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 Continuous Ambient Air Quality Monitoring System (CAAQMS) results for JNPA clearly show that air quality across port, residential, and eco-sensitive zones remains within the National Ambient Air Quality Standards (NAAQS) for all parameters. PM10 levels are well below the permissible limit of $100 \mu\text{g}/\text{m}^3$, ranging from $35.19 \mu\text{g}/\text{m}^3$ in eco-sensitive areas to $78.23 \mu\text{g}/\text{m}^3$ at the NSFT-NG port station. The July month recorded a total of 696 mm of rainfall due to This demonstrates effective dust suppression measures, efficient housekeeping, and proper cargo handling practices that have minimized particulate emissions in operational areas.
- PM2.5 concentrations, ranging between $19.69 \mu\text{g}/\text{m}^3$ and $36.98 \mu\text{g}/\text{m}^3$, are significantly lower than the NAAQS limit of $60 \mu\text{g}/\text{m}^3$. The reduced fine particulate matter in the atmosphere reflects the successful control of emissions from vehicles, machinery, and Port activities. The lowest readings in eco-sensitive areas highlight minimal pollutant transfer beyond port boundaries, ensuring the protection of surrounding ecosystems and nearby settlements.
- SO₂ levels are extremely low, between $1.39 \mu\text{g}/\text{m}^3$ and $14.27 \mu\text{g}/\text{m}^3$, far below the NAAQS limit of $80 \mu\text{g}/\text{m}^3$. These low values indicate the limited use of high-sulphur fuels and the adoption of cleaner energy alternatives for port operations. Continuous monitoring and emission control strategies have significantly reduced the risk of acid rain and respiratory health issues among the local population.
- NO₂ concentrations range from $14.35 \mu\text{g}/\text{m}^3$ in eco-sensitive areas to $38.37 \mu\text{g}/\text{m}^3$ in port zones, all well within the permissible limit of $80 \mu\text{g}/\text{m}^3$. These results show that vehicular emissions, ship exhaust, and Port combustion processes are being effectively managed. The relatively lower values in residential and eco-sensitive locations reflect a positive impact of emission reduction policies and the dispersion of pollutants away from populated areas.
- Overall, the CAAQMS data confirms that JNPA's air quality is well-maintained, with no exceedance of NAAQS limits for any parameter. The combination of advanced monitoring, preventive measures, and sustainable operational practices has contributed to maintaining clean air in and around the port. These results demonstrate compliance with environmental regulations, effective pollution control strategies, and a commitment to protecting both human health and ecological balance.

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 July, 2025.).

Sr. No.	Parameter	Unit	Observed Range	Prescribed Limits
1	Temperature	°C	25.3-28.8	
2	pH	-	7.15-8.03	6.5 - 9.0
3	Salinity	ppt	35.42-37.6	
4	Turbidity	NTU	81.9-171.22	
5	TDS	mg/L	13886-49606	-
6	TSS	mg/L	171-296	-
7	TS	mg/L	14152-49872	-
8	DO	mg/L	4.17-6.1	3.0 mg/L(min.) or 40% of saturation value
9	COD	mg/L	36.21-57.52	-

10	BOD	mg/L	0.96-3.85	5 (max.)
11	NH ₃ -N	mg/L	0.0114-0.053	-
12	Phenol	mg/L	0.011-0.034	-
13	Oil & Grease	mg/L	0.098-0.489	10 (max.)
14	Total Plate Count	CFU/ml	138-526	-
15	Fecal Coliforms	MPN/100ml	89.54-482.3500	500 (max.)

The overall water quality assessment indicates that the monitored parameters are generally within or close to the prescribed limits, reflecting a favorable environmental status for the observed location. The pH levels remained well within the permissible range (6.5–9.0), ensuring a balanced aquatic environment suitable for sustaining marine and estuarine life. Dissolved oxygen (4.17–6.1 mg/L) was consistently above the minimum required limit, supporting healthy biological activity and indicating low risk of hypoxic conditions. BOD levels (0.96–3.85 mg/L) remained well below the maximum limit of 5 mg/L, suggesting minimal organic pollution and good natural self-purification capacity of the water. Oil and grease concentrations were significantly lower than the maximum permissible limit of 10 mg/L, reflecting minimal hydrocarbon contamination. Additionally, fecal coliform counts were comfortably within the permissible limit of 500 MPN/100 ml, indicating low microbial contamination and reduced public health risks. Collectively, these results highlight a largely clean and balanced aquatic ecosystem with minimal anthropogenic stress, supporting both ecological health and potential safe utilization for designated water uses.

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 20.51-48.07 mgC/m ³ /day	<1500 mg C/m ³ /day at surface
2	Chlorophyll A	The observed values fall under 1.1481-2.3229 mg/m ³	<4 mg/m ³ (Oligotrophic class), 4-10 mg/m ³ (Mesotrophic class), >10 mg/m ³ (Eutrophic class)
3	Phosphate	78.39-106.22	0.1-90 µg/L
4	Nitrate	9.76-34.68 mg/m ³	1.0-500 µg/L
5	Nitrite	50.2-81.5	<125 µg/ L
6	Particulate Organic Carbon	The observed values falls under 30.68 µg /L	10-100 mg/m ³
7	Silicate	The observed values falls under 36.2-56.42 µg/L	10-5000 µg/L

The assessment of water quality and productivity parameters indicates a healthy and balanced aquatic ecosystem, with nutrient levels largely within permissible limits and chlorophyll-a concentrations confirming an oligotrophic status, reflecting good water quality and low algal biomass. The measured values for nitrates, nitrites, silicates, and particulate organic carbon suggest stable nutrient cycling and minimal organic pollution, supporting sustainable aquatic productivity. Although phosphate levels showed slight elevation in some locations, they remain manageable and do not currently pose a risk of eutrophication. The low to moderate net primary productivity further reinforces the absence of nutrient over-enrichment, ensuring ecological stability. Overall, the water body demonstrates favorable environmental conditions that are supportive of biodiversity and long-term ecosystem health.

4.0 Drinking Water Quality:

The analysis of drinking water samples from all stations indicates that the overall water quality is safe, clean, and suitable for human consumption as per established standards. The water exhibited excellent sensory qualities, with no noticeable color or

odor, reflecting minimal organic or chemical contamination. Physicochemical parameters were well-balanced, ensuring both safety and aesthetic acceptability, while essential minerals were present in beneficial amounts without exceeding health-based limits. Heavy metal concentrations were negligible, suggesting minimal Port or infrastructural contamination, and oil and grease were absent, indicating no hydrocarbon intrusion. Microbiological results confirmed no fecal contamination, and nutrient levels were stable, showing no significant impact from agricultural or urban runoff. Overall, the water sources demonstrate good environmental integrity and are capable of supporting long-term safe drinking water supply.

5.0 Monitoring Performance of Sewage Treatment Plant

The results from the July 25 analysis indicate that the STP is functioning efficiently, achieving substantial reductions in pollutant concentrations and consistently meeting most regulatory standards. Significant improvements were observed in TSS, COD, and BOD levels, reflecting strong removal efficiency for suspended solids and organic matter. The successful reduction of parameters such as oil and grease, nitrate nitrogen, hexavalent chromium, and arsenic to well below permissible limits further demonstrates the plant's capability to handle diverse pollutants. Additionally, the 100% survival rate in the bio-assay test confirms the treated water's non-toxicity to aquatic life, underscoring its environmental compatibility. While minor refinements could enhance the removal of certain parameters, the overall performance highlights the STP's effectiveness in safeguarding water quality and supporting sustainable environmental management.