adani

Ports and Logistics

Ref.No. AKPL /EHS-CFE-CFO/104/2022-23 Dated: 23.12.2022

To
Environment Engineer,
Regional Office,
APPCB,
SPSR Nellore, Andhra Pradesh.

Sub: Submission of Half yearly Compliance Report on conditions of CFE & CFO for the period of April 2022 to September 2022 – Reg.

Ref:

1. Consent & Authorization order no: APPCB/VJA/NLR/11344/CFO/HO/2019- Dated 11.11.2022
2. CFE for Phase II order no 633/PCB/CFE/RO-NLR/HO/201-390 dated 08.05.2010
3. CFE for Phase III order no: 633/APPCB/CFE/ROONLR/O/2010 dated 25.02.2021

Dear Sir,

In compliance with the general condition no 52 of schedule – B of the CFO 1st cited, condition no 1 of Schedule – A of the CFE cited at 2 and condition no 21 of the CFE order cited at 3, please find herewith enclosed condition wise Half yearly compliance reports of Adani Krishnapatnam Port for the period April 2022 to September 2022 along with Half-yearly Environmental monitoring report.

Thanking you,
Yours Sincerely,
For ADANI KRISHNAPATNAM PORT LIMITED

23/12/2022
G Venugopal Reddy
(Associate GM-EOHS)

Encl: Half yearly compliance reports on conditions CFE, CFO by Adani Krishnapatnam Port along with Environmental Monitoring report

Copy to: The Joint Chief Environment Engineer, APPCB, Vijayawada

Adani Krishnapatnam Port Ltd
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ADANI KRISHNAPATNAM PORT LIMITED

Ports and Logistics

Compliance Report On
Conditions Stipulated in Consent for Establishment (CFE) & Consent for Operation (CFO)
April 2022 to September 2022

Compliance Report on Conditions stipulated in the

Phase-I Consent For Establishment

Period: April' 2022 to September' 2022

Compliance Report on Consent for Establishment (CFE) Order of APPCB dated: 25.05.2004 for Phase – I Development
Reporting period – April 2022 to September 2022

S.No	Condition	Compliance Status
Schedule-A		
1.	There shall not be any perceptible odour outside the industry's premises	**Noted** No perceptible odours are generated in the Port.
2.	Environmental statement in form-V as per the provisions under Rule-14 of E (P) Act, 1996 and its amendments there of shall be submitted by 30th September of every year.	**Noted.** Environmental Statement in Form – V is being submitting annually. Form-V Environment Statement for the FY 2021-2022 is submitted on 29.09.2022.
3.	Progress on implementation of the project shall be reported to Board Office, Zonal Office and Regional Office, A.P. Pollution Control Board regularly.	**Complied**. Construction of Adani Krishnapatnam Port Phase-I completed.
4.	Suitable automatic flow measuring devices and monitoring equipment shall be installed at appropriate points. Separate energy meters shall be provided for ETP and Air pollution control equipment to record energy consumed.	**Complied.** Flow meters are installed at appropriate points for measuring the water flow. Separate Energy meter is provided at STP and the readings are recorded. Energy meters are provided for DSS and records maintained.
5.	All the rules and regulations notified by Ministry of Environment and Forests, Govt. Of India in respect of noise pollution control measures shall be followed to avoid nuisance to public.	**Noted**
6.	Consents for operation regularly from APPCB, as required Under Sec. 25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, for operation of the activity, before starting trial production. The consent for Operation will be accorded only after ensuring compliance of all the conditions stipulated in this order.	**Complied.** CFO for Phase-I is obtained from APPCB on 08.06.2009 before commencement of operations and is being periodically renewed. The latest CFO renewal order No: APPCB/VJA/NLR/11344/CFO/HO/ 2018 obtained on dated 29.07.2018 is valid till 31.10.2023 and CFO is amended on 30.08.2018 and 10.02.2020.
7.	Conditions issued by the Board in the consent order scrupulously be compiled with and carried out. Legal action will be initiated as per the provisions of the relevant Acts in case of non-compliance of any conditions of the consent order.	**Noted** All directions/ orders issued by the Board are being complied scrupulously. Compliance Reports are being regularly submitted to APPCB.
8.	Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec. 27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional	**Noted.**

	conditions for the purpose of the Act by the Board.	
9.	The consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspecting officers of different departments	**Complied**
10.	Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability	**Noted.**
11.	Appropriate Rainwater Harvesting (RWH) structure(s) shall be established on the available up-stream portion of the plant site. The applicant can approach the State Ground Water Authority, local Municipal / Urban Development Authorities, and even private consultants to procure suitable design for these structures. If there is no land available in the industry premises, RWH structures must be raised on the roofs of Administrative Blocks or such buildings where sudden leakages or moisture in the air would not affect the quality of the process or product.	**Complied** Rainwater harvesting pits are developed at buildings and other general areas of within the port.
Schedule-B		
I	**Construction Phase:**	
	1. Road Development	
	a. Proposed road development in the area, both in the Port area as well as area outside Port limits upto the National Highway. This should include construction of new roads and widening of existing roads the number of traffic lanes proposed on the roads, and their adequacy to accommodate increased traffic density on the roads on account of the construction activity in the Port area and consequential operational and developmental activities in the neighborhood.	**Complied** Government of Andhra Pradesh has developed a dedicated four-lane road connecting Venkatachalam on National Highway (NH) 16 and Port. Presently 6 lane work is under progress. Well-designed internal road network within the port is developed to facilitate inward and outward movement of cargo to/from the port.
	b. Spaces shall be allotted along the roads and below the roads for infrastructure facilities, such as sewer lines water means, storm water drains, telephone cables, electrical cables, and likely liquid cargo, such as fuel oil pipelines etc., these should be indicated on the road maps and sections to facilitate orderly development of infrastructure avoiding frequent digging of roads, after development.	**Complied**
	c. Avenue plantation and facilities for sprinkling water to mitigate dust generation on roads shall be planned and provided in the port area.	**Complied** Along the median shrubs and both sides of road avenue plantation have been developed. Mechanical sweeping machines and Mobile truck mounted sprinklers are deployed to mitigate the dust generation on roads among others.

	2. Break Waters, Other marine structures and Railway lines:		
	a.	Stone quarries shall be identified for extraction of stone and ballast for the construction of break waters and railway lines etc., and environmental management program for these quarries is to be drawn up to mitigate dust pollution to avoid water stagnation in the pits formed, resulting in mosquito breeding and for mitigating noise pollution. After completing the work, the quarry area shall be restored providing greenery with proper landscape design.	**Complied.** During the construction of breakwater stones were sourced from Government approved quarries. Environmental Management Program was adopted for quarry operations to avoid dust pollution and other pollution generated in the quarry.
	b.	The vessels and barges and other construction equipment used in the construction of break waters and other marine structures shall ensure that no oil spills, sewage / sullage, solid waste is allowed to be discharged into the sea. Such wastes shall be carefully collected and kept on Board and finally transported to the shore, in the Port area and disposed as follows:	**Complied.** It is ensured that the barges/workboats have appropriate system (slop tanks) for collection of liquid/solid waste generated on board and it is transferred on shore for disposal through approved vendors regularly. No wastes are discharged into the sea.
	i	Oils and other hazardous solid waste shall be disposed duly following Hazardous Waste Rules.	**Noted** Hazardous wastes are disposed through authorized vendor by following HW Rules.
	ii	Sewage / sullage to be disposed into a well-designed septic tank taking into consideration, the quantum of waste generated and the effluent from the septic tank shall be disposed in a well-designed absorption trenches, with loose jointed earthen ware pipe surrounded by broken stone.	**Complied**.
	iii	Organic solid waste shall be disposed by land fill	**Complied.** Bio-degradable wastes are composted and used for green belt.
	3. Dredging:		
	a.	The project involves substantial dredging. The disposal of dredged material for reclamation is a small fraction of the total quantity of dredged material anticipated to be obtained. Moreover, dredging may be required during operations phase. This material should be analyzed and carefully studied to find the possibilities of its use as a building material along with admixtures such as cement, as may be necessary. For this purpose, a proper institution such as Central Building Research Institute of Rorkee and the National Council for Cement and Building Material of Faridabad may be approached. From the environment angle, it is very important because the contemplated discharge of surplus dredged material into	**Complied** Dredged material suitable for reclamation is used for reclamation and balance disposed of in disposal area identified by undertaking Mathematical Model Studies duly following the EMP.

	the sea is in no way environmental friendly.	
	b. The need for construction of suitable groynes/connected to a bulk head @ intervals along the beaches projecting into the sea and on to land on beaches likely to be affected by erosion shall be examined and provided wherever necessary. The design of the groynes and bulkheads shall be based on model studies.	**Noted.**
	4. Dust: Identify all dust generation sources, during the construction period and provide water sprinkling facility at all such places.	**Complied** Areas prone to dust generation have been identified and measures such as sprinkling of water to suppress the dust levels are being implemented.
	5. Vehicular emissions: On account of increased volume of vehicular traffic in the area vehicular emission also will increase resulting in deterioration of ambient air quality. This situation has to be evaluated with reasonably accurate estimates of traffic volume on different roads and measures shall be taken to control the emission, to comply with PCB norms. A mobile task force shall be created in co-ordination with the RTA to check the vehicles periodically to ensure that they comply with the emission standards.	**Complied** Traffic density studies are carried out along the access roads to port i.e., MDR 2 from Nellore and MDR 20 from Venkatachalam to Muthukur and Port Road connectivity to National Highway is formed to reduce congestion as well as the risk of accidents. The Pollution Under Control Certificate is insisted for all vehicles deployed equipment/vehicles by in-house task force. The mobile vehicle pollution checking equipment is procured and vehicles are being checked for compliance.
	6. Noise and Protection of workman: All equipment used for the construction activity shall be properly maintained to ensure least generation of noise, and also workers shall be protected with earmuffs. The moving parts of the machines shall be properly oiled and greased to reduce noise generation. The workmen with loose fitting garments shall not be permitted and all workers shall be provided with protective clothing, helmets, protective goggles and appropriate shoes and gloves etc., wherever required.	**Noted** All equipment used for construction are being regularly maintained. Low noise equipment and mufflers/ enclosures are used to limit the excess noise limit. Use of protective gears/PPE such as earplugs and rotation of personnel are adopted to mitigate the impacts on operating personnel from exposure to noise levels below threshold limits.
	7. Campus for construction workers: These shall be provided in the port area. These camps shall have water supply and sanitary facilities and canteen. The liquid waste shall be treated in septic tanks followed by a tile field of absorption trenches properly designed. The canteen waste water shall be treated for removal of oil. The garbage generated shall be disposed by sanitary landfill. Where it is unavoidable to locate a camp, outside the port area prior permission shall be obtained from the local authority. All shelters provided shall be temporary nature and shall be dismantled after the construction	**Complied.** Worker camps are provided for the construction personnel. Worker camps are self-sufficient with all basic amenities and not rely on any local resource. These camps are located away from the coast and habitations. After completion of construction work these camps have been dismantled.

	work is completed and the same shall be restored to original state	
	8. Fuel oil storages: The construction equipment vessels and vehicles used in construction work and for transport of material require fuel oils. There shall be a storage facility for such fuel oils, well designed, and protected against fire hazards and provided with a compound wall, to prevent access to unauthorized elements. All surfaces run off from such storage areas shall pass through oil water separator, before it finds access to any storm water drainage course or sea	**Being Complied.** Handling of waste oil at site: collection, storage, transportation, and disposal is carried as per the standard operating procedure which is as per HWM rules, 2016 and their amendments
	9. Firefighting facilities: All fire prone areas during the construction phase shall be provided with fire detection and firefighting facilities with adequate water storage in consultation with the Directorate of Firefighting / Regional Offices of the Department	**Complied** Fire-fighting system along with adequate water storage is being ensured. Dedicated Fire-fighting equipment and trained personnel are available. Port Tugs are also having fire-fighting capability
	10. Greenbelt: Planting of saplings for greenbelt proposed shall start during the construction period itself. 1 meter height saplings shall be used for free plantation. The greenbelt shall be at least 50-meter width. In addition to the general greenbelt around the Port area, separate greenbelts shall be provided for at least 20 meters width around the Iron Ore and Coal Stockyards.	**Complied.** Green belt development is completed as per the requirement.
	11. Malaria control and health facilities:	
	a. Blood samples of all imported labour should be checked for Malarial parasite infection and they shall be immediately treated for Malaria. Health centers with proper medical facilities and Doctors shall be provided in the Port area to take care of the Health of the workers and staff, and for immediate medical attention to injured workers without delay	**Complied.** Regularly medical & health camps are carried out in consultation with the District Medical Officer, Nellore to identify the Malaria parasite in blood samples of the casuals. No Malaria parasite has been reported so far. First Aid facilities are being provided with in the port site with registrar medical doctor.
	b. Malaria control program and Health facilities shall be continued in the operation phase. Vector control programs shall be taken up in the operation phase, which should cover larval counts of Anaphlous mosquito in all the Saline water bodies created on account of harbour construction. Control of all breeding ground by the use of larvicides in addition to control of adult mosquitoes. The health team should include a trained entomolgest	**Complied.** Malaria control programs and health facilities are being followed under EHS & CSR by engaging reputed doctors.
	12. The water requirement submitted by the proponent shall clarify	
	a. The quality of water required for day-to-day operation of the harbour and quantity required to be supplied to ships for	For day to day needs water quality meets the standards of portable drinking water

	replenishment in accordance with the demand and requirements of staff colony.	standards as prescribed by CPCB i.e., IS10500. GoAP issued orders for release of 1MLD water to KPCL from Muthukur Irrigation Water Tank. In the meantime, Domestic water requirement is about 650 KLD being procured from authorized vendors.
	b. Since no local water source is indicated in the harbour area, proponent will have to obtain either through surface source or through ground water. The proponent informed that the GoAP will supply water requirement to the project. The proponent shall submit the agreements made with the Government and availability of surface water from the concerned authorities. For emergency use only, the industry can use ground water, duly obtaining permission from Ground Water Department. The same shall be reported to the Board.	**Complied.** The surface water permitted by GoAP water from irrigation drain 'Nakkalakalava' is being utilized for dust suppression, Green Belt development & firefighting needs. There is no withdrawal of ground water in the Port.
II	**Operation Phase:**	
	1. Maintenance Dredging The project proponent shall prepare a plan of action based on detailed studies	**Noted.**
	2. Loading & Unloading Operations of Cargo	
	a. Bulk Cargo:	
	i. Handling, loading, unloading of bulk cargo, such as coal, iron ore, fertilizer and dry chemicals generate dust with health and environmental impacts in the neighborhood. These need to be controlled at planning stage. Therefore, Mechanical handling Equipment shall be used, and the equipment shall be designed to minimize dust generation.	**Complied.** Following measures are being implemented to control fugitive emissions: a. Installed and operating 248 nos of Fixed and Portable sprinklers for dust suppression of coal stacking areas and railway yards. b. Deployed 12 nos of Mobile Water Tankers for Dust Suppression on roads and other areas. c. Deployed hoppers for unloading cargoes. d. Covering trucks and railway wagons with tarpaulins. e. Covering trucks deployed on inter carting with mechanical covers & water curtains. f. Undertaking PUC checks for vehicles plying in the port g. Developed paved roads and pavements. h. Deployed mechanical road sweeping machines. i. Developed Truck Wash Area and effluent recycled for Dust Suppression. j. Developed wind shield for village side
	i. Proper washing facilities shall be provided for the berth handling cargo, to eliminate between hazardous and non-hazardous cargo.	**Complied.** Quay wall is sloped towards land and runoff routed through settlement pits.
	3. Firefighting Facilities:	**Complied.**

	The coal storages should be provided with the sprinklers and yard hydrants to control and manage the incidence of spontaneous ignition of the coal stockpiles. All fire prone areas during the construction phase shall be provided with fire detecting and firefighting facilities.	Fire-fighting system along with adequate water storage is being ensured. Dedicated Fire-fighting equipment and trained personnel are available. Port Tugs are also having fire-fighting capability.
	4. Cargo Transport to Storage Areas:	
	a. The proposed port will handle cargo which is mostly dust producing. Therefore, extra care is needed in handling the Cargo especially at the transfer points. The proposed stated in EIA are in broad and generic terms in this regard. It will be desirable that a supplementary report giving specific details of the type of equipment proposed for loading, handling, transport, storage, and general handling is submitted for approval of the Board.	**Complied.** Krishnapatnam Port is undertaking a large number of measures for fugitive emission control. Following are significant among them: (a) Installation and operation of MDSS with 248 nos of sprinklers at coal stacking and wagon loading areas. (b) Deploying 12 nos of Truck mounted sprinklers for roads and transit areas. (c) Deploying Hoppers for unloading (d) Mechanized coal handling at 2 berths within the land so far transferred on lease by GoAP. Conveyors are designed for covering with hood. (e) Developed paved roads and resorted to mechanical sweeping of roads. (f) Covering of coal transport vehicles and wagons with Tarpaulin/mechanical covers. (g) Developed wind breaking shield for Village side (h) Developed Greenbelt along the port boundary, all-around the cargo staking areas, block plantation, median and avenue plantations. (i) Monitoring AAQ at 7 locations through NABL accredited & MoEF approved agency. (j) Commissioned three CAAQM stations & linked to APPCB website (k) We are committed to implement measures as required to ensure compliance of AAQ norms
	b. The conveyor belt: Shall be of the totally enclosed type preferably working under negative pressure. All dust generating areas in the cargo transport system shall be identified and facilities for dust mitigation with water sprinkling shall be provided.	
	This condition has been amended vide CFE order No: APPCB/VJA/NLR/633/HO/2004/9/46 dated 04.01.2017 **c. Cargo storage Areas:** Facilities for water sprinkler system and facilities for the drainages of sprinkler water / rainwater shall be provided. The cargo storage areas shall have their own greenbelt of 20 meters width.	
	s: Dust suppression measures shall be provided	
	5. Road System in the Port Area: The road system in the Port area shall be built of Bituminous concrete, so that they will be dust proof. The Avenue plantation of two rows shall be provided along the roads on both sides.	**Complied.** Roads within port are constructed with Bituminous concrete or concrete block pavements. Mechanical road sweeping machines are deployed. Avenue plantation has been developed along the roads on both sides.
	6. Handling of Hazardous Cargo: The proponent has informed that there will not be any program to set up storage facilities for petro products or for any other hazardous materials.	**Noted.**
	7. Fire fighting facilities shall be provided in all berth and coal storages and other fire prone areas. A network of water mains	**Being Complied.**

	hydrants, water storage tanks, Jockey pump and fire tenders and foam trolleys shall be provided in the Port area to fight any accidental fire.	'Light Hazard Category' Firefighting system is designed and provided as per Tariff Advisory Committee (TAC), India. It consists of three (2 Main + 1 Standby) horizontal Centrifugal Split casing type diesel engine driven fire water pumps of capacity 273 m^3/hr. @ 88 MWC head. Two (1 Main + 1 Standby) horizontal end suction type diesel engine driven jockey pump of capacity 25 m^3/hr. @ 88 MWC head. Port Tugs are provided with Firefighting Equipment.
	8. Vehicular emissions due to transport of cargo to and from the port:- A task force shall be constituted to check vehicle emissions to, enforce standards in co-ordination with the RTA and maintained on a permanent basis.	**Complied.** Task force is constituted. License to check vehicular pollutions obtained. PUC checks are being undertaken.
	9. Cleaning facilities to berth: all berths shall have cleaning facilities with water under pressure, to ensure non-contamination of one type of cargo with another type.	**Complied.** Utmost care is being taken to ensure the non-contamination of one type of cargo with another type.
	10. Sewage treatment: A site shall be selected for building a STP for sewage generated in the Port area and sewage after tertiary treatment should be used for washing purpose / flushing sewers, greenbelt development, firefighting, sprinkling for dust suppression and for industrial use within the Port area, other than domestic use. Treated sewage shall not be disposed off into the sea. The STP shall be provided with a separate greenbelt.	**Complied.** 540 KLD capacity STP's are in operation and the treated effluent is recycled for Green Belt Development.
	11. Greenbelt alround port area: a greenbelt of 50 mtrs width shall be developed and maintained around the port area.	**Being Complied.**
	12. A scavenging ship shall be provided in the Harbour to clean up the harbour waters periodically. This ship should be specifically designed to clean up oil spills.	**Complied.** It is ensured that the barges/workboats have appropriate system (slop tanks) for collection of liquid/solid waste generated on board and it is transferred on shore for treatment and disposal regularly. No wastes are discharged into the sea. Port is geared to handle Tier-1 oil Spills.
III	**Environmental Management & Monitoring Programme:**	
	This program shall be both for construction phase and operation phase and should include:	**Noted** Hydrodynamic studies carried out by M/s. HR Wallingford UK, revealed that the beaches are unaffected by the port development. Shore line monitoring being carried out through INCOIS also did not indicate any erosion. Studies are being continued.
	1. Conservation of beaches and prevention of erosion due to literal drift under the environmental management program.	
	2. Sand movement (quantification) and erosion of beaches caused by littoral drift, during the construction period as well as	

	operation period under the environmental monitoring program / (EMP).	
	3. Pollution parameters in Wastewater streams entering the sea in the area.	**Complied.** No discharge of treated waste water into the sea. Treated Wastewater and Harbour water Quality are monitored regularly through an agency having NABL accreditation and approved by MoEF&CC. Results of Monitoring are being submitted regularly to APPCB.
	4. General: The Environmental Manager Program shall be reviewed from time to time against the backdrop of results of Monitoring program and modified in consultation with the PCB to achieve the desired objectives.	**Complied.**
	5. They should have a environment management cell with qualified and trained staff as appropriate for the port area.	**Complied.** Environmental Cell headed by AGM Environment under the guidance of CEO with qualified and trained Staff is established in the Port.
IV	**This condition has been amended vide CFE order No: APPCB/VJA/NLR/633/HO/2004/9/46 dated 04.01.2017** Once the port is established, Onsite Emergency action plan has to be prepared after carrying out Risk Analysis and Hazop studies.	**Complied.** Disaster Management Plan is prepared with onsite emergency preparedness plans and submitted to APPCB. Same is being updated dated
V	**Master Plan:** In view of the critical issue of appropriate development of the surrounding area to protect health and environment, it is recommended that the proponent should take up the task of proper master plan for the area with the District authority for areas surrounding the Port, to ensure that no slum development and unauthorized construction occur in the area. The project proponent shall take up with District Authorities about the Krishnapatnam Port development and relevant notifications regarding development control in the region as reported in REIA.	**Noted.** Master plan for port development has been prepared and got approved by GoAP. Master plan for areas surrounding the port is outside the domain of port. District Administration is being requested to take up master plan of the surrounding area.
VI	The population projections in the areas around the Port area are to be worked out and shall take up with district authorities for preparation of Master plan and Land use plan for the area to accommodate the population with all infrastructure facilities like domestic water supply, storm water drainage, sewerage system and STP, road network, transport facilities, telephone facilities, power supply, lung space and greenbelts and parks, lung spaces etc. The plan should indicate industrial areas, commercial areas and residential areas recreational zones and shall include educational facilities and medical and health facilities. Conservation program shall	**Complied.** The planning authorities of the region developed the controls to regulate the land-use changes in the vicinity of the port to ensure sustainable development of the region.

	be taken up for all the water bodies in the area and no room shall be given for slum growth.	
VII	The ambient noise level shall not exceed 75 dB (A) during daytime and 70 dB (A) during nighttime	**Complied.** Ambient Noise level monitoring is carried out in 24 hrly during daytime and night time at 7 locations as a part of Environmental Monitoring. Monitoring Reports are regularly being submitted to APPCB. The noise levels are within prescribed limits.
VIII	The following rules and regulations notified by the MoEF, GOI shall be implemented.	
	a. Hazardous waste (Management and Handling), Rules, 1989	Noted. Latest Hazardous waste (Management and Handling) Rules 2016 are followed.
	b. Manufacture, storage and import of hazardous chemicals Rules, 1989	**Noted.**
	c. Rules for manufacture, use, import, export and storage of Hazardous micro-organisms/genetically engineered organisms or cells, 1989.	**Noted.** To date no such type of Hazardous micro-organisms/genetically engineered organisms or cells are handled. In the event of handling such type of Hazardous cargoes, due procedure will be followed in accordance with statutory requirement.
IX	The port shall establish adequate no. of ground water monitoring locations on scientific basis, and the same shall be monitored once in 6 months.	**Complied.** Ground water is being monitored at 4 locations and six-monthly reports are being regularly submitted to APPCB.
X	The port shall implement all the environmental measures proposed in the EIA and shall initiate all the studies mentioned in the EIA.	**Complied.** Environmental Monitoring Reports are being submitted regularly to the APPCB authorities.
XI	The port shall take permissions from the Board, before handling any Hazardous chemicals. Because as per the present proposal, the port is not planning to handle any hazardous chemicals.	**Noted.**
XII	The industry shall obtain necessary permission as required under CRZ regulations under E (P) Act, 1986	**Complied.** Environmental & CRZ Clearance for phase – I has been accorded by MoEF Delhi, vide letter no. 10-22/2005-IA-III dated 26th July 2006.
XIII	The various rules and regulation notified under E (P) Act, 1986 by MoEF, GOI from time to time shall be followed.	**Noted**
XIV	The rules and regulations notified by Ministry of Law and Justice, GOI regarding the Public liability insurance Act, 1991 shall be followed.	**Noted**.
XV	This Order is valid for a period of five years from the date of issue.	**Noted.**

Compliance Report on Conditions stipulated in the

Phase –II Consent For Establishment

Period: April' 2022 to September' 2022

Compliance Report on Consent for Establishment (CFE) Order of APPCB dated: 08.05.2010 for Phase – II Development Reporting period – April 2022 to September 2022

S. No	Condition	Compliance Status
SCHEDULE-A		
1.	Progress on implementation of the project shall be reported to the concerned Regional Office, A.P. Pollution Control Board once in six months.	Construction of Adani Krishnapatnam Port Phase-II completed.
2.	**Condition modified in CFE amendment** Order No. APPCB/VJA/NLR/633/HO/2004/9/46 dated 04.01.2017 is as under "**Separate energy meters shall be provided for the STP and MDSS pump Houses i.e., air pollution control equipment to record energy consumed**"	**Complied.** Separate energy meters are provided for STP and MDSS pump houses to record energy consumption.
3.	The proponent shall obtain Consents for Operation (CFO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the activity.	**Complied.** CFO is obtained from APPCB on 02.02.2011 before commencement of operations and is being periodically renewed. The latest CFO renewal order No: APPCB/VJA/NLR/11344/CFO/HO/ 2018 obtained on dated 29.07.2018 is valid till 31.10.2023 and CFO is amended on 30.08.2018 and 10.02.2020.
4.	Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.	**Noted.** All directives of the APPCB are being complied scrupulously.
5.	The consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspecting officers of different departments.	**Complied.**
6.	Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.	**Noted.**
7.	Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. The industry shall maintain a good housekeeping. All pipe valves, sewers, drains shall be leak proof. Dyke walls shall be constructed around storage of chemicals.	**Complied.** a) Quay wall is sloped towards land and runoff routed through settlement pits. b) Fertilizers are stored in warehouses and swept dry. c) Peripheral drains, collection pits and guard ponds have been developed for coal

<table>
<tr><td></td><td></td><td>storage yards with facility to recycle effluent for dust suppression.
d) Good house-keeping measures are being adopted in the Port.</td></tr>
<tr><td>8.</td><td>Rainwater Harvesting (RWH) structure(s) shall be established on the plant site. The proponent shall ensure that effluent shall not enter the Rainwater harvesting structure.</td><td>Complied.
Rainwater harvesting pits are developed for buildings.
For the general area, rainwater harvesting ponds are also developed at 11 locations in the port to charge the aquifer. Ensuring that wastewater shall not mix in the Rainwater harvesting structures.</td></tr>
<tr><td>9.</td><td>The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.</td><td>Noted.</td></tr>
<tr><td>10.</td><td>This order is valid for a period of 5 years from the date of issue.</td><td>Noted.</td></tr>
<tr><td colspan="3">SCHEDULE-B</td></tr>
<tr><td colspan="3"><u>Water:</u></td></tr>
<tr><td>1.</td><td>The source of water is Nakkalakaluva, Muthukur irrigation tank, Desalination Plant Kandaleru Creek (water supply for Fire protection system). The maximum permitted water consumption after expansion is 2500 KLD Vide CFO Order dt 14.05.2015.
<table>
<tr><th>S. No.</th><th>Purpose</th><th>Existing (KLD)</th><th>After Expansion (KLD)</th></tr>
<tr><td>(a).</td><td>Dust Suppression</td><td>950.0</td><td>1050.0</td></tr>
<tr><td>(b).</td><td>Domestic</td><td>50.0</td><td>400.0</td></tr>
<tr><td>(c).</td><td>Gardening / Irrigation</td><td>-</td><td>400.0</td></tr>
<tr><td>(d).</td><td>Miscellaneous (Fire protection services)</td><td>-</td><td>650.0</td></tr>
<tr><td></td><td>Total</td><td>1000.0</td><td>2500.0</td></tr>
</table></td><td>Complied
It is being ensured.</td></tr>
<tr><td>2.</td><td>The maximum Wastewater Generation (KLD) shall not exceed the following:
<table>
<tr><th>S. No.</th><th>Purpose</th><th>Existing (KLD)</th><th>After Expansion (KLD)</th></tr>
<tr><td>(a)</td><td>Domestic</td><td>40.0</td><td>300.0</td></tr>
</table>
<u>Treatment & Disposal:</u>
<u>Existing (consented):</u>
<table>
<tr><th>Effluent Source</th><th>Treatment</th><th>Disposal</th></tr>
<tr><td>Domestic</td><td>STP</td><td>Washing / flushing sewers / greenbelt</td></tr>
</table></td><td>Complied
540 KLD STP's are commissioned and is in operation.

Complied.
Treated wastewater is being recycled for Green Belt development.</td></tr>
</table>

		development within port area

After Expansion:

Effluent Source	Treatment	Disposal
1.Washwater from cargo handling areas / berths	Settling pits along the drainage	After settlement of solids, the water shall be used for dust suppression.
*2. Storm water runoff from port area	Settling pits along the drainage	After settlement of solids, the water shall be used for dust suppression. Surplus water will be discharged into sea.
3. Oily waste water generated from central canteen	Oil & Grease tank	Water shall be used for dust suppression
4. Domestic	**Sewage Treatment Plant	Treated water shall be used for plantation

* Storm water runoff from fuel oil storage area shall pass through oil & water separator before joining settling pits.

** STP shall be provided in accordance to CRZ notification.

Complied
Wash water from berths is being routed through collection pits with facility to recycle for dust suppression.

Complied.
Runoff from coal yards is being routed through Garland drains, collection pits with facility to recycle for dust suppression.

Complied.
The oil & water separators have been commissioned and wastewater recycled for dust suppression.

Complied.
540 KLD STP's are developed, and operational and treated water is recycled for dust suppression and green belt.

3.	The Effluent Treatment Plant (ETP) and Sewage Treatment Plant (STP) shall be constructed and commissioned along with the commissioning of the activity. All the units of the ETP & STP shall be impervious to prevent ground water pollution.	**Complied.** RCC Concrete structure which is impervious has been built for STP.
4.	The effluents shall be treated to the on land for irrigation / marine water standards as applicable, stipulated under Environment (Protection) Rules, 1986, notified and published by Ministry of Environment and Forests, Government of India as specified in Schedule VI vide G.S.R.422 (E), dt. 19.05.1993 and its amendments thereof,	**Complied.** Treated water from STP conforms to the standards

<table>
<tr><td></td><td>and additional standards / conditions stipulated by APPCB.</td><td></td></tr>
<tr><td>5.</td><td>There should not be any withdrawal of ground water in the CRZ area and ground water monitoring stations shall be provided on scientific basis and reports of the same shall be submitted for every six months.</td><td>Noted.
Ground water is not being drawn in the CRZ area.
Ground water quality is being monitored at 4 locations as per EMP and six-monthly reports are being regularly submitted to APPCB.</td></tr>
<tr><td>6.</td><td>The industry shall prepare oil spill contingency plan as approved by concerned department and shall recover the spill in case of any accidents.</td><td>Complied
Oil Spills, if any, shall be managed as per the approved Oil Spill Contingency Plan.
Oil Boom, Skimmer and chemicals required have been procured and trained professional are deployed to cater to Tier-I Oil spills.
As per Disaster Management Plan Indian Coast Guard will be alerted to Coordinate.</td></tr>
<tr><td>7.</td><td>The cargo ships shall be prohibited from discharging waste water, bilge/oil waste in the port area.</td><td>Complied.</td></tr>
<tr><td>8.</td><td>The impact on the drawl of the water from the Kandaleru Creek shall be regularly monitored and report shall be submitted to the concerned Regional Officer.</td><td>Complied.
No water is drawn from Kandaleru Creek except for firefighting contingency. Surface water quality is being monitored periodically and the reports are being submitted regularly.</td></tr>
<tr><td rowspan="4">9.</td><td>Separate meters with necessary pipeline shall be provided for assessing the quantity of water used for each of the purposes mentioned below.
(a). Industrial cooling, boiler feed.</td><td>Complied.</td></tr>
<tr><td>(b). Domestic purposes.</td><td>Complied.</td></tr>
<tr><td>(c). Processing, whereby water gets polluted, and pollutants are easily bio-degradable.</td><td>Complied.</td></tr>
<tr><td>(d). Processing, whereby water gets polluted, and the pollutants are not easily bio-degradable.</td><td>Not Applicable.</td></tr>
<tr><td colspan="3"><u>Air:</u></td></tr>
<tr><td>10.</td><td>The proponent shall comply with the following for controlling air pollution.
<table>
<tr><th>S. No.</th><th>Details of stack</th><th></th></tr>
<tr><td>(a).</td><td>Attached to</td><td>D.G. Sets</td></tr>
<tr><td>(b).</td><td>Capacity</td><td>1 x 320 KVA, 1 KVA, 1 x 160 K KVA</td></tr>
<tr><td>(c).</td><td>Fuel</td><td>Diesel</td></tr>
<tr><td>(d).</td><td>Stack height</td><td>As per CPCB r</td></tr>
<tr><td>(e).</td><td>Control equipment</td><td>Acoustic encl</td></tr>
</table></td><td>Noted.
DG sets are provided only as back-up for safety and emergency lighting during power failures and these sets comply with the guidelines of CPCB.</td></tr>
<tr><td>11.</td><td>The proponent shall comply with the following for controlling fugitive emissions. This Condition is modified in CFE amendment Order No. APPCB/VJA/NLR/633/HO/2004/9/46 dated 04.01.2017 is as under.</td><td></td></tr>
</table>

	* Fully mechanized handling equipment for loading & unloading operations.	Complied. ship unloaders have been commissioned for 2 berths for coal handling Conveyor has been commissioned from berths to i. Stack tubes in NEC Yards ii. To Port Boundary for APGENCO dispatch iii. To Port Boundary for TPCIL and NCC power Dispatch
	* Closed conveyor belt with water sprinkling arrangement for suppression of dust while conveying dusty cargos like Coal & Iron Ore. Specially designed Iron Ore ship loader necessary precautions to reduce drop height of Iron Ore into the ship.	
	* All outgoing vehicles involved in transportation of cargo shall be covered with tarpaulin.	**Being Complied** Tarpaulin cover is being ensured in respect of vehicles/wagons carrying coal destined to locations beyond port.
	* Vehicles shall be managed to avoid traffic congestions and shall provide empty dusting vehicle washings / dry cleaning system to clean the cargo vehicles.	**Being Complied** a) Vehicle identification and tracking system is implemented to avoid traffic congestion. b) Vehicle washing system with silt collection pits and oil separator is being implemented with facility to recycle effluent for dust suppression.
	* Based on traffic density / vehicular movements anticipated from the port, parking facilities will be provided.	**Being Complied** Adequate vehicle parking facilities have been provided.
	* Mechanical water sprinkling shall be provided on roads and at dusty cargo storage areas, for suppression of dust.	**Being complied** (a) Installation and operation of MDSS with 248 Nos of sprinklers at coal stacking and wagon loading areas. (b) 12 Nos of Truck mounted sprinklers for roads and transit areas. (c) Heavy-duty Atomizers sprayers are deployed (d) Deploying Hoppers for unloading. (e) Mechanized coal handling at 2 berths within the land so far transferred on lease by GoAP. Conveyors are covered with hood. (f) Developed paved roads and resorted to sweeping of roads by vacuum sweeping machines. (g) Covering vehicles and wagons of coal transport to destinations outside the port with Tarpaulins. (h) Trucks deployed for inter carting of coal are being doused with water spray. (i) Developed wind breaking shield and warehouses of 12 m height on west side of the FTP-1 coal yard.
12.	The industry shall install and commission continuous Ambient air monitoring stations (AAQM) within the plant as per the specifications of CPCB for online monitoring of SO_2, NO_x, $PM_{2.5}$, PM_{10} with networking to Head Office by April 2012 as committed.	**Complied** Commissioned 3 Nos CAAQM stations & linked it to APPCB website.

13.	Sprinklers / Nozzles shall be provided to control dust emissions at various points / areas. i. <u>Ship unloader</u> – Fixed cone nozzles shall be placed at receiving hoppers. ii. <u>Belt Transfer Points (in Transfer Towers)</u> –fixed nozzles at regular intervals, shall be mounted on skirt area and provide on discharge hoods of conveyors. iii. <u>Stock yard</u> – Water sprinkling system at high pressure with swiveling type nozzles shall be installed to cover entire stockpile. Nozzles shall be installed along stockpile at regular intervals to cover stockpile height and width. In other areas of stockpiles, two sprinklers at a time shall be operated sequentially to control dust generation due to winds. iv. <u>Rapid loading system</u> – fixed cone nozzles shall be installed, at regular intervals, at discharge point of shuttles conveyor on Rapid loading system.	**Noted.** (i), (ii) & (iv) being implemented as part of mechanization of cargo operations. (iii) Being complied. 248 Nos of Fixed water sprinklers are commissioned and operated at different coal yards and wagon loading areas. 12 Nos of truck mounted mobile sprinklers are being deployed for dust suppression on roads and other areas. Heavy-duty atomized sprayers are also deployed to augment dust suppression measures.
14.	For Iron Ore, a fully mechanized handling system comprising of Ship loader, covered conveyors, stackers and reclaimers, wagon tippler etc., shall be provided.	**Noted** Iron ore handling is intermittently taking place. Mechanization of iron ore handling shall be resorted to once exports exceed 6 MTPA. Dust suppression measure by means of regular water sprinklers is being followed.
15.	Greenbelt shall be developed around the coal and iron ore stockyards to prevent fugitive dust of 100m width as proposed by the industry.	**Noted.** a) Total Greenbelt required for Phase-I & II i.e.,191.5 Ha. has been developed. b) Lands are being handed over by GoAP in Phases for development. c) Green Belt being developed progressively in the lands transferred by GoAP on lease. d) As required entire 191.5 Ha of Greenbelt has been developed along port boundary, around coal yards and block plantation, avenue & median plantations. e) Causalities replacement of existing plantation areas is also in progress. f) Further Greenbelt is being taken up on a continuous basis on the lands being handed over by GoAP from time to time. GoAP is holding regular inter departmental meetings to resolve the land availability.
16.	A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.	**Not Applicable.**
17.	The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level	**Complied.** Ambient Noise level monitoring is carried out as per EMP during day time and night time at 7

<table>
<tr><td></td><td>shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.</td><td>locations and the noise levels are observed within prescribed CPCB limits.
Periodical Environmental Monitoring Reports of monitoring are regularly being submitted to APPCB.</td></tr>
<tr><td>18.</td><td>The proponent shall comply with the following:
<table>
<tr><th>S. No.</th><th>Solid Waste</th><th>Quantity</th><th>Method of Disposal</th></tr>
<tr><td>1.</td><td>Domestic use</td><td>250 Kgs/ day</td><td>After composting, Biodegradable waste is proposed to be used as manure. Non-Biodegradable waste will be disposed to approved vendors.</td></tr>
<tr><td>2.</td><td>STP sludge</td><td>-</td><td>To be used as manure.</td></tr>
</table></td><td>Complied.
a) Composting of domestic waste and using as manure.
b) Non-biodegradable wastes are being disposed to approved vendors.
c) STP sludge is being used as manure for Green belt development.</td></tr>
<tr><td>19.</td><td>The following rules and regulations notified by the MOE&F, GOI shall be implemented.
(a) Hazardous waste (Management, Handling and Trans boundary Movement), Rules, 2008.
(b) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
(c) Coastal Regulatory Zone (CRZ) Notification, 1991.
(d) Municipal Solid Waste (Management & Handling) Rules, 2000 & amendments thereof.</td><td>Noted and being complied.</td></tr>
<tr><td>20.</td><td>The storage facilities of fuel oils shall be made in well designated area where risk is minimum to storage facilities to prevent fire hazard and unauthorized access to unauthorized elements.</td><td>Noted.</td></tr>
<tr><td>21.</td><td>Fire detection and fire- fighting facilities with adequate water storage facility shall be provided in fire prone area in consultation with Directorate of Fire Firefighting.</td><td>Complied
Fire-fighting system along with adequate water storage is being ensured. Dedicated Fire-fighting equipment and trained personnel are available. Port Tugs are also having fire-fighting capability.</td></tr>
<tr><td>22.</td><td>This Condition modified in CFE amendment Order No. APPCB/VJA/NLR/633/HO/2004/9/46 dated 04.01.2017 is as under.
Onsite Disaster Management Plan shall be prepared to meet any eventuality in case of any accident. Mock drills shall be conducted at least twice a year and modifications required if any shall be incorporated in Disaster Management Plan.</td><td>Complied.
a) On-Site emergency plan is prepared and submitted to District authorities for integration with Off-Site emergency plan.
b) Disaster management Plan is prepared and is being updated as required.
c) Mock drills are being conducted.</td></tr>
<tr><td>23.</td><td>In case of any leakage container of hazardous cargo is found, permission shall be obtained</td><td>Noted.
Same shall be complied on such situations.</td></tr>
</table>

	from the Board for disposal after establishing type and quantity of the waste.	
Other Conditions:		
24.	Greenbelt of width 100m shall be developed along the boundary of the industry as committed by the proponent. The greenbelt shall be undertaken in an area of 167.5 ha in Phase-II. Greenbelt development shall be started along with the construction activity.	**Complied.** a) Total Greenbelt required for Phase-I & II i.e., 191.5 Ha. has been completed. b) Lands are being handed over by GoAP in phases for development. c) As required entire 191.5 Ha of Greenbelt has been developed along port boundary, around coal yards and block plantation, avenue& median plantations. d) Causalities replacement of existing plantation areas is also in progress. e) Further Greenbelt is being taken up on a continuous basis on the lands being handed over by GoAP from time to time. GoAP is holding regular inter departmental meetings to resolve the land availability.
25.	The industry shall implement the commitment given in action plan submitted vide Letter dated 19.04.2010 within the scheduled period and shall submit compliance to the concerned Regional Officer.	**Noted.**
26.	Dedicated 3-line road shall be laid as proposed by the proponent to avoid conjunction vehicular pollution to the villagers.	**Complied.** Four lane port connectivity road has been formed, by GoAP as per terms of the Concession agreement. Hence no congestion or vehicular pollution to villagers.
27.	The hydro-dynamic studies shall be undertaken to ascertain the impact to the shoreline in the stretch and ecologically sensitive areas and the report shall be submitted to the concerned Regional Officer.	**Complied.** a) The hydro-dynamic studies to ascertain the impact of port development on the shoreline in the stretch have been carried out through M/s.HR Wallingford, UK. No long-term impact is noticed due to minimal net drift along the coast. b) However, as recommended in their report dated October 2007, 7 Km of coastline both North and South of the port entrance is being monitored through M/s. Indian National Centre for Ocean Information Services (INCOIS), Hyderabad using satellite imagery. From the INCOIS reports for the period October 2008 to October 2010, the coastline is found to be stable. c) Shoreline monitoring being carried out monthly in-house also revealed that the coastline is reasonably unaffected except for seasonal variations. Further monitoring is being continued.
28.	The plantation of mangroves shall be undertaken in an area of 50 ha as the Phase-II of the project spreads over 800 ha and existing mangroves shall not be disturbed.	**Complied.** 1. The mangroves are highly sensitive to the soil conditions and mangroves grow only in specific areas. Therefore, GoAP has been approached to allot suitable additional land. 2. We raised Mangroves in 50 Ha in the port in the areas suggested by GoAP.

		3. Due to low survival rate, replanting of causalities and damages on account of human interference is being undertaken where needed.
29.	The industry shall comply with all the conditions stipulated in the Environmental Clearance and CRZ Clearance issued vide Order dated 13.11.2009 issued by MOE&F, GOI.	Complied. Compliance reports are being regularly submitted.
Conditions vide order No. 633/APPCB/CFE/RO-NLR/HO/2010 dated 10.02.2016		
6.	M/s Krishnapatnam Port Company LTD., shall comply with the following	
	a) The mechanical dust suppression system (sprinklers and fogging) of adequate capacity shall be provided at the coal handling points such as loading and unloading from ship, stacking and reclaiming processed in the stack yard to control dust generation and air emissions.	**Complied.** a) To control dust generation and air emissions, Mechanical dust suppression system is provided and operated for coal storage yards and transfer houses of conveyor system. b) Water Sprinkling system has been installed for the ship unloaders and conveyer systems. c) 248 Nos sprinklers have been installed and operating for dust suppression in storage yards. d) 12 Nos tankers have been deployed for dust suppression of pavements and roads. e) Heavy duty atomizer sprayers are deployed.
	b) Wind breaking wall / sheets shall be provided all along the Coal/ Iron ore stacks yards towards villages viz., Chalivendra, Gopalapuram and Krishnapatnam taking into consideration the meteorological characteristics of the location within 3 months as committed vide lr.dt.01.02.2016.	Wind Shield / screen along the Coal stacks yards has been erected for Chalivendra, Gopalapuram and Krishnapatnam villages are completed.
7.	The port authorities shall submit a copy of the orders issued by the Board to the MoEF&CC, GoI, New Delhi for record.	**Complied**: A copy of the CFE amendment Order was submitted to MoEF&CC vide letter No. KP/MoEF/21 dated 13.02.2016.
Conditions vide order No. 633/APPCB/CFE/RO-NLR/HO/2010 dated 22.02.2018		
1	The port authorities shall submit a copy of the order to the MoEF&CC, GoI, New Delhi for record.	A copy of the CFE amendment Order is submitted to MoEF&CC vide letter No. KP/MoEF/40 dated 11.04.2018.

Compliance Report
of conditions in
Consent for Establishment (CFE) Order
for Phase – III Expansion of Krishnapatnam Port
Period: April 2022 to September 2022

Adani Krishnapatnam Port Limited
Compliance Report on Consent for Establishment (CFE) Order of APPCB dated: 25.02.2021 and Amendment dated 06.04.2021 for Phase – III Expansion of Krishnapatnam Port
For the period – April 22 to September 22

<table>
<tr><th>S.No</th><th>Condition</th><th>Compliance Status</th></tr>
<tr><td>1.</td><td>The proponent shall obtain Consents for Operation (CFO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the activity.</td><td>Noted.
The Port shall obtain Consent For Operation (CFO) before commencement of the activity.</td></tr>
<tr><td>2</td><td>Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.</td><td>Noted.</td></tr>
<tr><td>3</td><td>The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.</td><td>Noted with the condition.</td></tr>
<tr><td>4</td><td><u>Water:</u>
The source of water is Muthukur Reservoir of 1000 KLD and 4 MLD of water from Nakkala kalava irrigation drain. The maximum permitted water consumption after proposed expansion is as following:
<table><tr><th>S. No.</th><th>Purpose</th><th>Qty as per CFO (Phase-1 & 2) (KLD)</th><th>Proposed in Expansion under Phase-III (KLD)</th></tr><tr><td>1.</td><td>Dust suppressions & other utilities</td><td>1600.0</td><td>1700</td></tr><tr><td>2.</td><td>Gardening</td><td>300</td><td>200</td></tr><tr><td>3.</td><td>Domestic</td><td>600</td><td>600</td></tr><tr><td></td><td>Total:</td><td>2500 KLD</td><td>2500 KLD</td></tr></table>Separate meters with necessary pipeline shall be provided for assessing the quantity of water used for each of the purposes viz., Dust suppression, Domestic purposes, Washing and servicing, development of greenery.</td><td>Noted.
AKPL has already laid pipeline from Nakalakalva drain to Port along with pumping system having separate water flow meter to measure the quantity of water being pumped from the drain. The water is being used for dust suppression, fire fighting etc

The waste water generated shall be treated by establishing ETP and STP as per the condition stipulated in the consent order and the mode of final disposal of treated effluent shall also be as per the condition in the consent order.</td></tr>
<tr><td>5</td><td>Wastewater generation
<table><tr><th>S. No.</th><th>Purpose</th><th>Qty as per CFO (Phase-1 & 2) (KLD)</th><th>Proposed in Expansion under Phase-III (KLD)</th><th>Total after expansion (KLD)</th></tr></table></td><td></td></tr>
</table>

1	Other Utilities	-	240	240
2	Domestic	300	450	750
	Total	300 KLD	690 KLD	990 KLD

Treatment & Disposal (As per EC order)

Source of effluent	Treatment	Mode of final disposal
Domestic	Sewage Treatment Plant of capacity of 700 KLD consisting of Sewage collection Sump, Fluidized Bed Bio Reactor, Secondary clarifier, Clarifier Water Tank, Dual Media Filter, treated water tank, Sludge drying beds etc.	Treated domestic effluents shall be utilized for Green belt development and dust suppression
Utilities	Effluent Treatment Plant of 300 KLD capacity consisting of Neutralization tank, Equalization tank, Oil Grease trap, flash mixing tank, clariflocculator, aeration tank, secondary clarifier, holding tank, pressure sand filter, activated carbon filter, sludge drying beds etc. for treating effluents	Treated effluent shall be reused for green belt and for dust suppression.

6	The effluent / sewage shall be treated to the on land for irrigation standards, as stipulated under Schedule VI of Environment (Protection) Rules, 1986, notified by Ministry of Environment and Forests, Government of India vide G.S.R.422 (E), dt.19.05.1993 and its amendments thereof. The treated wastewater	**Noted.** AKPL have 540 KLD STP's treating the wastewater generated and the treated waste water is used for greenbelt.

<table>
<tr><td></td><td>shall be used for development of greenery, dust suppression, re-used for various purposes within the premises.</td><td></td></tr>
<tr><td>7</td><td><u>Air:</u>
The Air pollution Control equipment shall be installed along with the commissioning of the activity and shall comply with the following for controlling air pollution:
<table><tr><td>S. No.</td><td>Details of stack</td><td>Stack 01</td></tr><tr><td>a)</td><td>Attached to</td><td>D.G. Sets</td></tr><tr><td>b)</td><td>Capacity of D.G. set</td><td>5 x 2000 KVA, 1 x 1000 KVA, 2 x 750 KVA, 5x 500 KVA, 3 x 320 KVA, 3 x 250 KVA, 3 x 160 KVA, 10 x 125 KVA, 10 x 82.5 KVA, 3 x 380 KVA</td></tr><tr><td>c)</td><td>Fuel</td><td>Diesel</td></tr><tr><td>d)</td><td>Stack height above the ground</td><td>This condition has been amended vide CFE order No: 633/APPCB/CFE/RO-NLR/HO/2010 dated 06.04.2021
The Port shall provide stack heights for the DG sets based on the following formula.
H=h+0.2√KVA Where H= Total height of the stack in meters, h= Height of the building in meters.</td></tr><tr><td>e)</td><td>Details of air pollution control equipment</td><td>Acoustic enclosures with silencers</td></tr></table></td><td>Noted.
DG sets are proposed as power back up in case of power failure. All the DG sets are installed as per CPCB guidelines and complying to the emission standards.</td></tr>
<tr><td>8</td><td>The proponent shall comply with the following for controlling fugitive emissions:
• Vehicle movement shall be minimized / eliminated by implementing mechanical operation.
• All the vehicles involved in transportation of cargo shall be covered with tarpaulin.
• Vehicles shall be managed to avoid traffic congestion and shall provide empty dusting vehicle washings / dry cleaning system to clean all out going cargo vehicles.</td><td>Noted.
- Mechanized loading and unloading of cargo shall be implemented to avoid emission from vehicle movement.
- All the loaded trucks and wagons shall be covered with tarpaulins.
- Port shall provide wheel washing facility at the entrance of the dusty cargo storage area.
- Port have adequate truck parking bays and shall provide additional</td></tr>
</table>

<table>
<tr><td></td><td>• Based on traffic density/ vehicular movements anticipated from the port, parking facilities shall be provided.</td><td>parking bays/areas during expansion.</td></tr>
<tr><td>9</td><td>All the transfer points, loading / unloading points and conveyer systems shall be housed completely with leak proof arrangements. Adequate dust suppression and containment measures shall be implemented for effective control of fugitive emissions.</td><td>Noted.
All the existing transfer tower points have been covered using GI sheets with openings as required for access and sprinklers have been installed for dust suppression. The same shall be implemented for the Phase-III expansion also.</td></tr>
<tr><td>10</td><td>Hazardous / Solid Waste details:
The Port Authority shall comply with the following w.r.t disposal of solid waste after expansion:
<table>
<tr><th>S.No.</th><th>Name of Waste</th><th>Quantity</th><th>Mode of disposal</th></tr>
<tr><td>1</td><td>Solid waste (degradable)</td><td>1800 kg/day</td><td>To as manu for reuse re green belt</td></tr>
<tr><td>2</td><td>Solid waste (Non-degradable)</td><td>200 kg/day</td><td>To authorized recyc</td></tr>
<tr><td>3</td><td>STP sludge</td><td>120 kg/day</td><td>To be used as manu</td></tr>
<tr><td>4</td><td>ETP sludge</td><td>50 kg/day</td><td>To TSDF for secured fill</td></tr>
<tr><td>5</td><td>Oil containing cargo residue washing water and sludge</td><td>250 KLPA</td><td rowspan="10">To authorized recyclers/ reprocessors / TSDF</td></tr>
<tr><td>6</td><td>Chemical car con go taining residue and sludge</td><td>100 KLPA</td></tr>
<tr><td>7</td><td>Sludge and filters contaminated with oil</td><td>200 TPA</td></tr>
<tr><td>8</td><td>Ballast water containing oil from ships</td><td>250 KLPA</td></tr>
<tr><td>9</td><td>Used/ Spent Oil</td><td>350 KLPA</td></tr>
<tr><td>10</td><td>Wastes / residues containing oil</td><td>100 KLPA</td></tr>
</table></td><td>Noted.
All the hazardous waste generated by the Port are collected, stored, and disposed to authorized recyclers/re-processors.</td></tr>
</table>

	11	Sludge from treatment of waste water arising out of cleaning/ disposal of barrels/ containers	100 TPA		
	12	Discarded containers/ barrels/ liners contaminated with Haz. Waste/ chemicals	100 TPA	To authorized recyclers/ reprocessors / TSDF	
	13	Flue gas cleaning residue	10 TPA		
	14	Chemical was slu te dge fro m water treatment	100 TPA		
	15	Oil and grease skimmin g residues	20 T PA		
11	The following rules and regulations notified by the MOE&F, GOI shall be implemented.				**Noted.** The port shall comply with rules and regulations notified by the MOE&F, GOI
	a.	Regulation of Persistent Organic Pollutants Rules, 2018.			
	b.	Hazardous waste and other wastes (Management and Transboundary Movement) Rules, 2016.			
	c.	Plastic Waste Management Rules, 2016.			
	d.	Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989			
	e.	Fly Ash Notification, 2016.			
	f.	Batteries (Management & Handling) Rules, 2010.			
	g.	E-Waste (Management) Rules, 2016.			
	h.	Construction and Demolition waste Management Rules, 2016.			
	i.	Solid Waste Management Rules, 2016.			
	j.	The Public Liability Insurance Act, 1991 and its amendments thereof.			

	Other Conditions:		
12	The Port shall comply with the following conditions as committed during the CFE Committee meeting held on 23.02.2021:		
	•	M/s. KPCL shall implement Mechanized MDDS systems for effective dust control. Water meters and energy meters shall be installed to record the quantity of water consumed and electricity consumed for MDSS systems.	**Noted.** Port installed and operating Mechanical Dust Suppression System (MDSS) with 248 Nos. of sprinklers at coal stacking and wagon loading areas. Separate Energy meters are installed to record the electricity consumption for MDSS. AKPL will augment the MDSS as per the requirement during Phase-III expansion of Port.
	•	M/s. KPCL shall conduct performance evaluation of MDSS systems.	**Noted.**
	•	M/s. KPCL shall explore the possibility of usage of Chemical suppressants such as Sodium / Potassium Aluminates, for effectively mitigating the dust emissions during coal / dusty cargo handling.	**Noted.**
	•	M/s. KPCL shall restrict the coal stack height to 10 m only. In future, APPCB will examine the increase in stack height of dusting cargo from 10 m to 12 m depending up on the justification submitted by the port.	**Noted.**
	•	This condition has been amended vide CFE order No: 633/APPCB/CFE/RO-NLR/HO/2010 dated 06.04.2021 The Govt. of A.P allotted surface water i.e., 1000 KLD from Muthukur Reservoir and 4MLD of water from Nakkalakalva irrigation waste water drain, which is sufficient to meet the total water requirement for port utilization for Phase-III. Further, Nellore Municipal Corporation commissioned one STP of 5 MLD capacity to treat municipal sewage. STPs of capacity 70 MLD are under construction. The Port shall explore possibility of utilization of treated waste water for dust suppression purpose in the Port area. The KPCL shall not draw the ground water under any circumstances.	**Noted.**
	•	M/s. KPCL shall allow the effluents / leachate generated from dust suppression / coal handling etc., into sea under any circumstances. The garland drains, settling tanks shall be de-silted regularly for free flow.	**Noted.** The port shall not allow the run off water from coal storage yards and water from dust suppression to the sea. The run off water shall be diverted to sedimentation pits and water shall be used for green belt, dust suppression.

	•	Greenbelt of width 100 m shall be developed along the boundary of the port as committed in the public hearing (para no. 5 of EC order dt.11.01.2021) and as stipulated in the CFE order dt.08.05.2010. The greenbelt shall be developed in an area not less than 120 Ha along the Port boundary and around the coal storage areas with native species, as stipulated in EC order dt.11.01.2021. Saline water-resistant saplings shall be planted as Bay-of-Bengal is located in the vicinity.	**Noted.** AKPL has already developed 191.5Ha. greenbelt as per the statutory requirement (Phase-I&II) with boundary plantation, avenue plantation and coal stockyard plantation. As part of Phase-III, 120 Ha. greenbelt shall be developed along the Port boundary and around coal storage areas with native species.
	•	The liquid cargo / chemicals shall be stored in the port area complying with OISD norms. All precautions shall be taken to prevent any chemical accidents. The chemicals stored in the port premises and their capacities shall be informed to the EE, RO: Nellore from time to time.	**Noted.** The Port shall inform the type of chemicals and their capacities to the Environment Engineer, APPCB Regional office, Nellore up on commissioning of the same after obtaining CFO.
	•	This condition has been amended vide CFE order No: 633/APPCB/CFE/RO-NLR/HO/2010 dated 06.04.2021 The Port shall implement effective dust suppression measures to meet National Ambient Air Quality standards.	**Noted and being complied.**
	•	This condition has been amended vide CFE order No: 633/APPCB/CFE/RO-NLR/HO/2010 dated 06.04.2021 The Port shall maintain and operate 3 nos. of CAAQM stations properly, consistently and transmit the data to the APPCB server, online.	**Noted.** Port installed and operating 3 nos. CAAQM station towards Gopalapuram village, Thamminapatnam village and Krishnapatnam village, the values are connected to the APPCB site.
	•	The Coal stock yard shall be enclosed suitably to have three layers of green belt of varying height on all the sides.	**Noted.**
	•	Dusty cargos shall be handled through mechanized handling equipment for loading & unloading operations.	**Noted.**
	•	Closed conveyor belt with water sprinkling arrangement shall be provided for conveying dusty cargos like coal& iron ore.	**Noted.**
	•	The ship un-loader for unloading and transfer of material shall be provided with in-situ water sprinkling system to avoid dust nuisance.	**Noted.**
	•	Mechanical stackers cum reclaimers for staking transfer and reclamation and conveyors for transfer of materials without manual handling.	**Noted.**

	•	Dry fogging system shall be provided at transfer points.	**Noted.**
	•	Automatic water sprinkling shall be provided at all dusty cargo stock yards. There shall be interlocking between the CAAQM station values for particulate matter and MDSS.	**Noted.** Mechanical dust suppression system is already in place in the Port, the same shall be enhanced for the future expansion. Port shall also explore the possibilities of installing automatic water sprinkling system.
	•	The facility shall maintain standby centrifugal pump with drive motor for uninterrupted dust suppression of the cargo.	**Noted.**
	•	The coal & iron ore shall be transported by rail from the stacking area as far as possible. The residual cargo if any shall be transported by road through covered trucks duly complying with the following measures:	**Noted.** Port is transporting coal to the nearby Power plants through closed conveyors, and to the steel plants and cement plants the coal is being transferred through rail with tarpaulin covers, only a small quantity of coal is being transferred through truck covered with tarpaulins.
		i. Traffic congestion shall be avoided.	**Noted.**
		ii. Automated mechanical water sprinkling shall be provided on roads and at dusty cargo storage areas, for suppression of dust.	**Noted.**
		iii. All the vehicles involved in transportation of cargo during the break downs shall be covered with tarpaulin and also ensure to manage vehicles	**Noted.**
		iv. The truck movement shall be through a dedicated road meant for truck movement located and avoid movement of trucks closer to residential areas.	**Noted.** Port has dedicated 4 lane road connecting NH-16 for truck movement.
		v. The trucks shall be fully covered with tarpaulin while plying with cargo on the roads.	**Noted.**
		vi. All cargo vehicles moving out from the port shall be passed through vehicle wheel wash area.	**Noted.** Port shall install adequate number of wheel washing facility for the trucks moving out of the Port.
	•	The port shall provide oil spill containment facilities around the SBM.	**Noted.** Port is equipped with Tier-1 Oil spill response equipment, after completion of SBM works oil spill contain facility shall be provided.
	•	The port shall take necessary environmental protection measures for the dump yard of the dredged material.	**Noted.**
13	The industry shall comply with all the conditions stipulated in the EC order		**Noted.**

	dt.11.01.2021 issued by MoEF & CC, GoI, New Delhi under Phase-III.	
14	Fire detection and fire fighting facilities with adequate water storage facility shall be provided in fire prone area in consultation with competent authorities.	**Noted.** AKPL has adequate fire fighting facilities with water storage facility for the entire Port area. For Phase-III expansion, Port shall enhance the fire fighting facility as required.
15	Onsite & offsite Disaster Management plan shall be prepared to meet any eventuality in case of any accident. Mock drills shall be conducted atleast twice a year and modifications required if any shall be incorporated in Disaster Management Plan and shall submit to Board.	**Noted.** Onsite emergency plan has been prepared and submitted to District Collector for incorporating with Offsite emergency plan of District magistrate.
16	The Port Authorities shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities including chemical storages / isolated storages by an expert not associated with such industrial activity as required under Rule 10 of MSIHC Rules, 1989 and get it approved by the Factories Dept., and submit the compliance along with copy of the safety report, safety audit report and safety certificate at concerned Regional Office, APPCB.	**Noted.**
17	The Port Authorities shall submit a copy of the NOC issued by the Andhra Pradesh State Disaster Response and Fire Service Dept., (APSDRFSD) at concerned Regional Office, APPCB.	**Noted.**
18	The Port Authorities shall submit risk assessment report covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.	**Noted.**
19	The Port Authorities shall obtain prior permission from MoEF&CC, GoI and APPCB for any changes in the cargo type / capacity.	**Noted.**
20	DO levels in the sea water at the dredging area shall be monitored at regular interval and the dredging time shall be suitably regulated to prevent depletion of DO levels in the sea water.	**Noted.** Monitoring shall be carried out in the dredging area at regular interval.
21	The industry shall submit compliance to the conditions stipulated in the EC and CFE orders to the concerned Regional Officer of APPCB every six months and shall upload the same at APPCB website viz., https://pcb.ap.gov.in/UI/Submission_Compliance_of_EC_CFE_CFO_Direction.aspx.	**Noted.**
22	Concealing the factual data or submission of false information/ fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order	**Noted.**

	and attract action under the provisions of relevant pollution control Acts.	
23	Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec. 27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to revoke the order, to review any or all the conditions imposed herein and to make such modifications as deemed fit and stipulate any additional conditions.	**Noted.**
24	Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules,1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.	**Noted.**

Compliance Report on

Conditions stipulated in the

Consent for Operation (CFO) Order of APPCB

Period: April 2022 to September, 2022

Compliance Report on conditions stipulated in the Consent For Operation (CFO) Order of APPCB Dt. 11.11.2022
Period of Reporting – April, 2022 to September, 2022

S No	Stipulation	Status
Schedule - A		
1	Any up-set condition in any industrial plant / activity of the industry, which result in, increased effluent / emission discharge and/ or violation of standards stipulated in this order shall be informed to this Board, under intimation to the Collector and District Magistrate and take immediate action to bring down the discharge / emission below the limits.	**Noted**
2	The port should carryout analysis of wastewater discharges or emissions through chimneys for the parameters mentioned in this order on quarterly basis and submit to the Board.	**Noted and being complied** Periodical Monitoring including STP outlet quality and emissions through DG set are being carried out at Port and reports being submitted to statutory authorities regularly. Six Monthly Environmental Monitoring Report April 2022, to September 2022 is attached.
3	All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 should be followed as applicable.	**Noted**
4	Notwithstanding anything contained in this consent order, the Board hereby reserves the right and powers to review / revoke any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.	**Noted**
5	The industry shall ensure that there shall not be any change in the process technology, source & composition of raw materials and scope of working without prior approval from the Board.	**Noted**
6	The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E (P) Rules, 1986 & amendments thereof.	**Complied** Environmental Statement in Form – V is being submitting annually. Form-V Environment Statement for the FY 2021-2022 is submitted on 29.09.2022.
7	The applicant should make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts and detailed compliance of CFO conditions for obtaining Consent & HW Authorization of the Board.	**Noted and complied** CFO renewed by the APPCB vide order No APPCB/VJA/NLR/11344/CFO/HO/2019 dated 11.11.2022 is valid up to 31st August 2027.
8	The port should immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions. Any change in the management shall be informed to the Board. The person authorized should not let out the premises / lend / sell / transfer their industrial premises without obtaining prior permission of the State Pollution Control Board.	**Noted and complied**
9	Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974	**Noted**

<table>
<tr><td></td><td>or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority constituted under Section 28 of the Water(Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.</td><td></td></tr>
<tr><td>10</td><td>The conditions stipulated are without prejudice to the rights and contentions of this Board in any Hon'ble court of law.</td><td>Noted</td></tr>
<tr><td>11</td><td>The port shall be liable to pay Environmental Compensation / Other Environmental Taxes, if any environmental damage caused to the surroundings, as fixed by the Collector & District Magistrate or any other competent authority as per the Rules in vogue.</td><td>Noted</td></tr>
<tr><td>12</td><td>The port may explore the possibility of tapping the solar energy for their energy requirements.</td><td>Noted</td></tr>
<tr><td>13</td><td>The port should educate the workers and nearby public of possible accidents and remedial measures.</td><td>Noted</td></tr>
<tr><td colspan="3">Schedule - B</td></tr>
<tr><td>1</td><td>The Port shall complete mechanizing of Berth no 6 by 31st March, 2023</td><td>Noted.
Mechanization of berth no 6 is completed and linking of all existing conveyors in process</td></tr>
<tr><td>2</td><td>The port shall complete the mechanization of Berth no 5 within 24 months from the date when the coal handled at berth no 5 is adequate to handle through mechanization system. Till the mechanization is completed, the port shall do sprinkling along with MDSS to control dust pollution due to handling of coal</td><td>Noted</td></tr>
<tr><td>3</td><td>The Port shall maintain the existing greenbelt of 100m width along the periphery. Further, development of 100 m green belt at other expansion areas shall be taken up at the time of expansion of the port facility and shall be completed within 3 years.</td><td>Noted</td></tr>
<tr><td>4</td><td>The port shall develop the 20 m width greenbelt along the existing coal stock yards as per EC & CFO conditions within a time period of 2 years</td><td>Noted and being complied</td></tr>
<tr><td>5</td><td>The port shall maintain storm water drains and improvement of the storm water drains in new areas shall be taken up along with the expansion of the port.</td><td>Noted and being complied</td></tr>
<tr><td colspan="3">Water</td></tr>
<tr><td>6</td><td>The source of water is Muthukur Reservoir 1000 KLD and 4 MLD of water from Nakkala kalava irrigation drain. The maximum permitted water consumption after proposed expansion is as following:
<table>
<tr><th>No.</th><th>Purpose</th><th>Quantity (KLD)</th></tr>
<tr><td>1.</td><td>Dust suppressions & Miscellaneous (Fire protection services)</td><td>1950.0</td></tr>
<tr><td>2.</td><td>Gardening</td><td>400.0</td></tr>
<tr><td>3.</td><td>Domestic</td><td>650.0</td></tr>
</table></td><td>Noted and being complied</td></tr>
</table>

	Total **3000.0** Separate meters with necessary pipe-line shall be maintained for assessing the quantity of water used for each of the purposes mentioned above.	
7	The port shall comply the following effluent discharged standards based on the disposal points permitted: **Outlet** / **Parameter** / **Concentration** **pH** / **5.5 - 9.0** **Total Suspended Solids (TSS)** / **<100 mg/l** **Oil and Grease** / **10 mg/l** **Biochemical Oxygen Demand (BOD)** / **30 mg/l** **Fecal Coliform (FC) (Most Probable Number per 100 Milliliter, MPN/100ml)** / **<1000 MPN/100 ml**	**Complied** The port complies to the standards as prescribed in the consent order and CPCB norms Environmental Monitoring Report April 2022, to September 2022 is attached.
Air		
8	The port shall comply with emission limits for DG sets of capacity upto 800 KW as per the Notification G.S.R.520 (E), dated 01.07.2003 under the Environment (Protection) Amendment Rules, 2003 and G.S.R.448(E), dated 12.07.2004 under the Environment (Protection) Second Amendment Rules, 2004. In case of DG sets of capacity more than 800 KW shall comply with emission limits as per the Notification G.S.R.489 (E), dated 09.07.2002 at serial no.96, under the Environment (Protection) Act, 1986.	**Complied**
9	The port shall comply with ambient air quality standards of PM10 (Particulate Matter size less than 10μm) - 100 μg/ m3; PM2.5 (Particulate Matter size less than 2.5 μm) - 60 μg/ m3; SO2 - 80 μg/ m3; NOx - 80 μg/m3, outside the factory premises at the periphery of the industry. Standards for other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009. Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A) Night time (10 PM to 6 AM) - 70 dB (A)	**Complied** i) AAQ and Ambient Noise levels are being monitored through an agency accredited by NABL and approved by MoEF&CC at the following 7 Locations along the periphery of the port: • Krishnapatnam Village • Krishnapatnam Village near Light House • Gopalapuram village • Chalivendra Village • Amenities Complex • Port Entrance (Zero Point) • South Port ii) The results comply with the NAAQ standards. Periodic Monitoring reports are being submitted to APPCB regularly. iii) The AAQ and ambient noise monitoring results during April 2022 to September 2022 are presented in the Six-Monthly Environmental Monitoring Report enclosed.

10	The Port shall take all measures including latest available technologies to comply with above ambient air quality standards	**Complied.** Krishnapatnam Port is undertaking considerable number of measures for emission control. Significant among them are as follows: (a) Installation and operation of Mechanical Dust Suppression System (MDSS with 248 Nos. of sprinklers at coal stacking and wagon loading areas. (b) 12 Nos. of Truck mounted sprinklers for roads and transit areas. (c) 8 Nos. of heavy duty Atomized Sprayers (d) Deploying Hoppers for cargo unloading. (e) Mechanized coal handling at 2 berths within the land so far transferred on lease by GoAP. Conveyors are designed with covering hood. (f) Developed paved roads and deployed road sweeping machines. (g) Covering of coal transport vehicles destined beyond port and wagons with Tarpaulins. (h) Trucks carrying coal for inter carting are doused with water spray. (i) Developed wind breaking shield on western side of FTP 1 coal storage yard. Construction of wind shield at two more locations is completed. (j) So far in an area of more than 191.5 Ha of Green belt has been developed along port boundary, around coal yards, avenue& median plantations. (k) Monitoring of AAQ at 7 locations through NABL accredited & MoEF&CC approved agency. (l) Commissioned 3 Nos. CAAQM equipment & linked to APPCB website. We are committed to implement measures as required to ensure compliance of AAQ norms.
11	The Port shall not increase the capacity beyond the permitted capacity mentioned in this order, without obtaining CFE & CFO of the Board.	**Noted and being complied**
12	Coal stack heights in all coal yards shall not be more than 12mts.	**Noted and being complied**
13	The port shall ensure required wetness all the time on the surface of stockpiles to avoid the dust emissions from the stock piles.	**Noted and being complied**

14	The port shall install sufficient number of CAAQM stations in between the villages and the port area. The stations shall be located at the periphery of the villages to monitor all the parameters given in the consent order.	**Complied.** Commissioned 3 Nos. of CAAQM Stations at the periphery of Gopalapuram, Thamminapatnam and Krishnapatnam Villages and the same is linked to APPCB website.
15	The port shall maintain properly the three CAAQM stations provided and shall be connected to APPCB website	**Noted and being complied**
16	Unloading of iron ore from the railway wagons house should be carried out with wagon tipplers only, in case, handling of iron ore is more than 6 MTPA. As and when iron ore handling is to be done intermittently, it should be handled with water sprinkling system at high pressure with swiveling type nozzles operated regularly to cover entire stockpile. Nozzles shall be operated along stockpile at regular Intervals to cover stockpile height and width.	**Noted.** Iron ore handling is intermittently taking place. Mechanization of iron ore handling shall be resorted to once exports exceed 6 MTPA. Dust suppression measure by means of regular water sprinklers is being followed.
17	The port shall take adequate air pollution control measures with respect to the enhanced dusty materials handling capacities.	**Noted and complied**
18	The port shall stock all the dusty materials with in the designated storage yards only.	**Noted and complied**
19	The port activities are concentrating in north quay by construction of 12th Berth, hence the stocking of dusty materials shall not be extended towards the residential areas around the port area.	**Noted and complied**
20	The dusty materials transporting vehicles shall be closed in all respects/ covered with tarpaulin for controlling fugitive emissions.	**Noted and complied**
21	The port shall provide wheel washing facility near the dusty cargo stocking area, to the freighted vehicles going outside the port.	**Noted and complied**
22	The port shall inform the modifications made in port infrastructure developments to the MoEF&CC and to the Board time to time.	**Noted and complied**
23	The port shall obtain EC for any change of scope of the project and shall restrict the port activities as permitted vide EC Orders Dt.26.07.2006 for Phase - I, 13.11.2009 for Phase - II & Phase-III (Expansion) 11.01.2021.	**Noted and complied**
24	The port shall continuously operate the 3 CAAQM stations installed in between villages and port area to monitor all the parameters given in the consent order and upload the data continuously to the APPCB / CPCB websites.	**Noted and complied**
General		
25	The MDSS system shall be in operation wherever the stock of any bulk material (Dusty cargo) is piled in a way to ensure wetness on the surface of stock piles.	**Noted and complied**
26	As regards to deviation in location of facilities such as stock piles and other facilities, from the originally envisaged plan, amendments for the EC and CFE have to be obtained immediately.	**Noted**
27	The port shall maintain the existing green belt with adequate width and density and in vacant places	**Complied.** As required entire Greenbelt area of 191.5 Ha has been developed along port boundary, around coal yards, avenue & median plantations.
28	The port shall use road sweeping machines to clean all port internal roads regularly.	**Complied.**

29	The port shall ensure that the trucks transporting cargos to outside the port shall be covered with tarpaulin to avoid fugitive emissions / spillages.	**Complied.**
30	All conveyor belts and other transfer points shall be covered with GI sheets to mitigatevfugitive emissions generated during conveying of dusty cargos.	**Complied.** Transfer tower points haves been covered using GI sheets with openings as required for access and sprinklers have been installed for dust suppression. Fixing hoods to the conveyor is completed.
31	The port shall maintain water sprinklers for effective control of fugitive emissions generated during handling of cargo and increased volume of vehicular traffic.	**Complied.**
32	The port shall maintain Mechanical Dust Suppression System (MDSS) for stock yards, dusty cargo berths and conveyor belts.	**Complied.**
33	The port shall develop and maintain 100 m width greenbelt along the periphery & 20 m width around coal stack yards as per EC/CFE condition	**Complied.** a) As required entire Greenbelt area of 191.5 Ha has been developed along port boundary, around coal yards and block plantation, avenue & median plantations. b) Causalities replacement of existing plantation areas also in progress c) Upon transfer of salt land by GoAP, Green belt development along boundary near Krishnapatnam and Gopalapuram villages will be undertaken on priority. Near Chalivendra village due to site limitation green belt has been developed both along the boundary and also on opposite side along the road, pending transfer of forest lands.
34	The port shall maintain empty dusty cargo vehicles washing system to clean dusty cargo empty vehicles.	**Noted and complied**
35	The port shall record the energy consumption for the energy meters provided for Sewage Treatment Plant (STP), pump houses to water sprinklers / dust suppression measures and Air Pollution Control Equipments (APCE)	**Noted and complied**
36	The port shall not allow any hazardous wastes through the port other than waste oil from DG Set, Waste oil from Ship, Wastes / residues containing oil from ships, used oil generated in the Port without prior permission of Board and shall comply with EC conditions.	**Noted and complied**
37	The port shall not store any hazardous waste within the premises a per the time frame mentioned in HWM Rules.	**Noted and complied**
38	In case a leaky container of hazardous cargo is found, a separate permission of the Board may be obtained after establishing the quality and the type of waste for disposal	**Noted**
39	All types of the fertilizers should be stored in the closed warehouses only. The Port should ensure that there should not be any open storage of urea or any other fertilizer materials. There shall not be any effluent generation	**Noted and complied**
40	The port shall store fuel oils used for construction equipment, vessels and vehicles in a well-designed manner	**Noted and complied**

	and protect them against fire hazards by construction of compound wall to prevent access to unauthorized elements. The surface run off from storage area shall pass through oil water separator before being discharged.	
41	The port shall provide fire detection and firefighting facilities with adequate water storage in fire prone areas in consultation with Directorate of firefighting.	**Noted and complied**
42	The port shall comply latest technologies for controlling fugitive emissions including the following: 1. Fully mechanized handling equipment for loading and unloading operations 2. Closed conveyor belt with water sprinkling arrangement for suppression of dust while conveying dusty cargoes like coal, iron ore etc. 3. Specially designed iron ore ship loader with necessary precautions to reduce drop height of iron ore into the ship. 4. Mechanical water sprinkling shall be provided on roads and at dusty cargo storage areas for suppression of dust.	**Complied** Coal ship unloaders and conveyer systems are provided at three berths. Water sprinkler system has been providing in ship unloaders and conveyer system for dust suppression. GI sheet covering has been provided for all transfer towers and Conveyor. Iron ore handling is intermittently taking place. Mechanization of iron ore handling shall be resorted to once exports exceed 6 MTPA. Dust suppression measure by means of regular water sprinklers is being followed. 248 Nos mechanized sprinklers are being operated in coal storage yards and 10 Nos mobile tankers and 3 Nos heavy duty atomizer sprayers are being deployed.
43	The port shall maintain adequate number of ground water monitoring location on scientific basis and the same shall be monitored every six months.	**Complied.** Ground water monitoring is being carried out at 4 locations envisaged in the EMP and six-monthly reports are being regularly submitted to APPCB.
44	The port shall construct the storm water drains to avoid the contamination of runoff with other effluents.	**Complied.** Adequate storm water drains are provided in operational areas.
45	The port shall regularly clean the drains to avoid siltation.	**Complied.** Drains are cleaned regularly to avoid siltation
46	The port shall monitor compliance through Environment Management Cell with qualifies and trained staff	**Complied**
47	The port shall maintain onsite emergency action plan after carrying out risk analysis and HAZOP studies.	**Complied.** a) Onsite emergency plan has been prepared and submitted to District Collector for incorporating with Offsite emergency plan of District magistrate HIRA (Hazard Identification and Risk Assessment) has been done for all operations in the port.
48	The port shall comply with the conditions of CFE order dated 08.05.2010, 22.02.2018 and 25.2.2021.	**Complied**
49	The port shall submit monthly monitoring reports to RO: Nellore	**Complied.** Monthly monitoring reports are being submitted to APPCB Nellore regularly.

50	The port shall comply with standards and directions issued by APPCB / CPCB / MoEF&CC as and when notifications are issued from time to time.	**Noted** All directions issued by APPCB are being scrupulously followed.
51	The port shall install digital display boards at publicly visible places at the main gate indicating the products manufactured Vs permitted quantities, Treated effluent concentrations Vs discharge standards, Stack emission & AAQ concentrations Vs standards, hazardous waste generation, disposed, stock Vs permitted quantities and validity of CFO; and exhibit the CFO order at a prominent place in the factory premises, as per Hon'ble Supreme Court order	**Noted and being complied.** Publicly visible board is placed and updated regularly. Setting up of digital display board is in process
52	The port shall submit Half yearly compliance reports to all the stipulated conditions in Environmental Clearance (EC), Consent for Establishment (CFE) and Consent for Operation (CFO) through website i.e., https://pcb.ap.gov.in by 1st of January and 1st July of every year. The first half yearly compliance reports shall be furnished by the industry and second half yearly compliance reports shall be the audited through MoEF&CC recognized and National Accreditation Board for Laboratory Testing (NABL) accredited third party.	**Being Complied** Last compliance report submitted on 30.06.2022
Special conditions		
53	The port shall possess valid NOC issued by the Andhra Pradesh State Disaster Response and Fire Service Dept., (APSDRFSD) and submit a copy at concerned Regional Office, APPCB.	**Complied**
54	The port shall prepare a safety report and carry out an independent safety audit report of the respective industrial activities including chemical storages / isolated storages by an expert not associated with such industrial activity as required under Rule 10 of MSIHC Rules, 1989 and get it approved by the Factories Dept., and submit the compliance along with copy of the safety report, safety audit report and safety certificate at concerned Regional Office, APPCB.	**Complied**
55	The port shall extend training to the working personnel for the prevention of accidents and necessary antidotes to ensure safety, as per the MSIHC Rules, 1989	**Complied**
56	The port shall carryout calibration of safety equipment and leak detection systems at regular intervals and shall certify the same with the Factories Department. That certified copy shall be submitted to the APPCB, Regional Office.	**Complied**
57	The port shall install fluorescent Wind Vane at the highest point in the industry premises.	**Complied**
58	The port shall submit Risk analysis and risk assessment covering worst scenario clearly describing impact within the industry premises and outside the industry premises and emergency response system.	**Complied**
59	The port shall submit the copy of the safety audit report and On-Site / Off Site Emergency Plans as applicable after being certified by the Factories Department to the APPCB, Regional Office from time to time, if the storage quantity of hazardous chemicals is equal to or, in excess of the threshold quantities specified in schedule 2 & 3 of MSIHC Rules, 1989	**Complied**
Schedule C		
1	The authorized person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.	**Noted**

2	The authorization or its renewal shall be produced for inspection at the request of an officer authorized by the State Pollution Control Board.	**Noted and complied**
3	The person authorized shall not rent, lend, sell, transfer, or otherwise transport the Hazardous and other wastes except what is permitted through this authorization.	**Noted**
4	Any unauthorized change in personnel, equipment or working conditions as mentioned in the application by the person authorized shall constitute a breach of his authorization	**Noted**
5	The person authorized shall implement Emergency Response Procedure (ERP) for which this authorization is being granted considering all site-specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;	**Noted**
6	The person authorized shall comply with the provisions outlined in the Central Pollution Control Board guidelines on "Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty".	**Noted**
7	It is the duty of the authorized person to take prior permission of the State Pollution Control Board to close the facility.	**Noted**
8	An application for the renewal of an authorization shall be made as laid down under these Rules.	**Noted**
9	Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.	**Noted**
Specific conditions		
10	The port shall comply with the provisions of HWM Rules, 2016 in terms of interstate transport of Hazardous Waste and manifest document prescribed Under Rule 18 and 19 of the HWM Rules, 2016.	**Complied**
11	The port shall not store hazardous waste for more than 90 days as per the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.	**Being complied**
12	The port shall store Used / Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal to the manufacturers / dealers on buyback basis.	**Being complied**
13	The industry shall transport the hazardous waste to cement industries only through vehicle fitted with GPS tracking system.	**Being complied**
14	The industry shall maintain 7 copy manifest system for transportation of waste generated and a copy shall be submitted to concerned Regional Office of APPCB. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter should carry a Transport Emergency (TREM) Card	**Complied.** Waste oil generating from the port is being disposed through APEMC Portal authorized vendors.
15	The industry shall maintain proper records for Hazardous and Other Wastes stated in Authorization in Form-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form-4 as per Rule 20 (2) of the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.	**Being complied**

16	Annual return shall be filed by June 30th for the period ensuring 31st March of the year.	**Complied**

ANNEXURE-A

ADANI KRISHNAPATNAM PORT LIMITED

Ports and Logistics

ENVIRONMENTAL MONITORING REPORT

FOR THE PERIOD

APR'22 to SEP'22

Prepared By

M/s. SV ENVIRO LABS & CONSULTANTS

(MOEF Recognized, NABL & NABET Accredited And
ISO 9001, 14001 & OSHAS 18001 Certified Laboratory)
Enviro House, B1, Block-B, Autonagar, Visakhapatnam -12

TABLE OF CONTENTS

CHAPTER – 1

INTRODUCTION

1.0 INTRODUCTION

Adani Krishnapatnam Port is located at Krishnapatnam in Muthukur Mandal, "Sri Potti Sri Ramulu" Nellore District, Andhra Pradesh on the East Coast of India at Latitude $14^{0}15'10"$ N and Longitude 80^{0} 08' 05" E on the Northern bank of Khandaleru (Upputeru). Krishnapatnam Port is situated at about 180 Km North of Chennai (Madras) Port.

The Environmental Clearance (EC) was accorded for the Phase – I development of this Port by the MoEF, GoI vide lr no. 10-22/2005-IA-III dated: 26th July, 2006 and the CFE was accorded by the APPCB vide Order No. APPCB/VJA/NLR/633/HO/2004/9 - 467 dt. 25.05.2004. The Phase - I facility was commissioned during the year 2009.

For the Phase II development of this Port, the Environmental Clearance has been accorded by the MoEF, GoI vide F. No. 11 – 62 / 2009 – IA.III dated: 13th November, 2009 and MoEF&CC extended vide Oder even No. dated 18.08.2015 & 16.04.2018 and amended by MoEF&CC vide order dt 16.3.2016. The CFE accorded by the APPCB vide Order No. 633/PCB/CFE/RO-NLR/HO/2010-390 dt. 08.05.2010 is extended vide APPCB Order dt 02.07.2015 and amended vide APPCB's Orders dt. 14.03.2014, 02.07.2015, 10.02.2016, 04.01.2017 & 22.02.2018.

The CFO has been accorded by the APPCB vide Order No. APPCB/VSP/VJA/NLR/633/CFO/HO/2009-582 dt. 08.06.2009 and same is being periodically renewed. The APPCB has accorded latest CFO renewal Order, vide APPCB's Order No. APPCB/VJA/NLR/11344/CFO/HO/2018 dt. 29.07.2018 & 30.08.2018 which is valid till 31st October, 2023. Further, it is amended for additional one berth and increased coal cargo capacity from 46.5 MTPA to 51 MTPA. As of now, 12 berths are operational with necessary infrastructure with capacity to handle 68 MTPA of non-container cargo and 2.0 MTEUsPA of container cargo are commissioned and being operated.

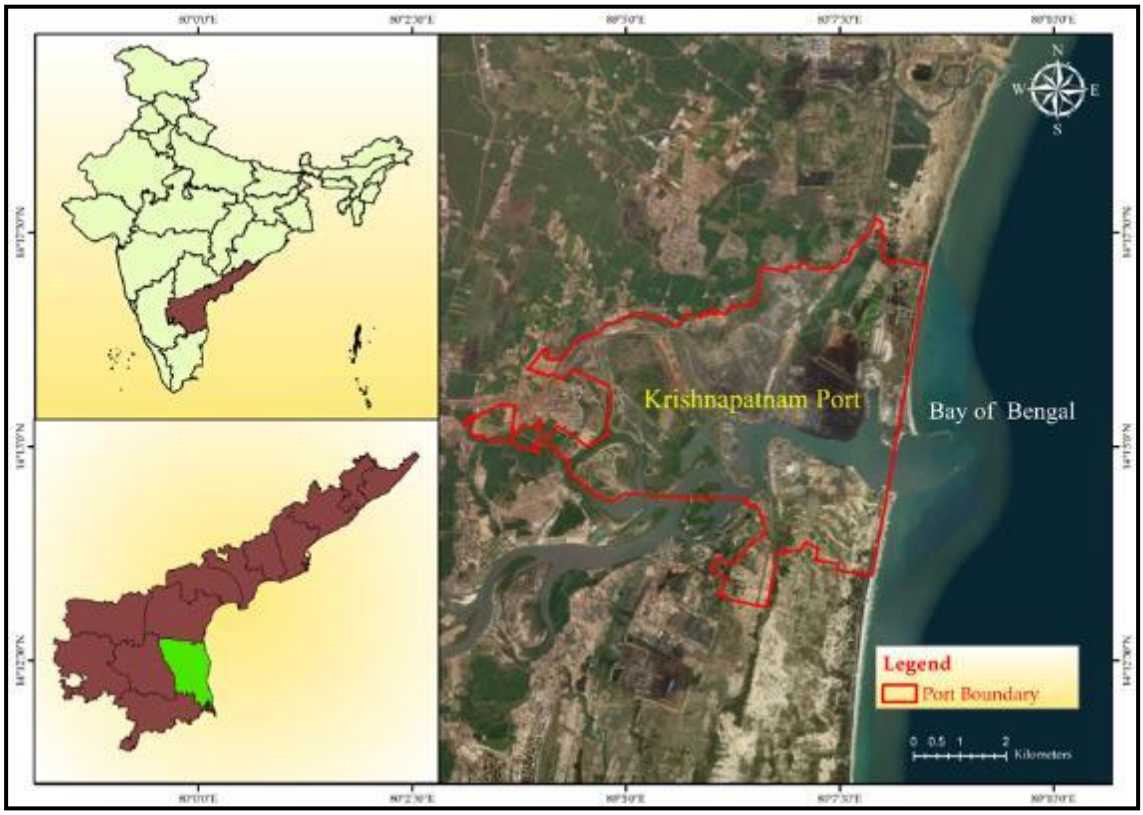
Adani Ports and Special Economic Zone (APSEZ), a part of globally diversified Adani Group, the largest port developer and operator in India. APSEZ acquired KPCL from CVR Group and other investors and changed to Adani Krishnapatnam Port Limited (AKPL).

MoEF&CC granted Environment & CRZ clearance for the "Expansion of Krishnapatnam Port (Phase-III)" vide File No: 1018/2016-IA.III dated 11.01.2021, the project comprising of 16 berths including 3 jetties for liquid cargo and 3 SBMs in deep waters to cater 150.2 MTPA of various types of cargo and 1.1 MTEUsPA of container cargo with dredging of 60 Million cum. AKPL obtained CFE vide order no. 633/APPCB/CFE/RO-NLR/HO/2010 dated 25.02.2021The general Layout plan of the Krishnapatnam Port Phases I, II & III development is shown in this report.

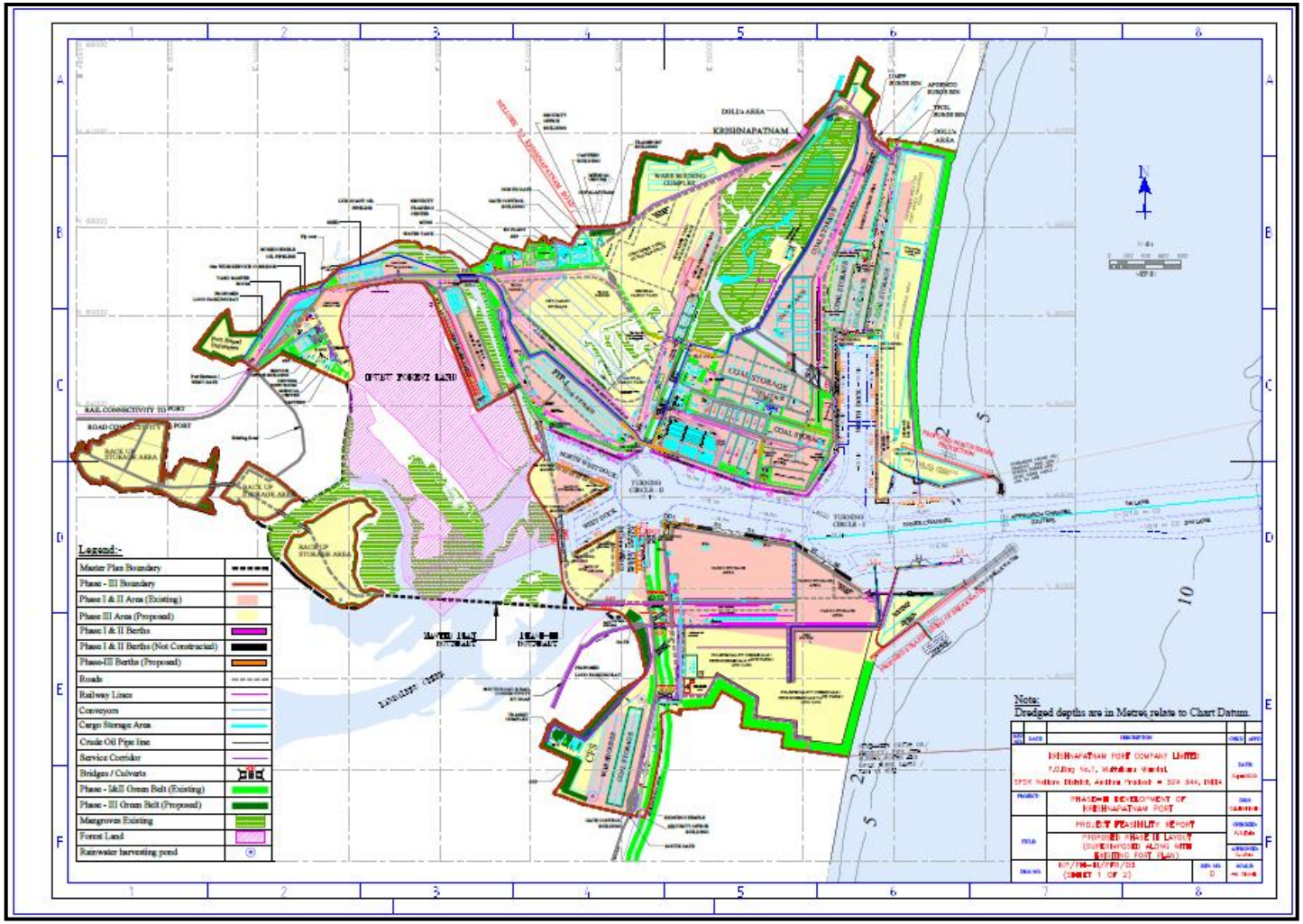
The Environmental Management Plan (EMP) envisaged in the Environmental Impact Assessment (EIA) Report is being scrupulously implemented and augment as needed. Monitoring of Environmental parameters viz., Ambient Air, Ambient Noise, Water Quality (Ground, Surface & Marine), Marine Ecology and Soil as envisaged is being undertaken regularly through an agency having NABL accreditation and approved by MoEF&CC. The

results of monitoring comply with the statutory standards. Periodical Reports with results of monitoring thereof are being regularly submitted regularly to the APPCB and the MoEF&CC, RO as stipulated in the EC/CFE/CFO accorded.

Location Map



ADANI KRISHNAPATNAM PORT LAYOUT



CHAPTER – 2

SCOPE OF WORK

2.0 SCOPE OF WORK

The scope of the baseline studies include monitoring of the following environmental components

1. Ambient Air Quality
2. Marine Water
3. Marine Sediment
4. Noise Level Intensity
5. STP Inlet & Outlet
6. DG Set Emission Quality
7. Ground Water Quality Monitoring
8. Soil Quality

The parameters covered under the scope for each of the above attributes are given below:

SCOPE OF WORK

S.No	Attribute	Scope	Frequency
1.	Ambient Air Quality	Sampling of ambient air at 07 stations for analyzing the following parameters: • PM10 • PM2.5 • SO2 • NOx • NH_3	Monthly Once at each location
2.	Marine Water	Collected at four locations and analyzed the following parameters : • pH • Temperature • Salinity • Density • Turbidity • Total Dissolved solids • Total Suspended solids • Potassium • COD • BOD • Oil & Grease • D.O • Nitrates • Nitrites • Ammonia • Phosphates • Chlorides • Sodium • Sulphates • Silicates • Reactive Silica	Weekly Once at each location

		• Total Phosphorus • Total Nitrogen • Primary Productivity • Chlorophyll • Phytoplankton • Zooplankton • Heavy Metals	
3.	Marine Sediment	Collected at four locations and analyzed for • Sediment Compositions • pH • Nitrogen • Phosphorus • Potassium • Sodium • Benthos Communities • Heavy Metals	Weekly Once at each location
4.	Noise Level Monitoring	Collected at seven locations • Day Leq in dB(A) • Night Leq in dB(A)	Once in a month
5.	STP Inlet and Outlet	• pH • Total Solids • Total Suspended Solids • COD • BOD • Oil & Grease	Once in a month
6.	DG Set Emission Quality	• PM • NOx • HC • CO	Once in six months
7.	Ground Water Quality Monitoring	Collected at Four locations • pH • Electrical Conductivity • Total Dissolved solids • Total alkalinity • Chlorides • Sodium • Potassium • Fluorides • Nitrates • Cyanide • Total Hardness • Salinity	Once in six months

		• Sulphates • COD • Mercury • Cadmium • Arsenic • Selenium • Iron • Lead • Zink • Chromium • Total Coliforms • Fecal coliforms	
8.	Soil Quality Monitoring	Collected at Four locations • pH • EC • Texture • Available Nitrogen • Available Phosphorous • Available Potassium • Exchangeable Sodium • Exchangeable calcium • Exchangeable Magnesium • SAR • Water Soluble Chlorides • Organic Carbon • Lead • Cadmium • Copper • Zinc	Once in six months

CHAPTER – 3

METHODOLOGY

3.0 METHODOLOGY

Methodologies adopted for sampling and analysis for each of the above parameters are detailed below. Methods of monitoring and analysis for various parameters

S.No	Attributes	Measurement Technique		
1.	**Ambient Air Quality**	PM_{10}	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part-XXIII)
		$PM_{2.5}$	Fine Particulate Sampler (Gravimetric method)	IS-5182 (Part-XXIV)
		Sulphur dioxide	Modified West and Gaeke	IS-5182 (Part-II)
		Oxides of Nitrogen	Jacob & Hochheiser	IS-5182 (Part-VI)
		NH3	Indophenol Blue Method	-
2.	**Marine Water**	APHA Methods 23rd Edition, 2017		
3.	**Marine Sediment**	ASTM Method		
4.	**STP Inlet and Outlet**	APHA Methods 23rd Edition, 2017		
5.	**Noise Level Intensity**	Digital Noise Level Meter – SL Lutron 4001		
6.	**DG Set Emission Quality**	IS : 11255 Measurement of Emission from Stationary Sources		
7.	**Ground Water Quality**	APHA Methods 23rd Edition, 2017		
8.	**Soil Quality**	IS:2720 & methods of soil analysis, part-1, 2nd edition, 1986 (American Society for Agronomy and Soil Science Society of America).		

CHAPTER – 4

ENVIRONMENTAL MONITORING STUDIES

4.0 ENVIRONMENTAL MONITORING STUDIES – Apr'22 to Sep'2022

S.No	ATTRIBUTE	SCOPE	STUDIES CARRIED OUT
1.	Ambient Air Quality	Collection of ambient air at Seven locations in and outside of port premises	Ambient Air samples collected at 7 locations for PM10, PM2.5, SO2, NOx & NH3 (monthly once) for the period of 01.04.2022 to 30.09.2022.
2.	Marine Water and Surface Water Quality	Collection of Marine Water at six locations. • Port Entrance (Approach Channel) • Turning Circle • Coal Berth • Reclamation Area (Mutable) • Buckingham Canal • Khandaleru Creek	Marine Water samples from Port Entrance, Turning Circle, Coal Berth and Reclamation Area are collection weekly once. Samples for Buckingham Canal and Khandaleru Creek are collected monthly once. All the samples are tested for Physical, Chemical and Microbiological parameters Collected for the period of 01.04.2022 to 30.09.2022.
3.	Marine Water Quality for Turbidity	Collection of Marine Water at seven locations. • Port Entrance (Approach Channel) • Turning Circle • Coal Berth • Reclamation Area (Mutable) • 14°19'26"N & 80°15'43"E	Marine Water samples from Port Entrance, Turning Circle, Coal Berth and Reclamation Area are collection weekly once. Deep Sea water Samples are collected monthly once. Collected for the period of 01.04.2022 to 30.09.2022.

		• 14°16'52"N &80°17'40"E • 14°16'11"N & 80°17'40"E	
4.	Marine Sediment	Collected at • Port Entrance (Approach Channel) • Turning Circle • Coal Berth • Reclamation Area (Mutable)	Collected at four locations and analyzed for the hereunder weekly once. • Sediment Compositions • pH • Nitrogen • Phosphorus • Potassium • Sodium • Benthos Communities • Heavy Metals Collected for the period of 01.04.2022 to 30.09.2022.
5.	Noise Level Intensity	Noise levels were noted at Seven locations inside and outside port premises.	Day and Night Noise levels were noted at • Zero Point • Thamminapatnam • CVR Building • Gopalpuram • Chalivendram • Krishnapatnam • Light House Siding Collected Noise Levels at seven locations for day and night periods once in the month from 01.04.2022 to 30.09.2022.

6.	DG Set Emission Quality	Emission Quality was conducted to DG Sets of port premises	Emission Quality was conducted to DG Sets of port premises, ie PM, NOx, HC & CO (Six months once) for the period of 01.04.2022 to 30.09.2022.
7.	Ground Water Quality Monitoring	Collected at • Port Site • Krishnapatnam village • South side of the port • Gopalapuram village	Ground Water samples from Port site, Krishnapatnam village, South side of the port, Gopalapuram village Bore wells water samples are collected half yearly once. All the samples are tested for Physical, Chemical and Microbiological parameters Collected for the period of 01.04.2022 to 30.09.2022.
8.	STP Inlet and Outlet	Inlet and Outlet samples are collected from STP at Port	STP Inlet and Outlet samples are collected monthly once. Collected for the period of 01.04.2022 to 30.09.2022.
9.	Soil Quality	Collection of Soil sample at Two locations. • Storage area towards west Buckingham canal • Storage area at Port	Soil samples from Storage area towards west, Storage area at Port Area are collection half yearly once. All the samples are tested for Physical, Chemical parameters. Collected for the period of 01.04.2022 to 30.09.2022.

4.1 METEOROLOGICAL DATA

Meteorological data was collected on hourly basis by installing an auto weather monitoring station at Plant site in project office building. The report depicted hereunder represents the data for study period (01.04.2022 to 30.09.2022.)

The following parameters were recorded

- Wind speed
- Wind direction
- Temperature
- Relative humidity
- Rainfall

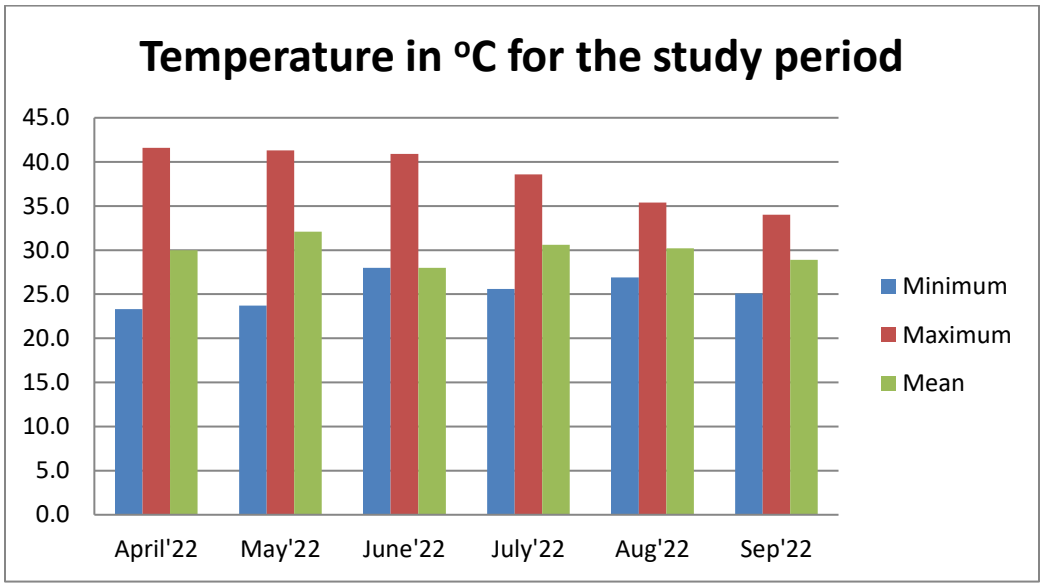
MINIMUM AND MAXIMUM VALUES OF RELATIVE HUMIDITY, TEMPERATURE AND RAINFALL DURING STUDY PERIOD (01.04.2022 to 30.09.2022.).

Temperature in ^{o}C	April'22	May'22	June'22	July'22	Augt'22	Sep'22
Minimum	23.3	23.7	28.0	25.6	26.9	25.1
Maximum	41.6	41.3	40.9	38.6	35.4	34.0
Mean	30.0	32.1	28.0	30.6	30.2	28.9

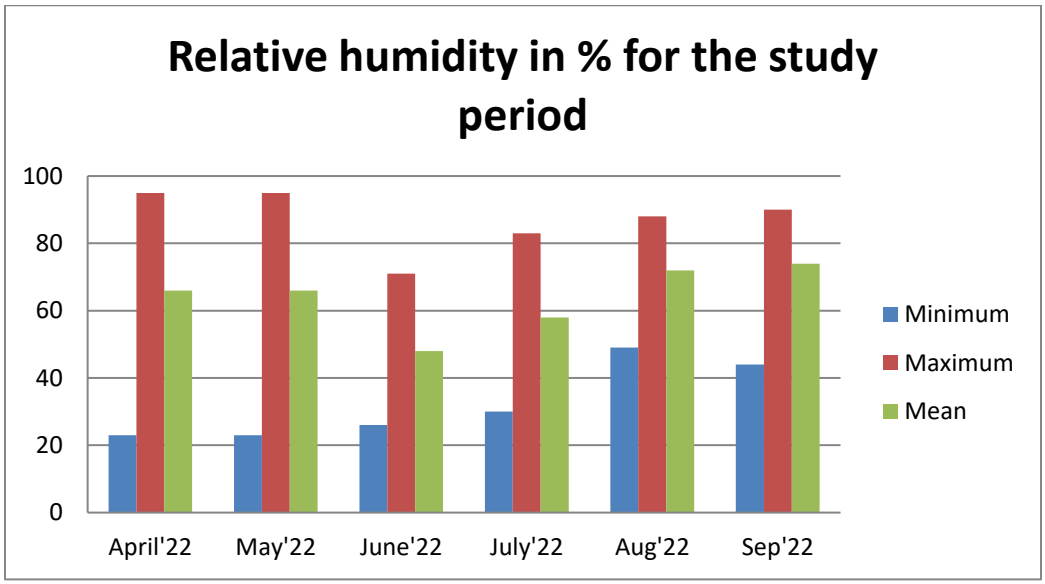
Relative Humidity %	April'22	May'22	June'22	July'22	Augt'22	Sep'22
Minimum	23	23	26	30	49	44
Maximum	95	95	71	83	88	90
Mean	66	66	48	58	72	74

Rainfall in mm	April'22	May'22	June'22	July'22	Augt'22	Sep'22
Minimum	0	0.1	0.1	0.1	0.1	0.1
Maximum	0	8.08	1.27	0.89	5.1	6.4
Cumulative	0	50.9	6.76	17.2	48.5	66.7

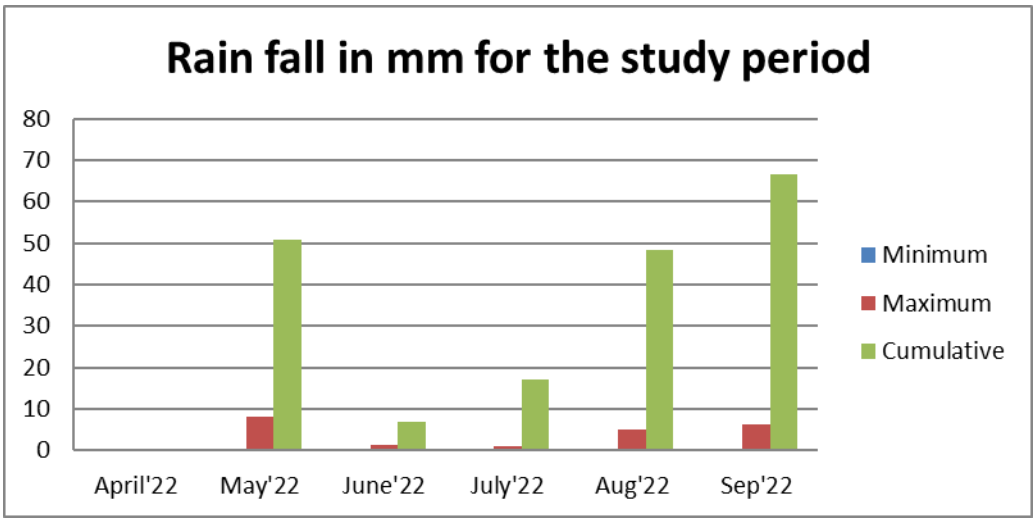
Graphical interpretation of Minimum and Maximum values of and Temperature during study period.



Graphical Interpretation of Minimum and Maximum values of Relative Humidity during study period.



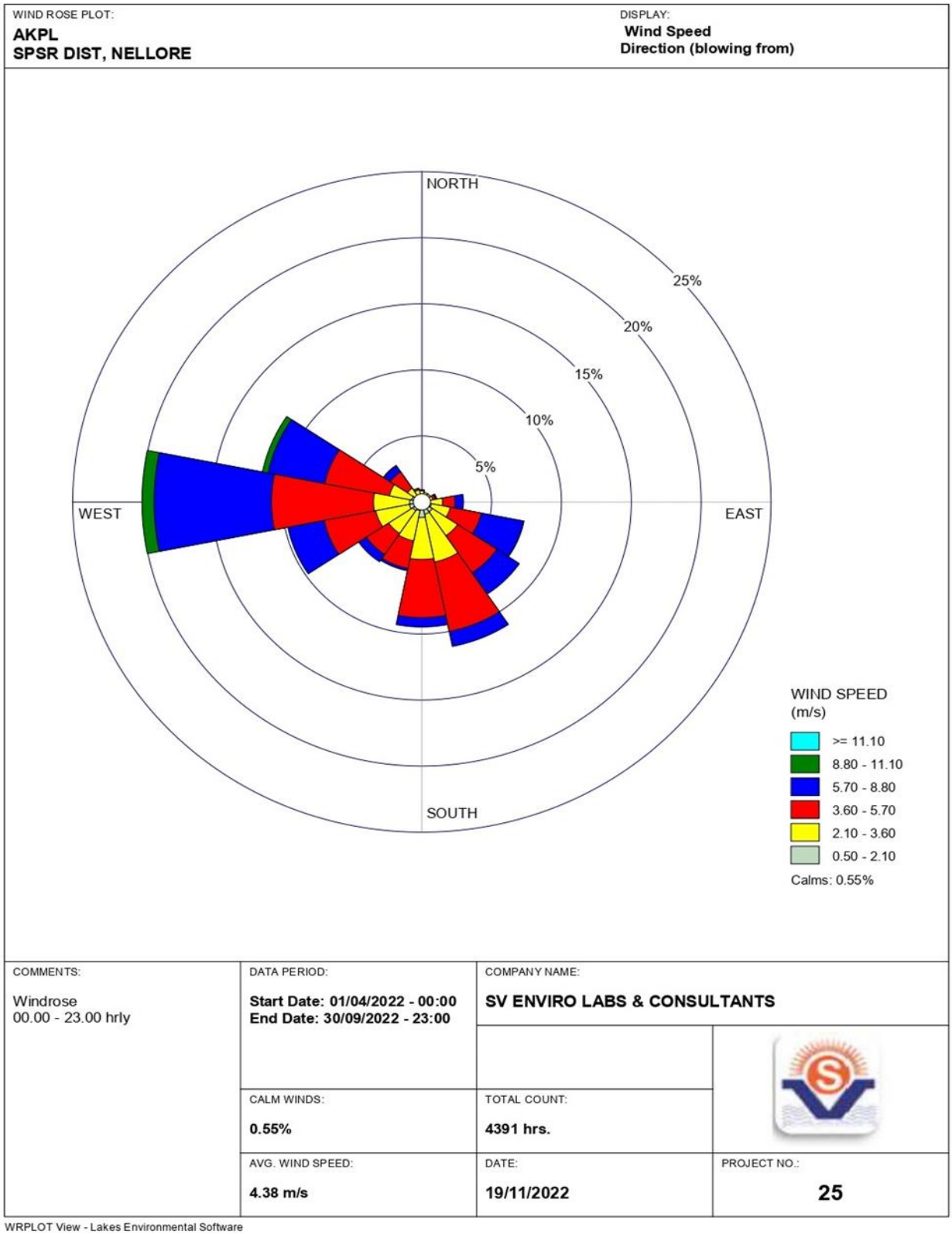
Graphical Interpretation of Minimum and Maximum values of Rainfall during study period.



WIND PATTERN – (April'22 – September'22).

Predominant Wind directions	Distribution in Percentage
ENE	17.1 %
E	11.6%
NE	10.1%
ESE	9.5%

Wind rose diagram for 00.00 – 23.00 hrs (24hrly)



4.2 AMBIENT AIR QUALITY MONITORING

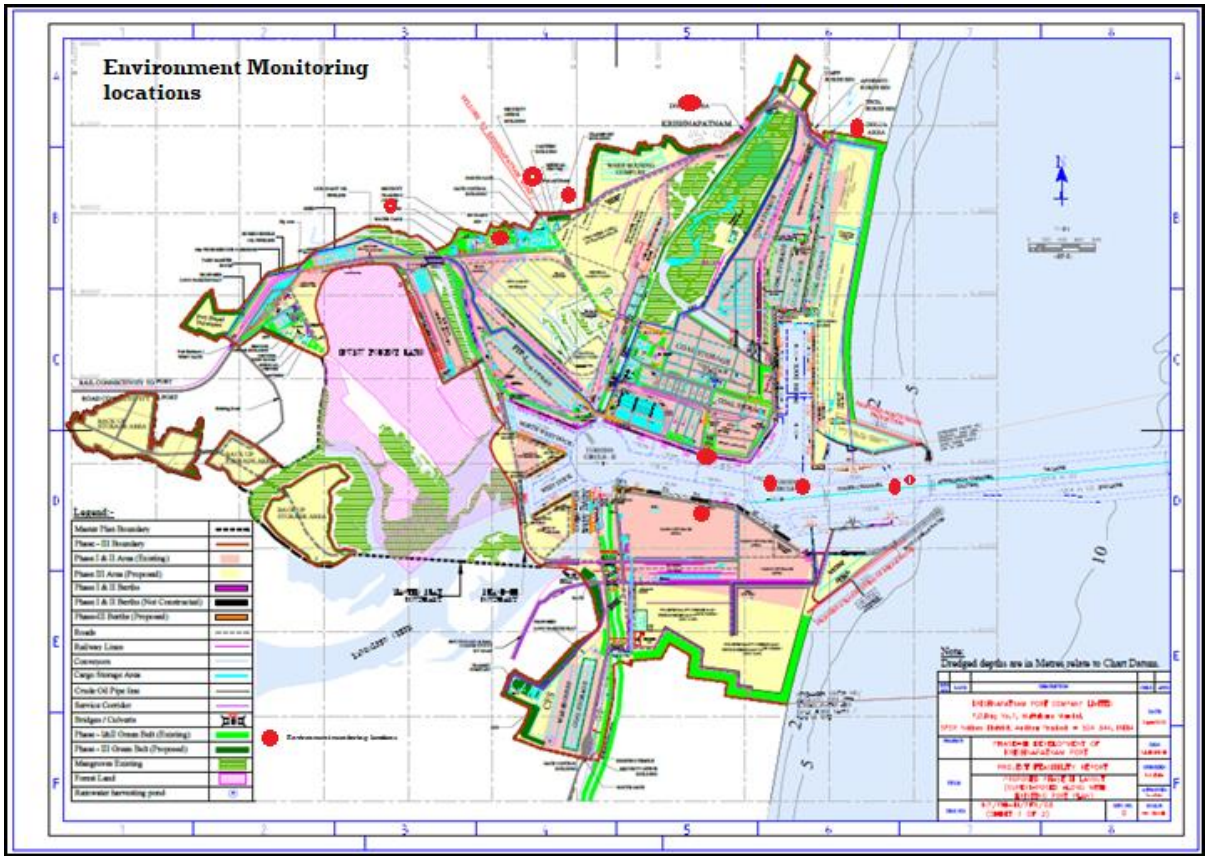
The ambient air quality was assessed through a network of 07 AAQM stations within 10 Km radius of project site (5 stations in buffer zone &2 location inside plant area).

The locations of ambient air quality stations given below:

DETAILS OF AMBIENT AIR QUALITY MONITORING LOCATIONS

Station code	Location	Direction w.r.t. Project site	Environmental setting
A1	At Zero Point	W	Industrial
A2	At Thamminapatnam Village	S	Industrial
A3	At CVR Building	WNW	Residential
A4	At Gopalpuram Village	NW	Residential
A5	At Chalivendram	WNW	Residential
A6	At Krishnapatnam	NNW	Residential
A7	At Light House	SW	Residential

AMBIENT AIR SAMPLING STATIONS LOCATION MAP



Summary of Analysis of Ambient Air Quality in the Study Area at A1 –Zero Point for the period of April'22 to Sep'22

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_2 (µg/m^3)	NH3 (µg/m^3)
April'22	57.6	23.1	11.6	13.5	BDL
May'22	59.2	25.3	12.4	14.6	BDL
June'22	56.4	23.2	11.8	13.6	BDL
July'22	53.8	21.4	10.6	12.2	BDL
Aug'22	57.6	24.9	12.1	14.2	BDL
Sep'22	55.0	23.0	11.4	13.2	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area at A2 –Thamminipatnam for the period of April'22 to Sep'22

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	57.6	23.1	11.6	13.5	BDL
May'22	59.2	25.3	12.4	14.6	BDL
June'22	56.4	23.2	11.8	13.6	BDL
July'22	53.8	21.4	10.6	12.2	BDL
Aug'22	57.6	24.9	12.1	14.2	BDL
Sep'22	55.0	23.0	11.4	13.2	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area at A3 –CVR for the period of April'22 to Sep'22

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	67.6	27.8	15.5	16.9	BDL
May'22	64.1	25.4	14.3	15.8	BDL
June'22	61.6	24.0	13.2	14.4	BDL
July'22	63.2	24.8	14.1	15.2	BDL
Aug'22	60.1	23.1	12.8	14.6	BDL
Sep'22	64.9	24.2	13.9	15.6	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area at A4 –Gopalpuram for the period of April'22 to Sep'22

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	57.4	22.7	11.5	13.0	BDL
May'22	60.2	24.5	12.6	13.8	BDL
June'22	57.8	22.6	11.7	12.9	BDL
July'22	54.6	21.2	10.8	11.9	BDL
Aug'22	56.2	23.1	12.4	13.3	BDL
Sep'22	52.2	21.3	11.9	12.0	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area at A5 –Chalivendram for the period of April'22 to Sep'22.

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	55.9	21.8	12.6	13.5	BDL
May'22	58.6	23.4	13.5	14.7	BDL
June'22	54.6	21.8	12.4	13.2	BDL
July'22	52.4	19.6	11.2	12.8	BDL
Aug'22	55.1	20.9	12.1	13.8	BDL
Sep'22	51.4	19.0	11.6	12.4	BDL
NAAQS Standards	100	60	80	80	400

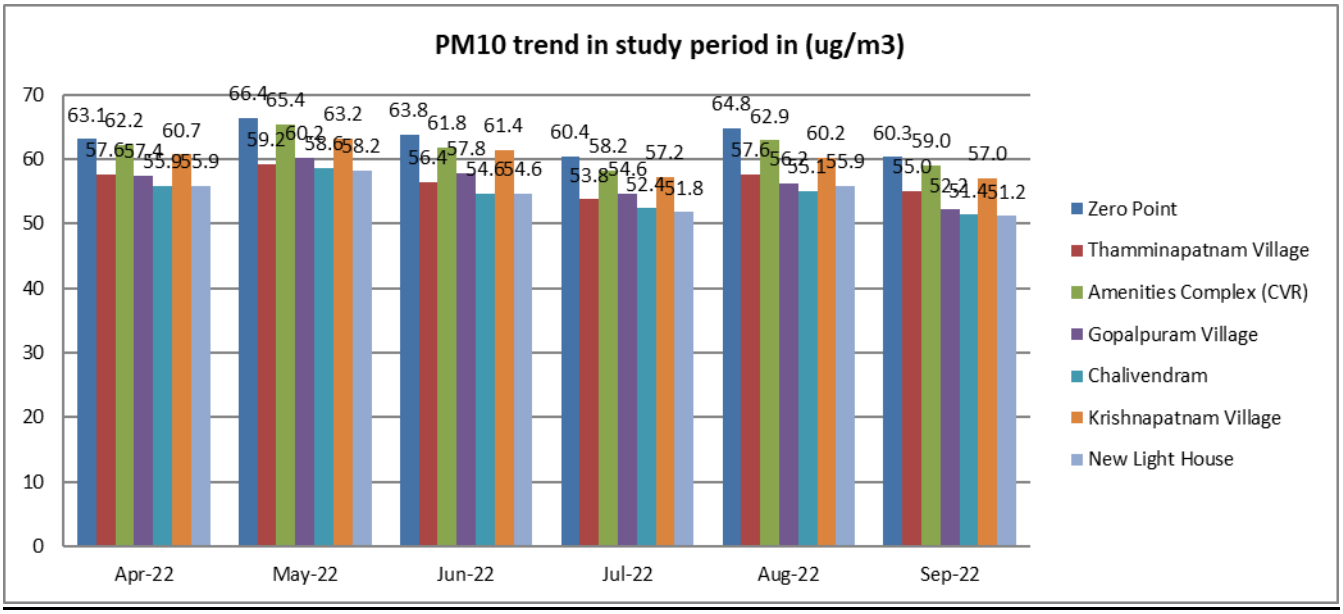
Summary of Analysis of Ambient Air Quality in the Study Area at A6 –Krishnapatnam for the period of April'22 to Sep'22

	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	60.7	24.6	13.8	15.1	BDL
May'22	63.2	26.1	14.6	16.0	BDL
June'22	61.4	24.8	13.5	14.6	BDL
July'22	57.2	22.4	12.0	13.5	BDL
Aug'22	60.2	23.6	12.8	13.7	BDL
Sep'22	57.0	22.3	11.9	12.3	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area at A7 –Light House for the period of April'22 to Sep'22

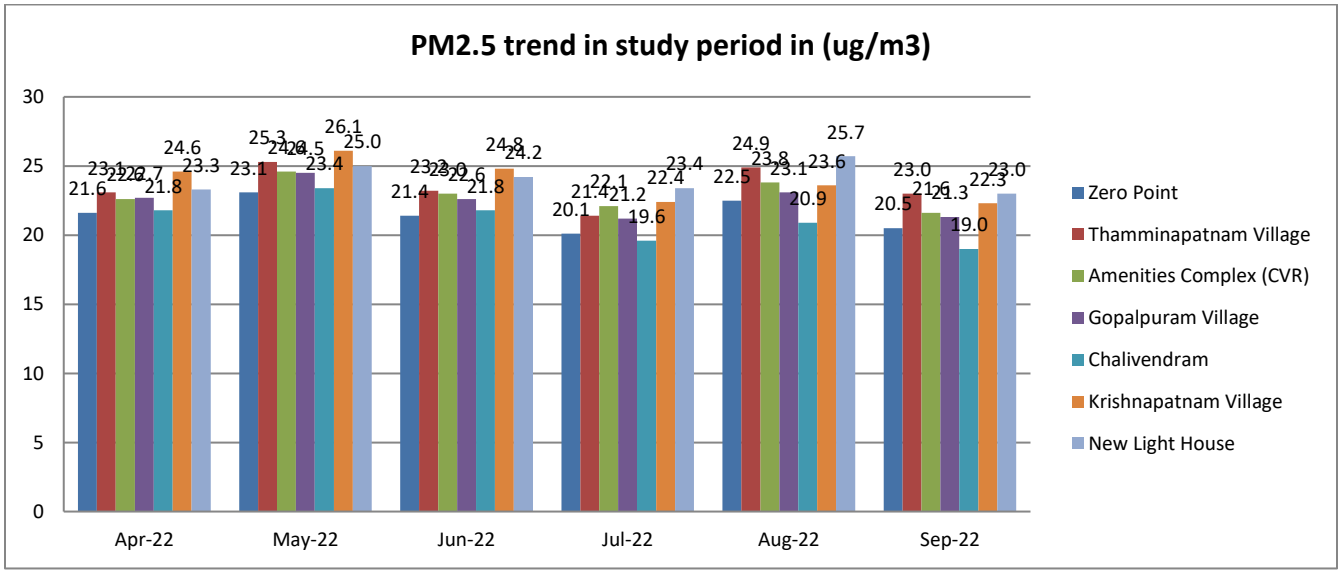
	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_X (µg/m^3)	NH3 (µg/m^3)
April'22	55.9	23.3	10.6	13.1	BDL
May'22	58.2	25.0	11.4	14.1	BDL
June'22	54.6	24.2	10.8	13.4	BDL
July'22	51.8	23.4	9.6	12.2	BDL
Aug'22	55.9	25.7	10.5	13.2	BDL
Sep'22	51.2	23.0	9.8	12.0	BDL
NAAQS Standards	100	60	80	80	400

Summary of Analysis of Ambient Air Quality in the Study Area – PM10 for April'22 to Sep'22



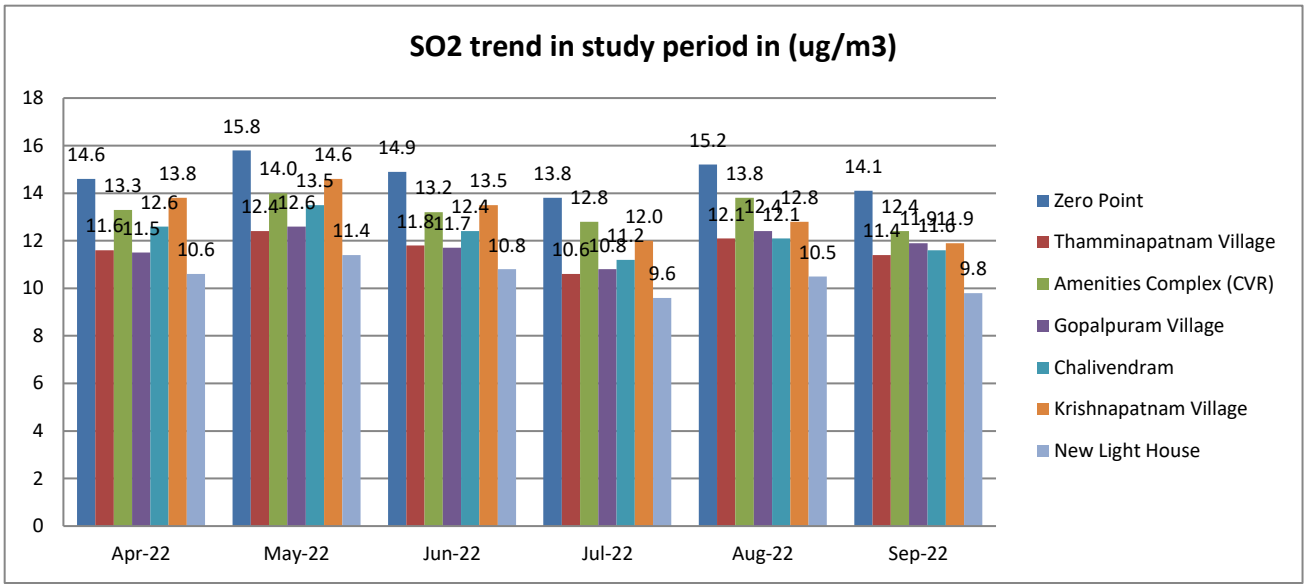
- ***PM10 varied between 51.2 to 66.4 µg/m,3 Minimum: New Light House***
- ***Maximum: CVR, NAAQ Standard: 100µg/m³***

Summary of Analysis of Ambient Air Quality in the Study Area – PM2.5 for April'22 to Sep'22



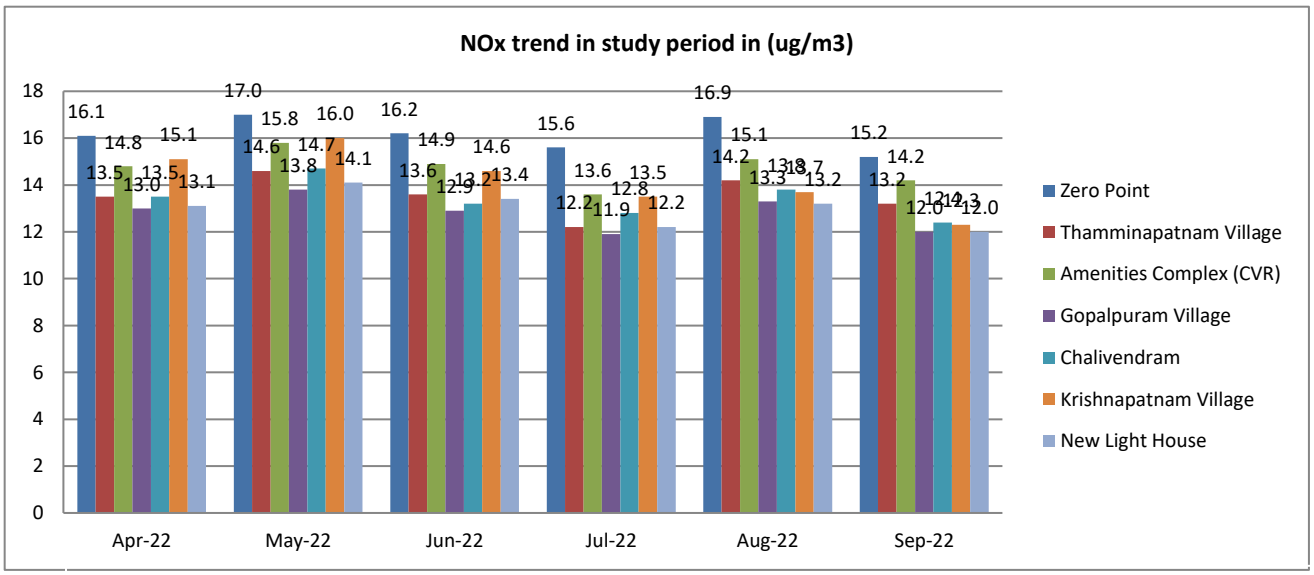
- ***$PM_{2.5}$ Varied between 19.0 to 26.1 µg/m3, Minimum: Chalivendram***
- ***Maximum ; Krishnapatnam Village , NAAQ Standard : 60 µg/m³***

Summary of Analysis of Ambient Air Quality in the Study Area – SO2 for April'22 to Sep'22



- ***SO_2 Varied between 9.6 to 15.8 µg/m^3, Minimum : New Light House***
- ***Maximum : Zero Point, NAAQ Standard : 80 µg/m^3***

Summary of Analysis of Ambient Air Quality in the Study Area – NOx for April'22 to Sep'22



- ***NOx Varied between 11.9 to 17.0 µg/m^3, Minimum : Gopalpuram village***
- ***Maximum : Zero Point, NAAQ Standards : 80 µg/m^3***

4.3 AMBIENT NOISE LEVEL INTENSITY

Collection of ambient noise levels at six locations (5 locations at nearby villages & 1 location near plant). Spot noise levels where measured with a precalibrated Noise Level Meter – SL Lutron 4001 for day and night periods.

DETAILS OF NOISE MONITORING LOCATIONS

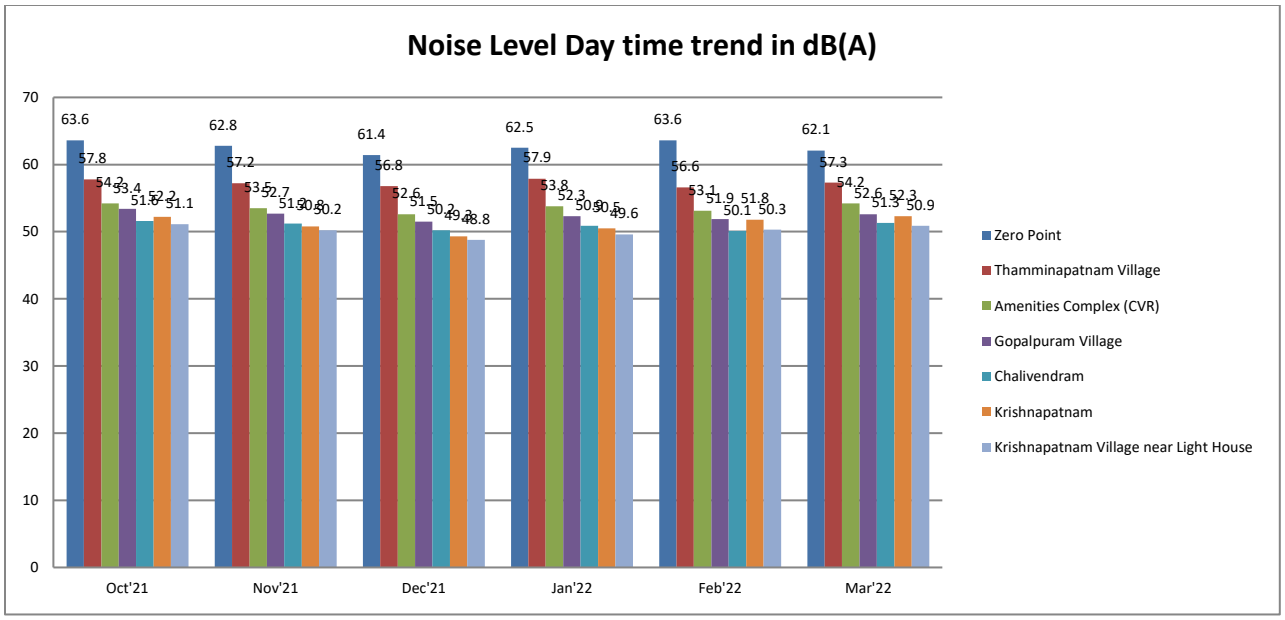
STATION CODE	LOCATIONS	DIRECTION w.r.t PROJECT SITE
N1	At Zero Point	W
N2	At Thamminapatnam Village	S
N3	At CVR Building	WNW
N4	At Gopalpuram Village	NW
N5	At Chalivendram	WNW
N6	At Krishnapatnam	NNW
N7	At Light House	SW

The noise monitoring locations are depicted in

The noise levels monitored during the study period are given hereunder in form of Leq day, Leq night compared with CPCB Standards.

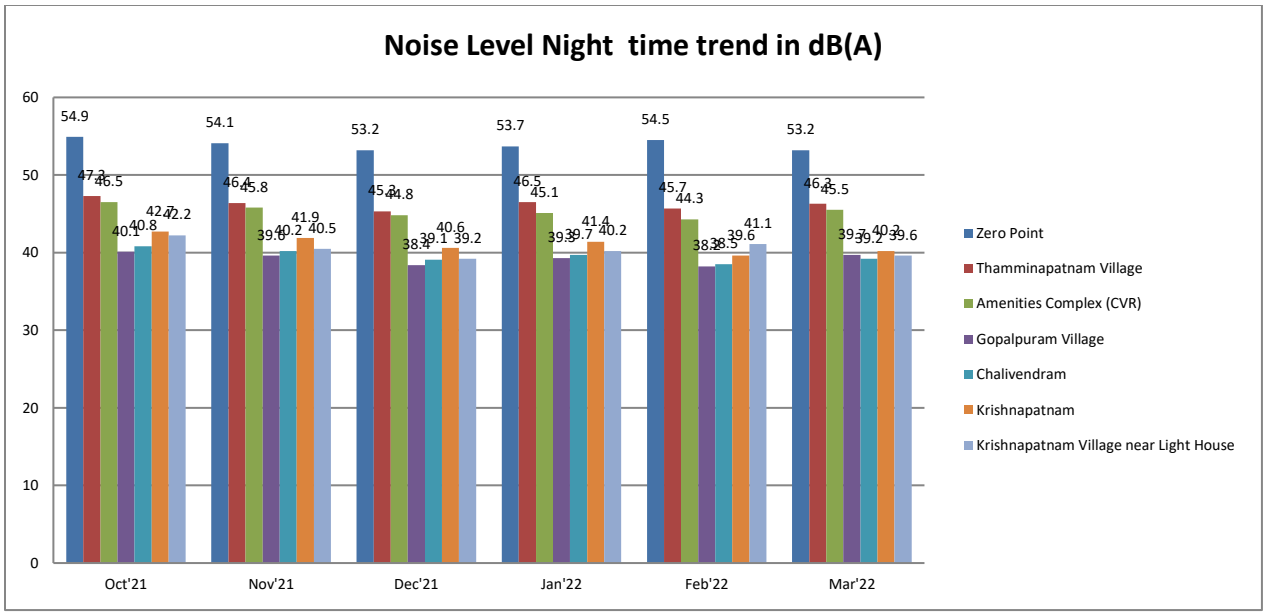
Location Code	Environmental Setting	CPCB norms Leq (Dba)	
		Day	Night
N1	Industrial	75	70
N2	Industrial	75	70
N3	Residential	55	45
N4	Residential	55	45
N5	Residential	55	45
N6	Residential	55	45
N7	Residential	55	45

Noise Level Data for the above locations are shown in the table



Location	April'22	May'22	June'22	July'22	Aug'22	Sep'22
Zero Point	63.2	62.6	63.4	62.8	64.1	63.2
Thamminapatnam Village	56.3	55.8	56.2	55.4	57.8	56.1
Amenities Complex (CVR)	55.3	54.4	55.6	54.6	56.2	55.8
Gopalpuram Village	51.5	50.6	51.8	50.3	51.2	50.8
Chalivendram	50.7	51.2	52.7	51.7	50.2	51.2
Krishnapatnam	51.5	52.4	53.2	52.8	51.1	52
Krishnapatnam Village near Light House	51.6	50.7	51.6	50.2	51.3	52.8

- ***Industrial Day time noise level varied between 50.2 to 64.1 dB(A)***
- ***Residential Day time noise level varied between 50.2 to 53.2 dB(A)***
- ***NAAQ Standard: Industrial -75 Db(A):Residential –55dB(A)***



Location	April'22	May'22	June'22	July'22	Aug'22	Sep'22
Zero Point	54.1	53.4	54.6	53.2	54.2	53.2
Thamminapatnam Village	45.4	44.2	45.8	44.8	46.4	45.9
Amenities Complex (CVR)	46.2	45.3	46.2	45.4	47.5	46.3
Gopalpuram Village	39.0	38.6	39.4	38.7	40.1	39.9
Chalivendram	38.2	39.4	40.6	39.1	38.5	39
Krishnapatnam	39.9	40.6	41.3	40	39.4	40.1
Krishnapatnam Village near Light House	41.2	40.5	41.8	40.6	41.2	42.3

- ***Industrial Night time noise level varied between 40.5 to 54.6 dB(A)***
- ***Residential Night time noise level varied between 38.2 to 41.3 dB(A)***
- ***NAAQ Standard: Industrial -70 Db(A) ,Residential-45 dB(A)***

4.4 Marine Water and Surface Water Quality

4.4.1 Sampling Locations

Marine water sampling is carried out once in every week at Four sampling locations in the port. In addition to marine quality sampling, surface water quality sampling is also carried out at two locations in the creek once in every month. The marine water and surface water sampling locations are given below

MARINE WATER QUALITY AND SURFACE WATER MONITORING LOCATIONS

Location Code	Location
Marine Water Quality Sampling Location	
MW1	Coal Berth
MW2	Turning Circle
MW3	Approach Channel
MW4	Reclamation Area (Mutable)
Surface Water Sampling Location	
SW1	Kandaleru Creek
SW2	Buckingham Canal

- Analysis results of the water samples collected from the above locations are enclosed

The methodology for sample collection and preservation techniques was followed as per the Standard Operating Procedures (SOP) mentioned in table hereunder:

Standard Operating Procedures (SOP) For Water Sampling

Parameter	Sample Collection	Sample Size	Storage/ Preservation
pH	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Electrical Conductivity	Grab sampling Plastic /glass container	50 ml	Refrigeration, can be stored for 7 days
Total suspended solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
Total Dissolved Solids	Grab sampling Plastic /glass container	100 ml	Refrigeration, can be stored for 7 days
BOD	Grab sampling Plastic /glass container	500 ml	Refrigeration, 48 hrs
Hardness	Grab sampling Plastic /glass container	100 ml	Add HNO_3 to pH<2, refrigeration; 6 months
Chlorides	Grab sampling Plastic /glass container	50 ml	Not required; 28 days
Sulphates	Grab sampling Plastic /glass container	100 ml	Refrigeration; 28 days
Nitrates	Plastic containers	100 ml	Refrigeration; 48 hrs
Fluorides	Plastic containers only	100 ml	Not required; 28 days
Alkalinity	Plastic/ glass containers	100 ml	Refrigeration; 14 days
Ammonia	Plastic/ glass containers	100 ml	Add H_2SO_4 to pH>2, refrigeration, 28 days
Heavy Metals (Ar, Cd, Mn, Cu, Fe, Zn, Pb etc.)	Plastic/ Glass rinse with 1+1 HNO_3	500 ml	Filter, add HNO_3 to pH>2; Grab sample; 6 months

Source: Standard Methods for the Examination of Water and Wastewater, Published By APHA, 27nd Edition,2017

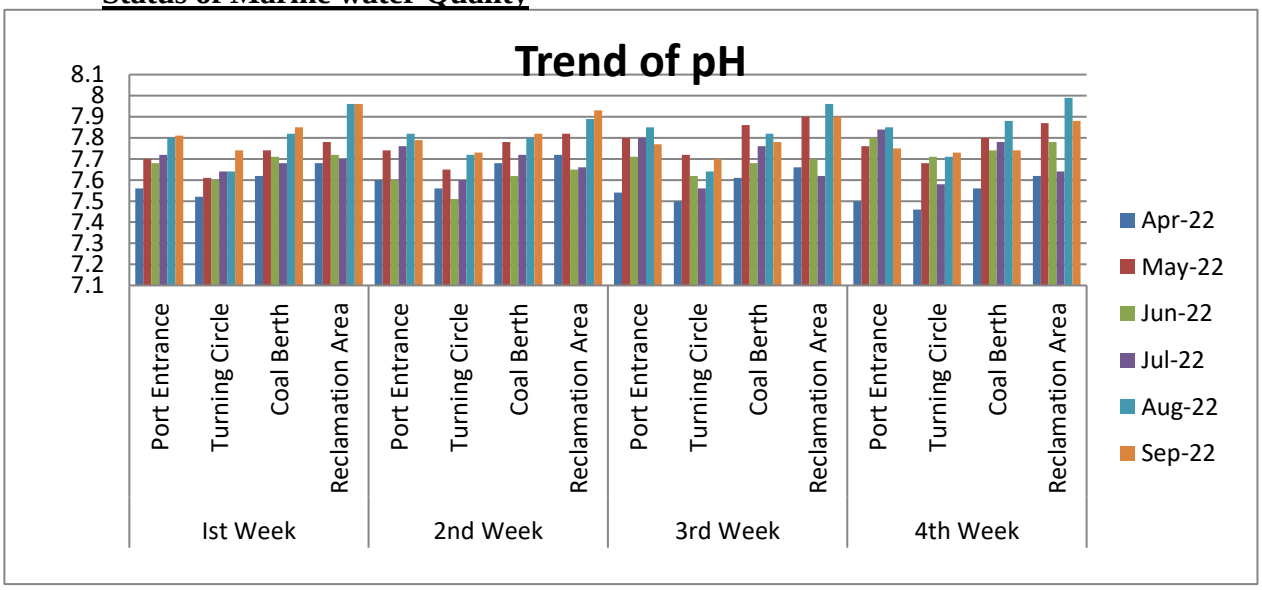
The analytical techniques used for water analysis is given in the table hereunder:

Analytical Techniques forWater Analysis

S.No	Parameter	Method
1.	pH	APHA, 4500-H+B, 23rd Ed., 2017
2.	Colour	APHA, 2120-C/2120-B, 23rd Ed., 2017
3.	Odour	APHA, 2150, 23rd Ed., 2017
4.	Temperature	APHA, 2550-A+B, 23rd Ed., 2017
5.	Oil & Grease	APHA, 5520-D, 23rd Ed., 2017
6.	Total Suspended Solids	APHA, 2540-D, 23rd Ed., 2017
7.	Total Dissolved Solids	APHA, 2540-C, 23rd Ed., 2017
8.	Total Residual Chlorine	APHA, 4500-Cl B, 23rd Ed., 2017
9.	Biochemical Oxygen Demand	APHA, 5210-B, 23rd Ed., 2017 4500-OC, 23rd Ed.,
10.	Chemical Oxygen Demand	APHA, 5220-B, 23rd Ed., 2017
11.	Free Ammonia	IS 3025
12.	Ammonical Nitrogen	APHA, 4500-NH_3 B, 23rd Ed., 2017
13.	Total Kjeldhal Nitrogen	APHA, 4500-Norg B, 23rd Ed., 2017
14.	Zinc	APHA, 3111-B, 23rd Ed., 2017
15.	Lead	APHA, 3111-B, 23rd Ed., 2017
16.	Cadmium	APHA, 3111-B, 23rd Ed., 2017
17.	Mercury	APHA, 3112-B, 23rd Ed., 2017
18.	Arsenic	APHA, 3114-B, 23rd Ed., 2017
19.	Copper	APHA, 3111-B, 23rd Ed., 2017
20.	Nickel	APHA, 3111-B, 23rd Ed., 2017
21.	Cyanide	APHA, 4500-CNB, 23rd Ed., 20172
22.	Fluoride	APHA, 4500-FD, 23rd Ed., 2017 (SPANDS Methods)
23.	Phosphates	APHA, 4500-PD, 23rd Ed., 2017
24.	Sulphates	APHA, 4500-SO_4^{2-} E, 23rd Ed., 2017
25.	Sulphide	APHA, 4500-S^{2-}, 23rd Ed., 2017
26.	Manganese	APHA, 3111-B, 23rd Ed., 2017
27.	Iron	APHA, 3111-B, 23rd Ed., 2017
28.	Phenolic Compounds	APHA, 5530-B, 23rd Ed., 2017
29.	Bio Assay Test	IS 6582

Marine water samples have been collected in the port and the results of the same are shown below in **Table.**

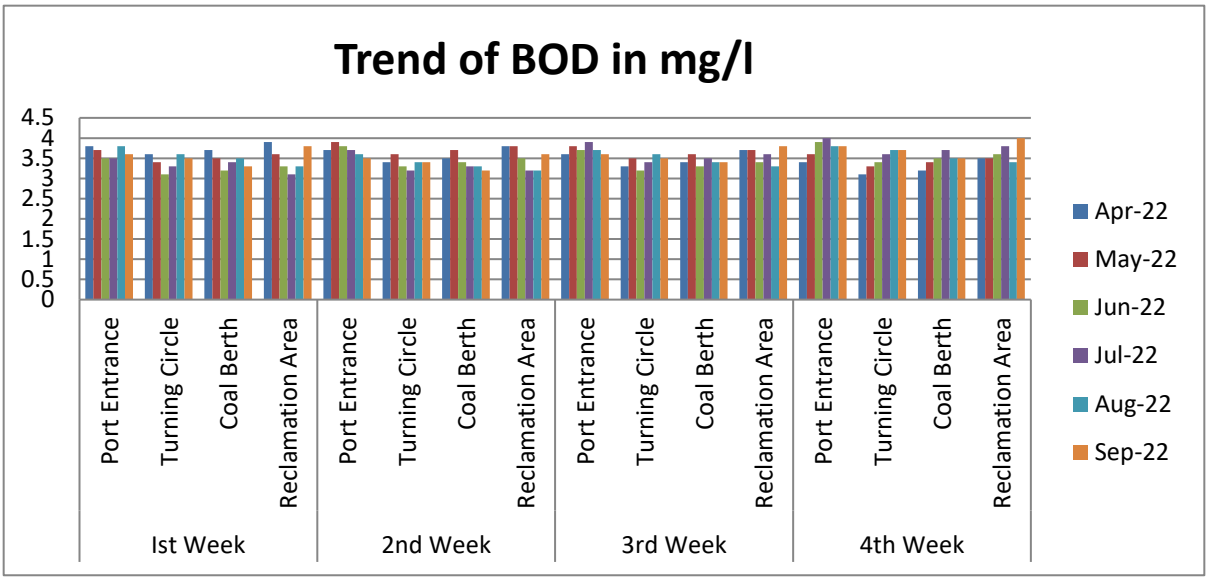
Status of Marine water Quality



pH of Marine water varied between 7.46 to 7.99

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	7.56	7.52	7.62	7.68	7.60	7.56	7.68	7.72
May'22	7.70	7.61	7.74	7.78	7.74	7.65	7.78	7.82
June'22	7.68	7.60	7.71	7.72	7.60	7.51	7.62	7.65
July'22	7.72	7.64	7.68	7.7	7.76	7.60	7.72	7.66
Aug'22	7.80	7.64	7.82	7.96	7.82	7.72	7.80	7.89
Sep'22	7.81	7.74	7.85	7.96	7.79	7.73	7.82	7.93

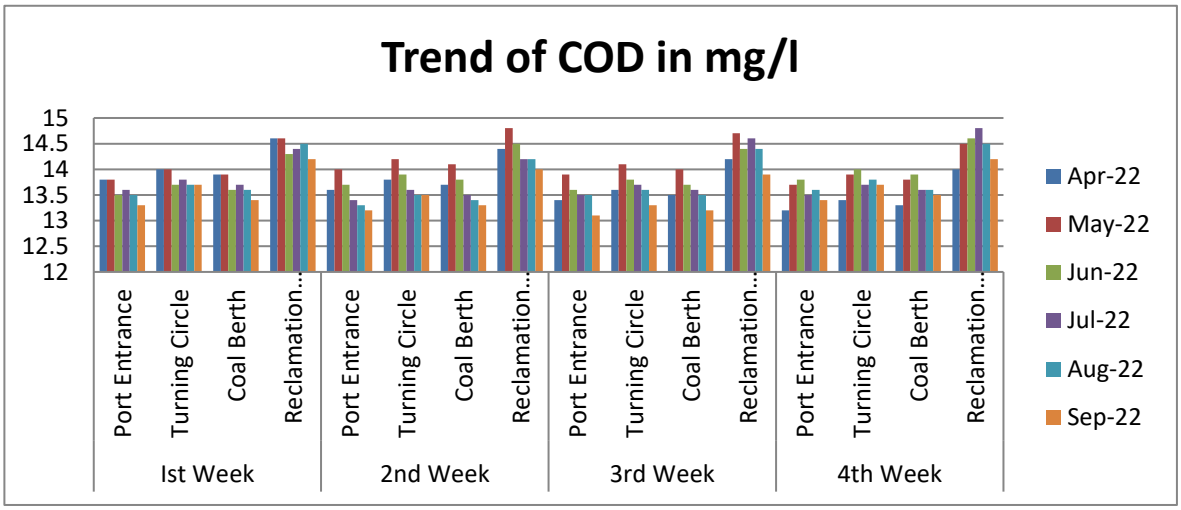
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	7.54	7.50	7.61	7.66	7.50	7.46	7.56	7.62
May'22	7.80	7.72	7.86	7.90	7.76	7.68	7.80	7.87
June'22	7.71	7.62	7.68	7.70	7.80	7.71	7.74	7.78
July'22	7.80	7.56	7.76	7.62	7.84	7.58	7.78	7.64
Aug'22	7.85	7.64	7.82	7.96	7.85	7.71	7.88	7.99
Sep'22	7.60	7.56	7.62	7.67	7.75	7.73	7.74	7.88



❖ **BOD of Marine Water varied between 3.1 to 4.0 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	3.8	3.6	3.7	3.9	3.7	3.4	3.5	3.8
May'22	3.7	3.4	3.5	3.6	3.9	3.6	3.7	3.8
June'22	3.5	3.1	3.2	3.3	3.8	3.3	3.4	3.5
July'22	3.5	3.3	3.4	3.1	3.7	3.2	3.3	3.2
Aug'22	3.8	3.6	3.5	3.3	3.6	3.4	3.3	3.2
Sep'22	3.6	3.5	3.3	3.8	3.5	3.4	3.2	3.6

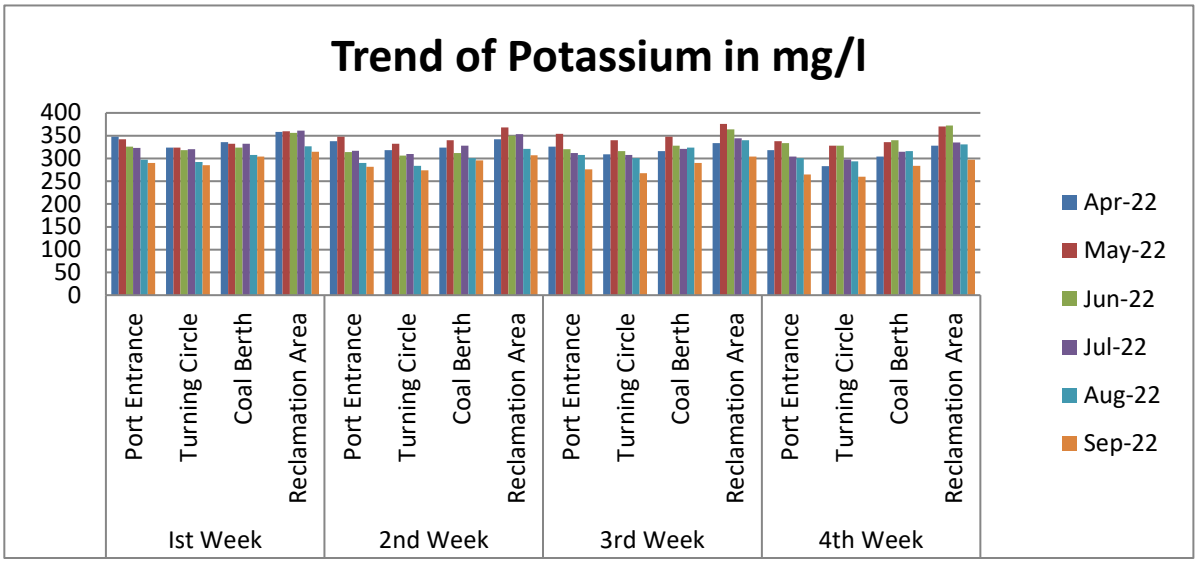
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	3.6	3.3	3.4	3.7	3.4	3.1	3.2	3.5
May'22	3.8	3.5	3.6	3.7	3.6	3.3	3.4	3.5
June'22	3.7	3.2	3.3	3.4	3.9	3.4	3.5	3.6
July'22	3.9	3.4	3.5	3.6	4.0	3.6	3.7	3.8
Aug'22	3.7	3.6	3.4	3.3	3.8	3.7	3.5	3.4
Sep'22	3.6	3.5	3.4	3.8	3.8	3.7	3.5	4.0



❖ **COD of Marine Water varied between 13.1 to 14.8 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	13.8	14.0	13.9	14.6	13.6	13.8	13.7	14.4
May'22	13.8	14.0	13.9	14.6	14.0	14.2	14.1	14.8
June'22	13.5	13.7	13.6	14.3	13.7	13.9	13.8	14.5
July'22	13.6	13.8	13.7	14.4	13.4	13.6	13.5	14.2
Aug'22	13.5	13.7	13.6	14.5	13.3	13.5	13.4	14.2
Sep'22	13.3	13.7	13.4	14.2	13.2	13.5	13.3	14.0

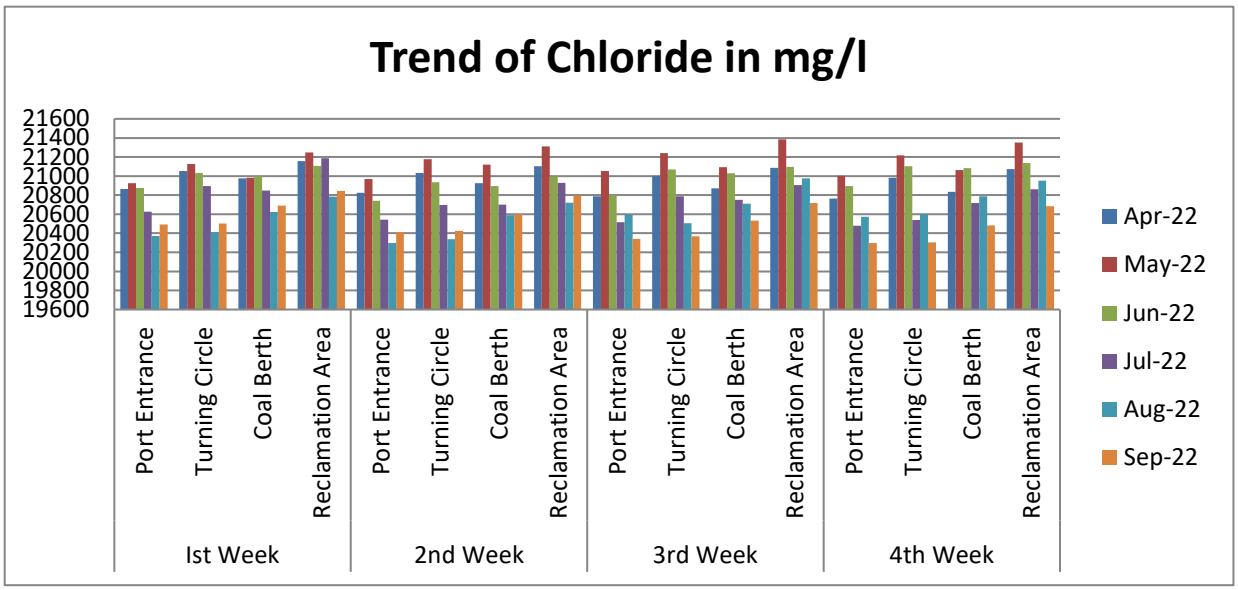
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	13.4	13.6	13.5	14.2	13.2	13.4	13.3	14.0
May'22	13.9	14.1	14.0	14.7	13.7	13.9	13.8	14.5
June'22	13.6	13.8	13.7	14.4	13.8	14.0	13.9	14.6
July'22	13.5	13.7	13.6	14.6	13.5	13.7	13.6	14.8
Aug'22	13.5	13.6	13.5	14.4	13.6	13.8	13.6	14.5
Sep'22	13.1	13.3	13.2	13.9	13.4	13.7	13.5	14.2



❖ **Potassium Concentration in Marine water varied between 260 to 376 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	348	324	336	358	338	318	324	342
May'22	342	324	332	360	348	332	340	368
June'22	326	318	324	356	314	306	312	350
July'22	323	320	332	361	317	310	328	353
Aug'22	297	292	308	327	290	284	301	321
Sep'22	290	285	304	315	282	274	296	307

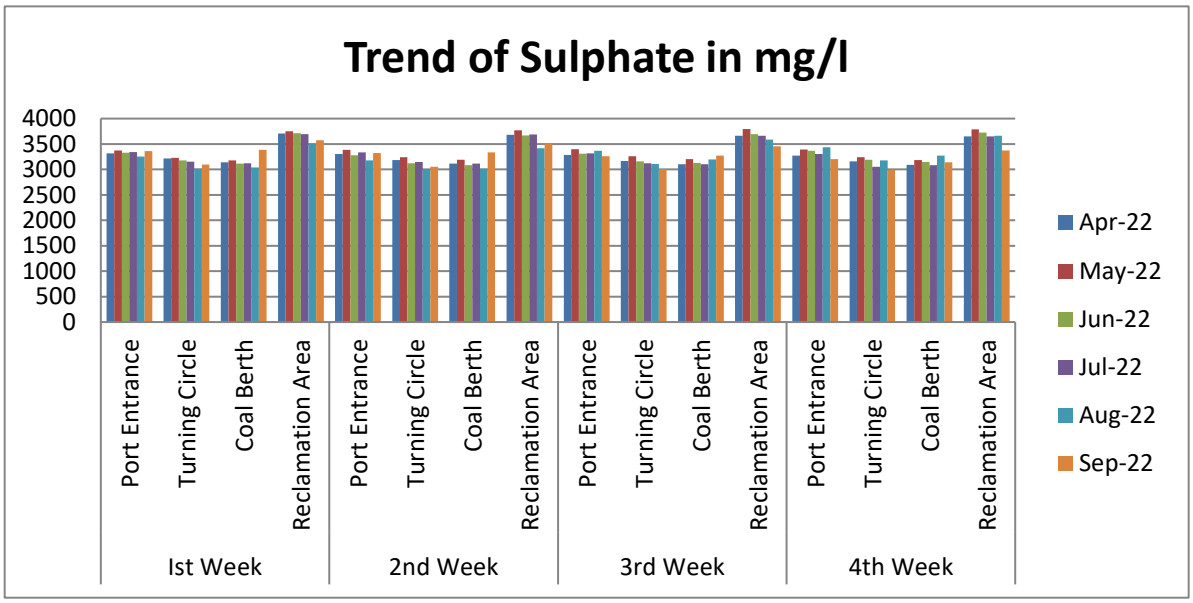
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	326	309	316	334	318	283	304	328
May'22	354	340	348	376	338	328	336	370
June'22	320	316	328	364	334	328	340	372
July'22	312	308	321	344	304	298	315	335
Aug'22	308	301	324	340	301	294	316	331
Sep'22	276	268	290	304	265	260	284	297



❖ **Chloride concentration in Marine water varied between 20298 to 21384 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	20866	21052	20976	21158	20824	21032	20924	21104
May'22	20926	21126	20982	21248	20968	21178	21120	21312
June'22	20874	21034	20998	21107	20742	20936	20896	20995
July'22	20628	20894	20848	21186	20542	20698	20701	20928
Aug'22	20371	20411	20624	20783	20298	20339	20589	20721
Sep'22	20492	20501	20689	20843	20413	20426	20601	20799

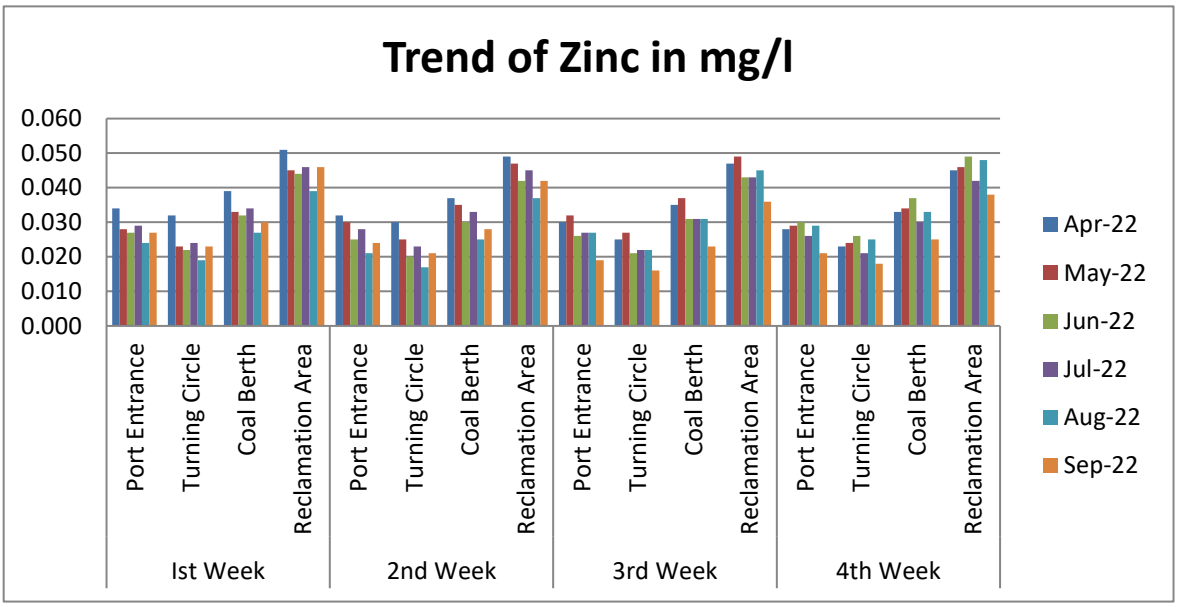
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	20786	21004	20872	21086	20764	20982	20834	21072
May'22	21052	21240	21092	21384	21004	21216	21063	21352
June'22	20802	21068	21028	21098	20896	21102	21082	21136
July'22	20516	20786	20752	20904	20478	20538	20716	20862
Aug'22	20596	20506	20711	20976	20572	20599	20786	20951
Sep'22	20342	20369	20532	20716	20299	20303	20481	20684



❖ **Sulphate concentration in Marine water varied between 2991 to 3793 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	3318	3216	3140	3704	3304	3186	3118	3680
May'22	3372	3227	3180	3752	3384	3241	3192	3772
June'22	3328	3180	3118	3712	3280	3124	3082	3668
July'22	3341	3152	3120	3696	3336	3146	3114	3688
Aug'22	3254	3014	3042	3503	3176	3005	3015	3418
Sep'22	3362	3098	3388	3573	3324	3054	3336	3511

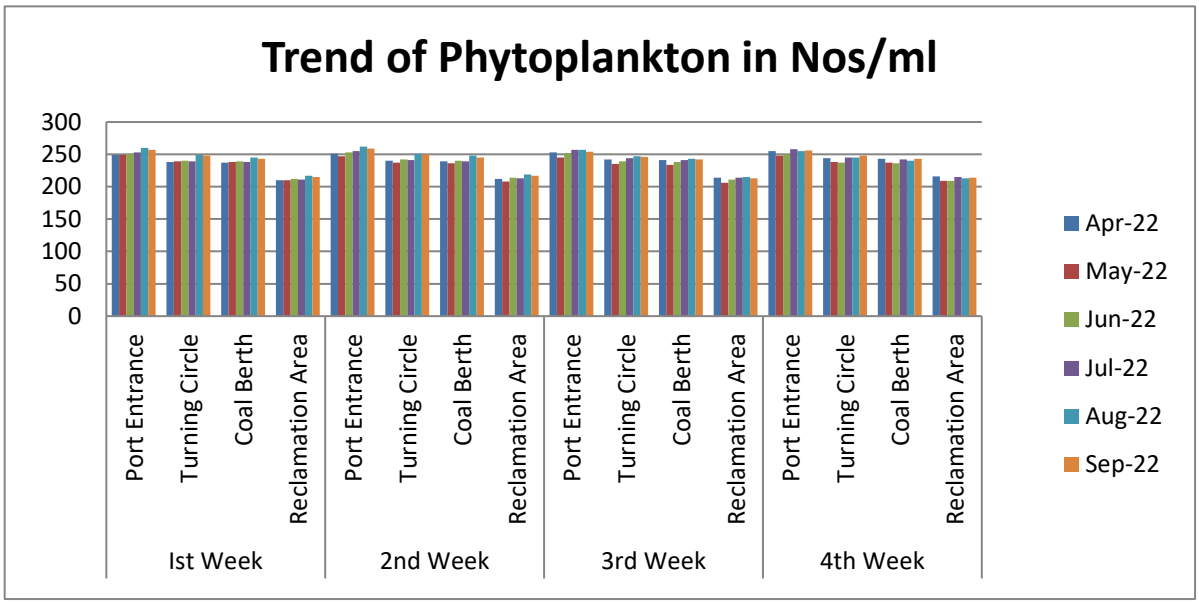
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	3286	3168	3104	3664	3274	3156	3088	3648
May'22	3396	3257	3206	3793	3390	3238	3186	3786
June'22	3312	3162	3126	3694	3369	3188	3144	3728
July'22	3318	3124	3102	3664	3304	3051	3084	3650
Aug'22	3368	3109	3196	3584	3436	3175	3272	3661
Sep'22	3262	3003	3271	3452	3201	2991	3139	3372



❖ **Zinc concentration in Marine water varied between 0.016 to 0.051 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	0.034	0.032	0.039	0.051	0.032	0.030	0.037	0.049
May'22	0.028	0.023	0.033	0.045	0.030	0.025	0.035	0.047
June'22	0.027	0.022	0.032	0.044	0.025	0.020	0.030	0.042
July'22	0.029	0.024	0.034	0.046	0.028	0.023	0.033	0.045
Aug'22	0.024	0.019	0.027	0.039	0.021	0.017	0.025	0.037
Sep'22	0.027	0.023	0.030	0.046	0.024	0.021	0.028	0.042

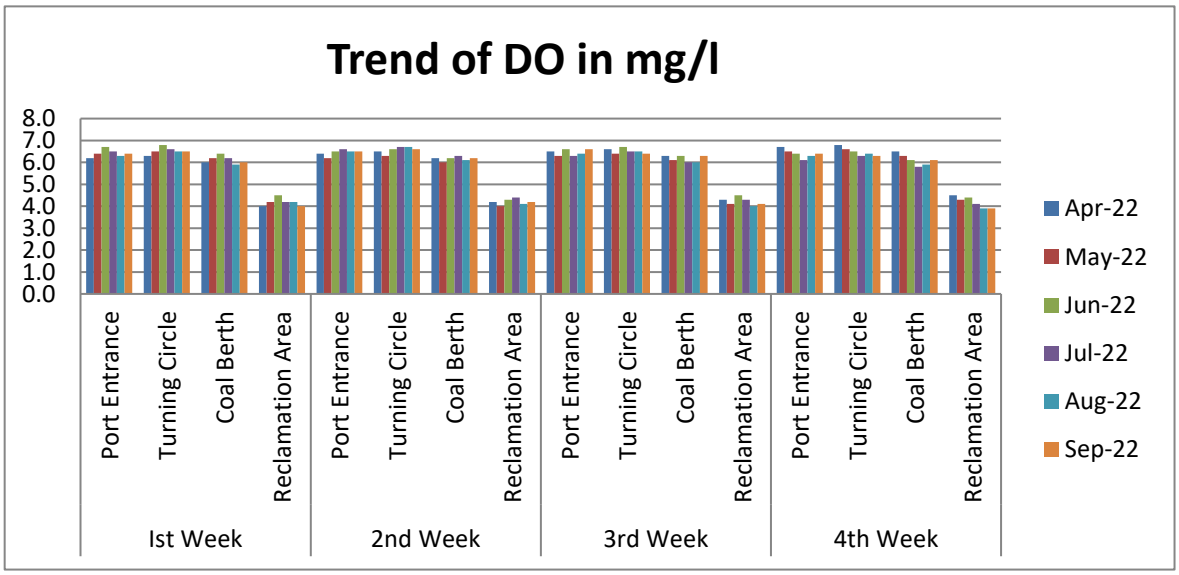
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	0.030	0.025	0.035	0.047	0.028	0.023	0.033	0.045
May'22	0.032	0.027	0.037	0.049	0.029	0.024	0.034	0.046
June'22	0.026	0.021	0.031	0.043	0.030	0.026	0.037	0.049
July'22	0.027	0.022	0.031	0.043	0.026	0.021	0.030	0.042
Aug'22	0.027	0.022	0.031	0.045	0.029	0.025	0.033	0.048
Sep'22	0.019	0.016	0.023	0.036	0.021	0.018	0.025	0.038



- **Phytoplankton in Marine water varied between 206 to 262 No./ml**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	249	238	237	210	251	240	239	212
May'22	249	239	238	210	247	237	236	208
June'22	251	240	239	212	253	242	240	214
July'22	253	239	238	211	255	241	239	213
Aug'22	260	249	245	217	262	251	248	219
Sep'22	257	248	243	215	259	250	245	217

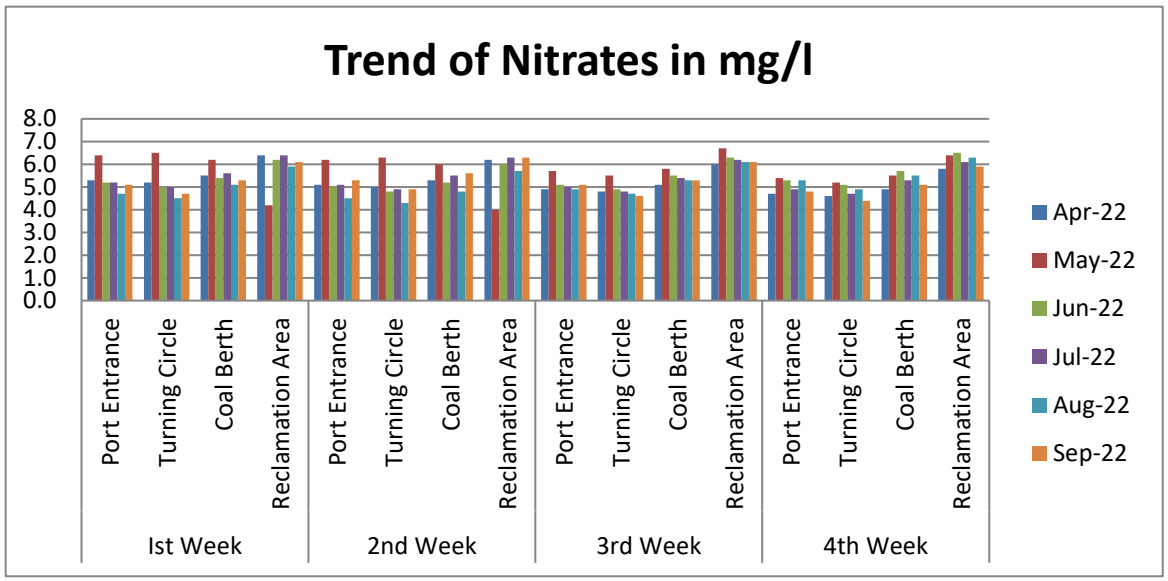
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	253	242	241	214	255	244	243	216
May'22	245	235	234	206	248	238	237	209
June'22	252	239	238	211	250	237	236	209
July'22	257	244	241	214	258	245	242	215
Aug'22	257	247	243	215	255	245	240	213
Sep'22	254	246	242	213	256	248	243	214



❖ **DO in Marine water varied between 3.9 to 6.8 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	6.2	6.3	6.0	4.0	6.4	6.5	6.2	4.2
May'22	6.4	6.5	6.2	4.2	6.2	6.3	6.0	4.0
June'22	6.7	6.8	6.4	4.5	6.5	6.6	6.2	4.3
July'22	6.5	6.6	6.2	4.2	6.6	6.7	6.3	4.4
Aug'22	6.3	6.5	5.9	4.2	6.5	6.7	6.1	4.1
Sep'22	6.4	6.5	6.0	4.0	6.5	6.6	6.2	4.2

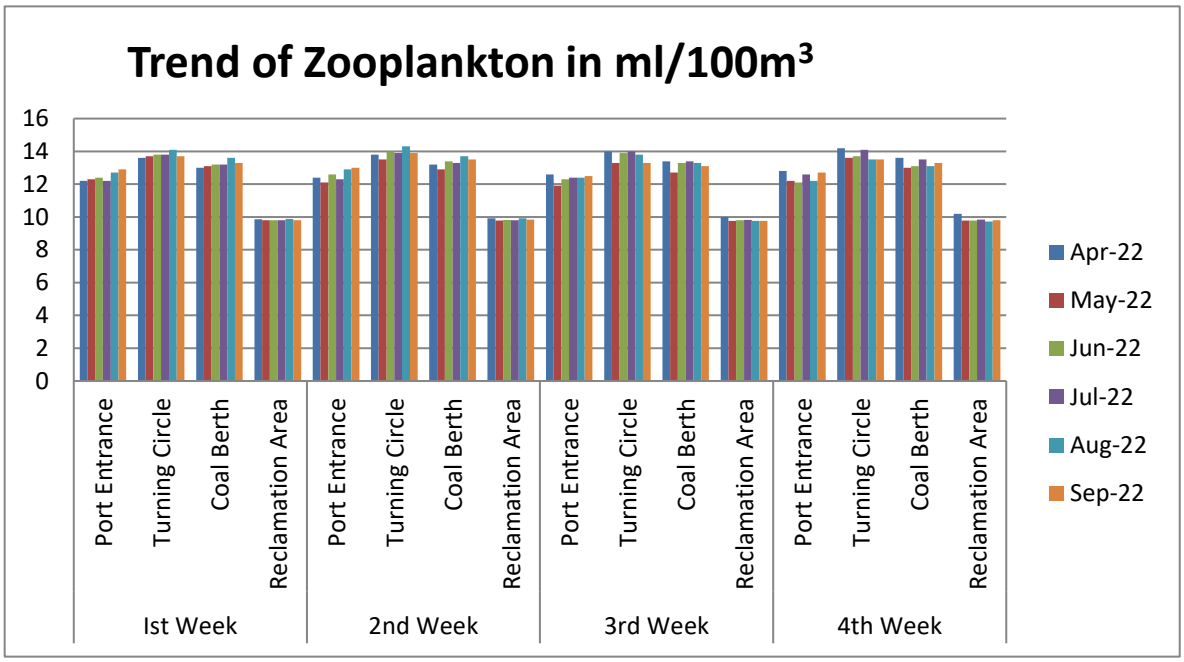
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	6.5	6.6	6.3	4.3	6.7	6.8	6.5	4.5
May'22	6.3	6.4	6.1	4.1	6.5	6.6	6.3	4.3
June'22	6.6	6.7	6.3	4.5	6.4	6.5	6.1	4.4
July'22	6.3	6.5	6	4.3	6.1	6.3	5.8	4.1
Aug'22	6.4	6.5	6.0	4.0	6.3	6.4	5.9	3.9
Sep'22	6.6	6.4	6.3	4.1	6.4	6.3	6.1	3.9



- **Nitrates in Marine water varied between 4.0 to 6.7 mg/l**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	5.3	5.2	5.5	6.4	5.1	5.0	5.3	6.2
May'22	6.4	6.5	6.2	4.2	6.2	6.3	6.0	4.0
June'22	5.2	5.0	5.4	6.2	5.0	4.8	5.2	6.0
July'22	5.2	5.0	5.6	6.4	5.1	4.9	5.5	6.3
Aug'22	4.7	4.5	5.1	5.9	4.5	4.3	4.8	5.7
Sep'22	5.1	4.7	5.3	6.1	5.3	4.9	5.6	6.3

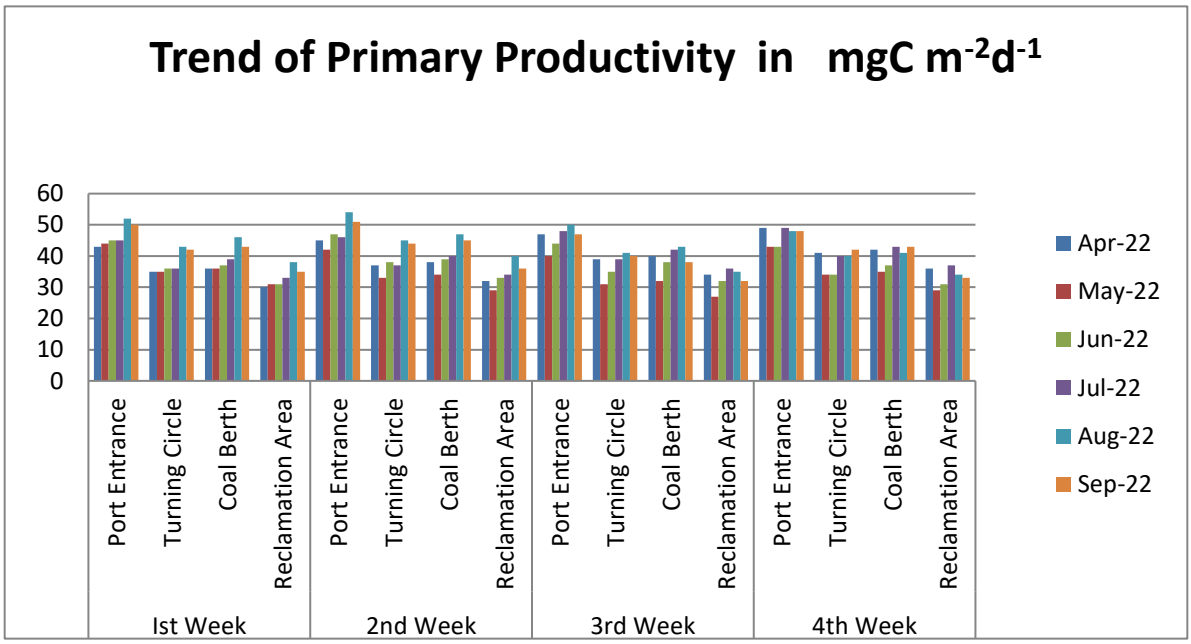
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	4.9	4.8	5.1	6.0	4.7	4.6	4.9	5.8
May'22	5.7	5.5	5.8	6.7	5.4	5.2	5.5	6.4
June'22	5.1	4.9	5.5	6.3	5.3	5.1	5.7	6.5
July'22	5.0	4.8	5.4	6.2	4.9	4.7	5.3	6.1
Aug'22	4.9	4.7	5.3	6.1	5.3	4.9	5.5	6.3
Sep'22	5.1	4.6	5.3	6.1	4.8	4.4	5.1	5.9



❖ **Zoo plankton in Marine water varied between 9.73 to 14.3 ml/100m^3**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	12.2	13.6	13.0	9.86	12.4	13.8	13.2	9.92
May'22	12.3	13.7	13.1	9.80	12.1	13.5	12.9	9.78
June'22	12.4	13.8	13.2	9.81	12.6	14.0	13.4	9.83
July'22	12.2	13.8	13.2	9.80	12.3	13.9	13.3	9.81
Aug'22	12.7	14.1	13.6	9.88	12.9	14.3	13.7	9.92
Sep'22	12.9	13.7	13.3	9.80	13.0	13.9	13.5	9.85

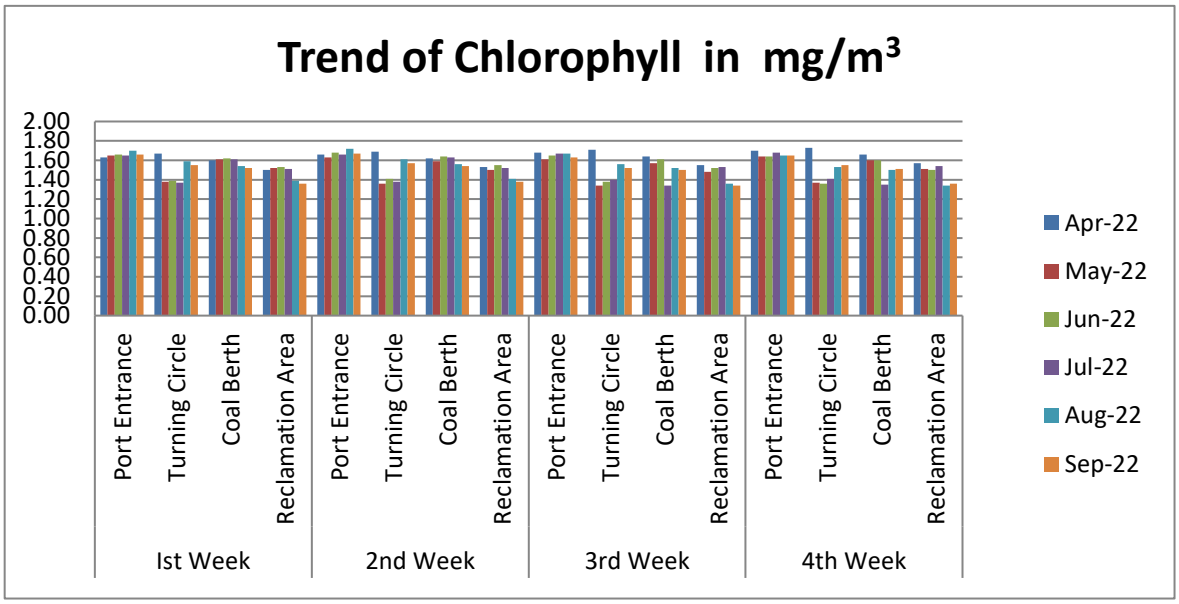
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	12.6	14.0	13.4	10.0	12.8	14.2	13.6	10.2
May'22	11.9	13.3	12.7	9.76	12.2	13.6	13.0	9.79
June'22	12.3	13.9	13.3	9.80	12.1	13.7	13.1	9.78
July'22	12.4	14.0	13.4	9.83	12.6	14.1	13.5	9.85
Aug'22	12.4	13.8	13.3	9.77	12.2	13.5	13.1	9.73
Sep'22	12.5	13.3	13.1	9.76	12.7	13.5	13.3	9.80



❖ **Primary Productivity in Marine water varied between 27 to 54 mgC $m^{-2}d^{-1}$**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	43	35	36	30	45	37	38	32
May'22	44	35	36	31	42	33	34	29
June'22	45	36	37	31	47	38	39	33
July'22	45	36	39	33	46	37	40	34
Aug'22	52	43	46	38	54	45	47	40
Sep'22	50	42	43	35	51	44	45	36

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	47	39	40	34	49	41	42	36
May'22	40	31	32	27	43	34	35	29
June'22	44	35	38	32	43	34	37	31
July'22	48	39	42	36	49	40	43	37
Aug'22	50	41	43	35	48	40	41	34
Sep'22	47	40	38	32	48	42	43	33



❖ **Chlorophyll in Marine water varied between 1.34 to 1.73 mg/m^3**

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1.63	1.67	1.60	1.50	1.66	1.69	1.62	1.53
May'22	1.65	1.38	1.61	1.52	1.63	1.36	1.59	1.50
June'22	1.66	1.39	1.62	1.53	1.68	1.41	1.64	1.55
July'22	1.65	1.37	1.61	1.51	1.66	1.38	1.63	1.52
Aug'22	1.70	1.59	1.54	1.39	1.72	1.61	1.56	1.41
Sep'22	1.66	1.55	1.52	1.36	1.67	1.57	1.54	1.38

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1.68	1.71	1.64	1.55	1.70	1.73	1.66	1.57
May'22	1.61	1.34	1.57	1.48	1.64	1.37	1.60	1.51
June'22	1.65	1.38	1.61	1.52	1.64	1.36	1.60	1.50
July'22	1.67	1.40	1.34	1.53	1.68	1.41	1.35	1.54
Aug'22	1.67	1.56	1.52	1.36	1.65	1.53	1.50	1.34
Sep'22	1.63	1.52	1.50	1.34	1.65	1.55	1.51	1.36

Summary of Marine water quality results for six months of period April 22 – Sep 22

- pH - values are in the range 7.46 to 7.99
- BOD -values are in the range 3.1 to 4.0 mg/l
- COD - values are in the range 13.1 to 14.8 mg/l
- Potassium - values are in the range 260 to 376 mg/l
- Chloride - values are in the range 20298 to 21384 mg/l
- Sulphates - values are in the range to 2991 to 3793 mg/l
- Zinc - values are in the range 0.016 to 0.051 mg/l
- Phytoplankton - values are in the range 206 to 262 No./ml
- DO - values are in the range 3.9 to 6.8 mg/l
- Nitrates - values are in the range 4.0 to 6.7 mg/l
- Zoo plankton - values are in the range 9.73 to 14.3 ml/100m^3
- Primary productivity - values are in the range 27 to 54 mgC $m^{-2}d^{-1}$
- Chlorophyll - values are in the range 1.34 to 1.73 mg/m^3

4.5 Marine Water Turbidity

Marine water turbidity is carried out on one day every week at each of the four locations of Marine Water quality sampling (MT1, MT2 ,MT3 and MT4). Turbidity levels are monitored during Low Tide, Medium Tide and High Tide.

MARINE TURBIDITY MONITORING LOCATIONS

Sampling Code	Name of the Location
MT1	Coal Berth
MT2	Turning circle
MT3	Approach channel
MT4	Reclamation Area (Mutable)

4.5.1 Marine Deep Sea Turbidity

Marine water turbidity is carried out in the deep water i.e., at the dredged material disposal area on one day every month at three locations.

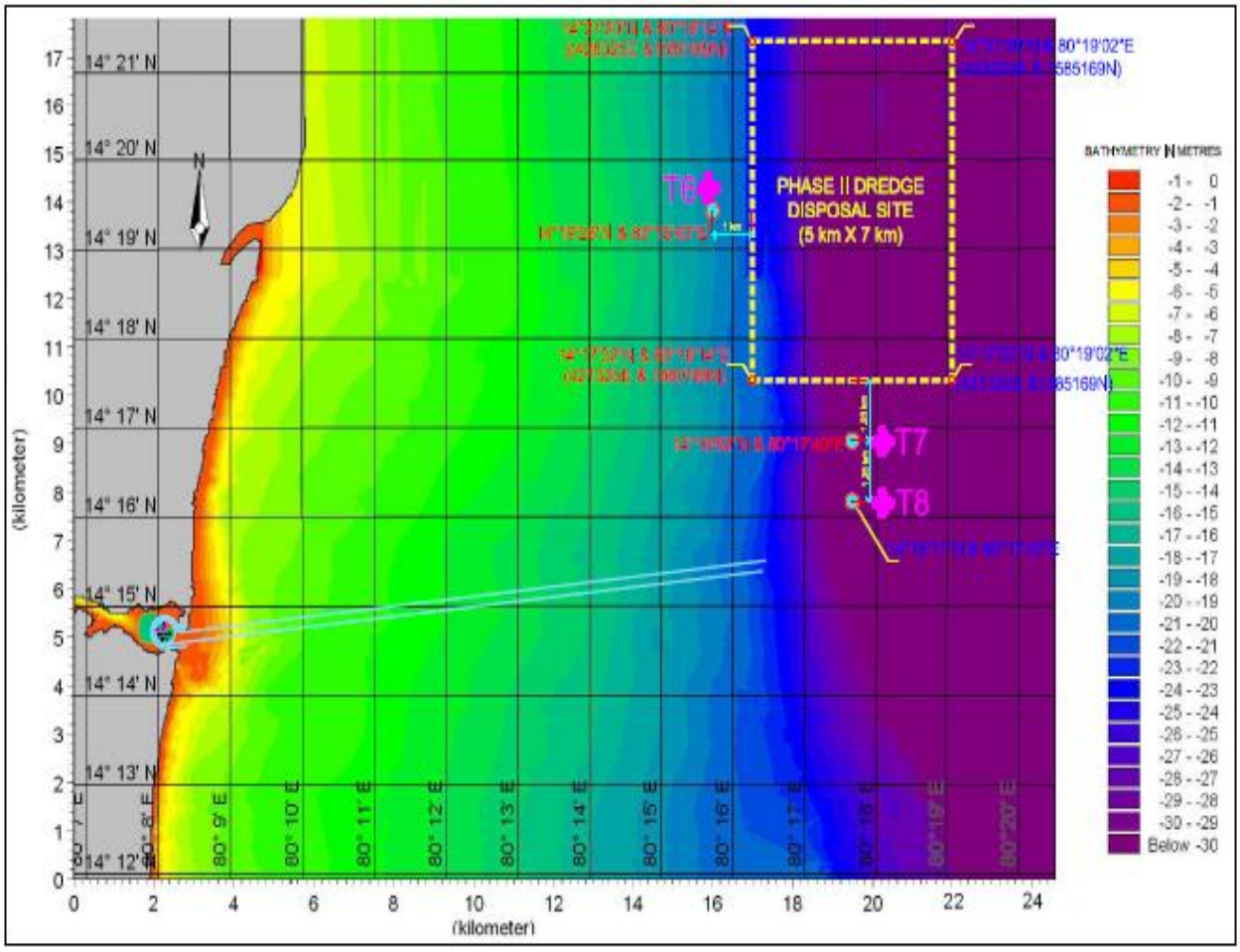
4.5.2 Sampling Locations

Turbidity levels are monitored during Low Tide, Medium Tide and High Tide. Monitoring locations listed below **.**

MARINE DEEP SEA TURBIDITY MONITORING LOCATIONS

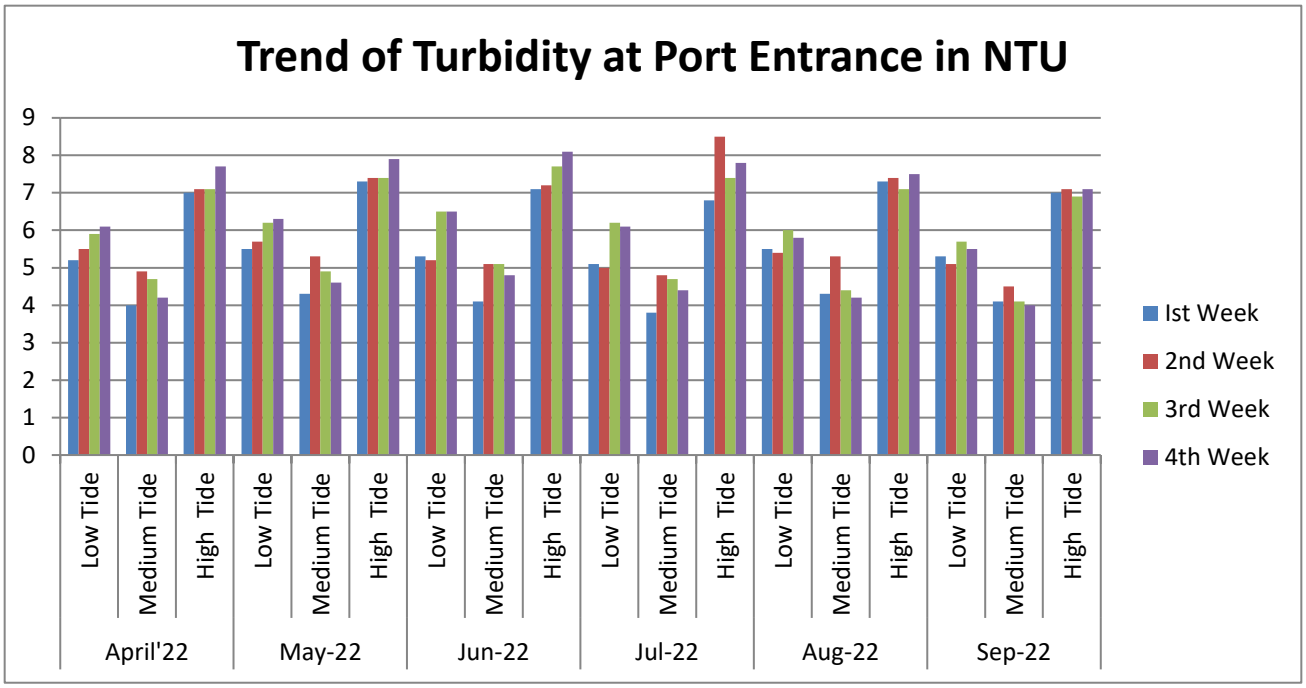
Location Code	Geographical Co-ordinates
DS1	$14^0$19'26"N ; $80^0$15'43"E
DS2	$14^0$16'52"N ; $80^0$17'40"E
DS3	$14^0$16'11"N ; $80^0$17'40"E

KRISHNAPATNAM PORT DEEP SEA MONITORING LOCATIONS

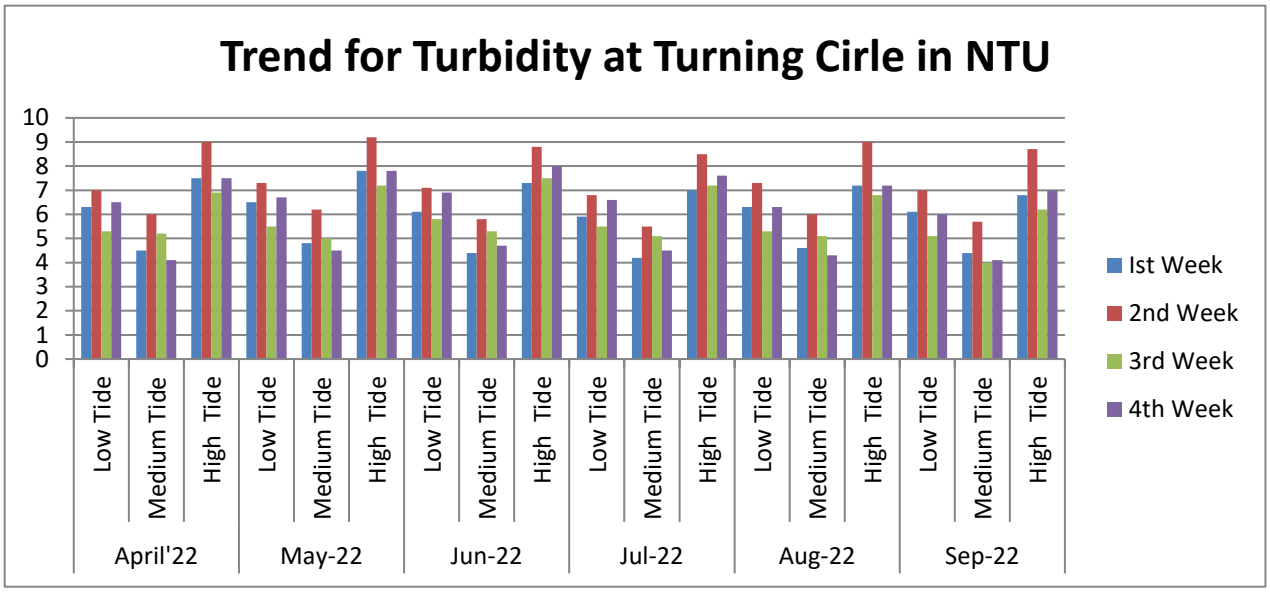


CODE	PARAMETERS	CO-ORDINATES OF MONITORING STATION
♣	Turbidity Monitoring	
T6		14°19'26"N & 80°15'43"E
T7		14°16'52"N & 80°17'40"E
T8		14°16'11"N & 80°17'40"E

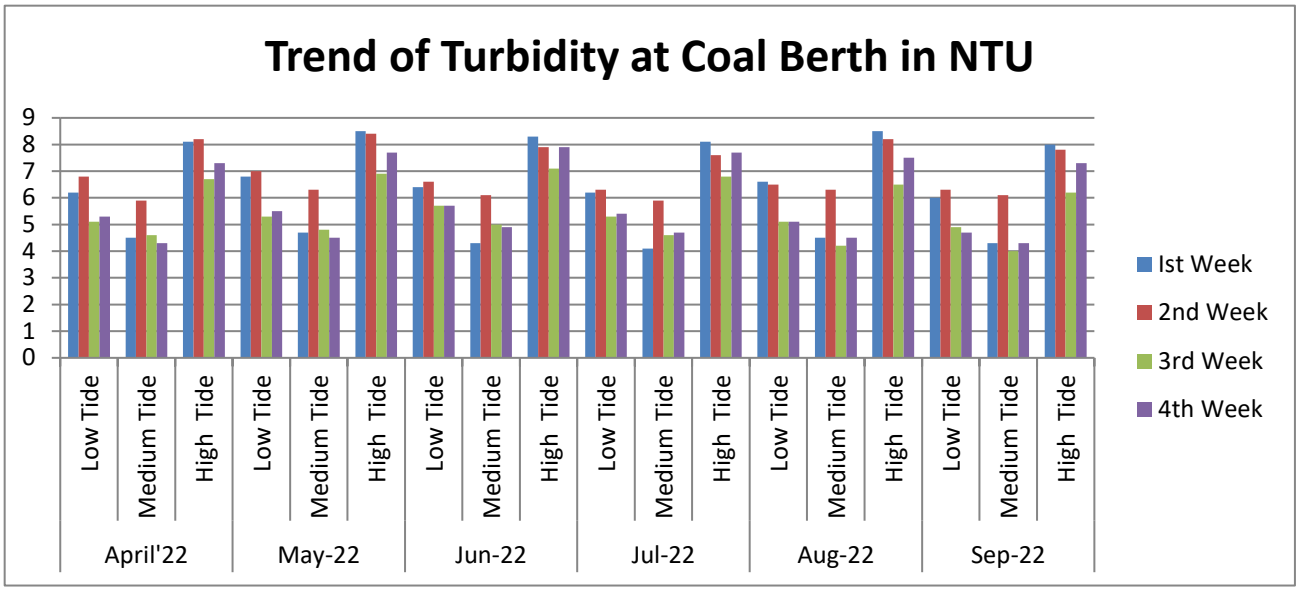
Status of Turbidity in Marine Water



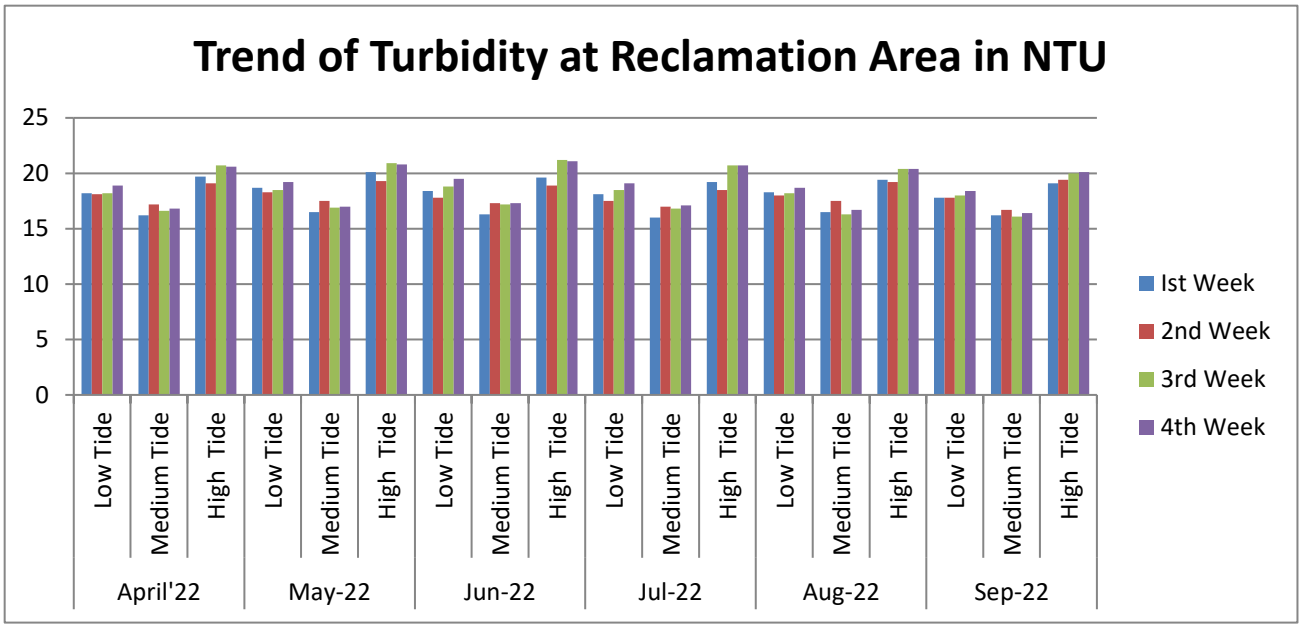
Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	5.2	5.5	5.9	6.1	July'22	Low Tide	5.1	5.0	6.2	6.1
	Medium Tide	4.0	4.9	4.7	4.2		Medium Tide	3.8	4.8	4.7	4.4
	High Tide	7.0	7.1	7.1	7.7		High Tide	6.8	8.5	7.4	7.8
May'22	Low Tide	5.5	5.7	6.2	6.3	Aug'22	Low Tide	5.5	5.4	6.0	5.8
	Medium Tide	4.3	5.3	4.9	4.6		Medium Tide	4.3	5.3	4.4	4.2
	High Tide	7.3	7.4	7.4	7.9		High Tide	7.3	7.4	7.1	7.5
June'22	Low Tide	5.3	5.2	6.5	6.5	Sep'22	Low Tide	5.3	5.1	5.7	5.5
	Medium Tide	4.1	5.1	5.1	4.8		Medium Tide	4.1	4.5	4.1	4.0
	High Tide	7.1	7.2	7.7	8.1		High Tide	7.0	7.1	6.9	7.1



Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	6.3	7.0	5.3	6.5	July'22	Low Tide	5.9	6.8	5.5	6.6
	Medium Tide	4.5	6.0	5.2	4.1		Medium Tide	4.2	5.5	5.1	4.5
	High Tide	7.5	9.0	6.9	7.5		High Tide	7.0	8.5	7.2	7.6
May'22	Low Tide	6.5	7.3	5.5	6.7	Aug'22	Low Tide	6.3	7.3	5.3	6.3
	Medium Tide	4.8	6.2	5.0	4.5		Medium Tide	4.6	6.0	5.1	4.3
	High Tide	7.8	9.2	7.2	7.8		High Tide	7.2	9.0	6.8	7.2
June'22	Low Tide	6.1	7.1	5.8	6.9	Sep'22	Low Tide	6.1	7.0	5.1	6.0
	Medium Tide	4.4	5.8	5.3	4.7		Medium Tide	4.4	5.7	4.0	4.1
	High Tide	7.3	8.8	7.5	8.0		High Tide	6.8	8.7	6.2	7.0



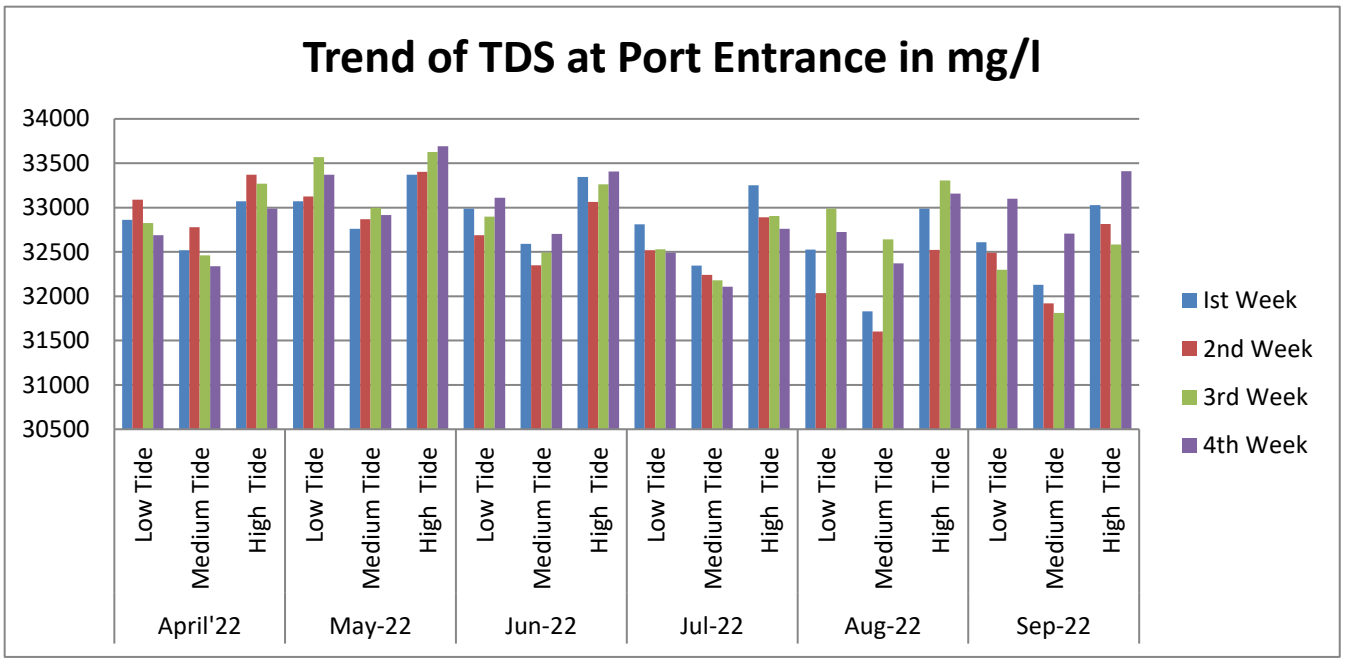
Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	6.2	6.8	5.1	5.3	July'22	Low Tide	6.2	6.3	5.3	5.4
	Medium Tide	4.5	5.9	4.6	4.3		Medium Tide	4.1	5.9	4.6	4.7
	High Tide	8.1	8.2	6.7	7.3		High Tide	8.1	7.6	6.8	7.7
May'22	Low Tide	6.8	7.0	5.3	5.5	Aug'22	Low Tide	6.6	6.5	5.1	5.1
	Medium Tide	4.7	6.3	4.8	4.5		Medium Tide	4.5	6.3	4.2	4.5
	High Tide	8.5	8.4	6.9	7.7		High Tide	8.5	8.2	6.5	7.5
June'22	Low Tide	6.4	6.6	5.7	5.7	Sep'22	Low Tide	6.0	6.3	4.9	4.7
	Medium Tide	4.3	6.1	5.0	4.9		Medium Tide	4.3	6.1	4.0	4.3
	High Tide	8.3	7.9	7.1	7.9		High Tide	8.0	7.8	6.2	7.3



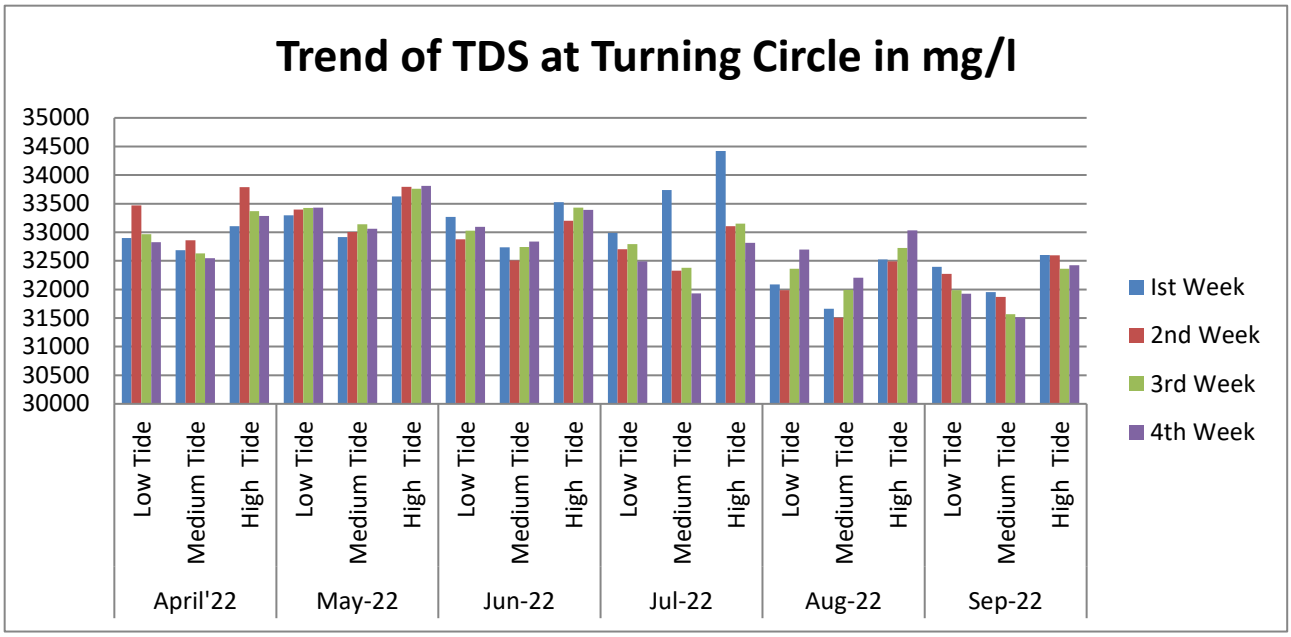
Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	18.2	18.1	18.2	18.9	July'22	Low Tide	18.1	17.5	18.5	19.1
	Medium Tide	16.2	17.2	16.6	16.8		Medium Tide	16.0	17.0	16.8	17.1
	High Tide	19.7	19.1	20.7	20.6		High Tide	19.2	18.5	20.7	20.7
May'22	Low Tide	18.7	18.3	18.5	19.2	Aug'22	Low Tide	18.3	18.0	18.2	18.7
	Medium Tide	16.5	17.5	16.9	17.0		Medium Tide	16.5	17.5	16.3	16.7
	High Tide	20.1	19.3	20.9	20.8		High Tide	19.4	19.2	20.4	20.4
June'22	Low Tide	18.4	17.8	18.8	19.5	Sep'22	Low Tide	17.8	17.8	18.0	18.4
	Medium Tide	16.3	17.3	17.2	17.3		Medium Tide	16.2	16.7	16.1	16.4
	High Tide	19.6	18.9	21.2	21.1		High Tide	19.1	19.4	20.0	20.1

Summary of Turbidity: Coal berth varied between 4.0 to 8.5 NTU: Turning circle varied between 4.0 to 9.2 NTU and Approach channel varied between 3.8 to 8.5 NTU: Reclamation Area varied between 16.0 to 21.2 NTU

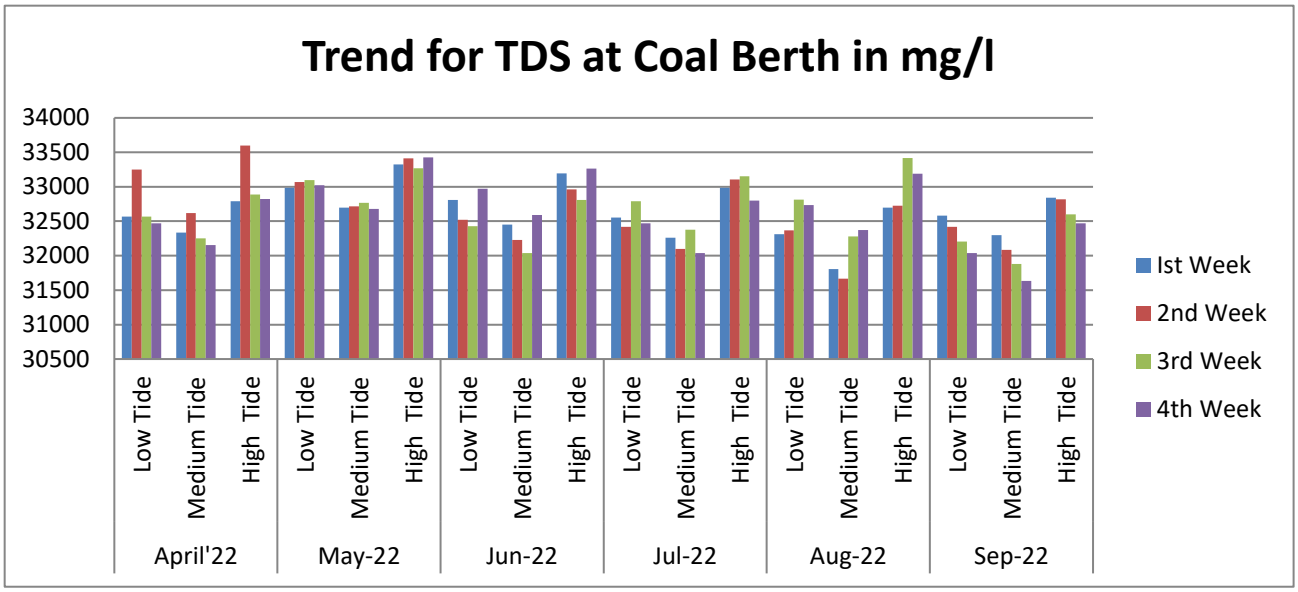
Status of Total Dissolved Solids in Marine Water



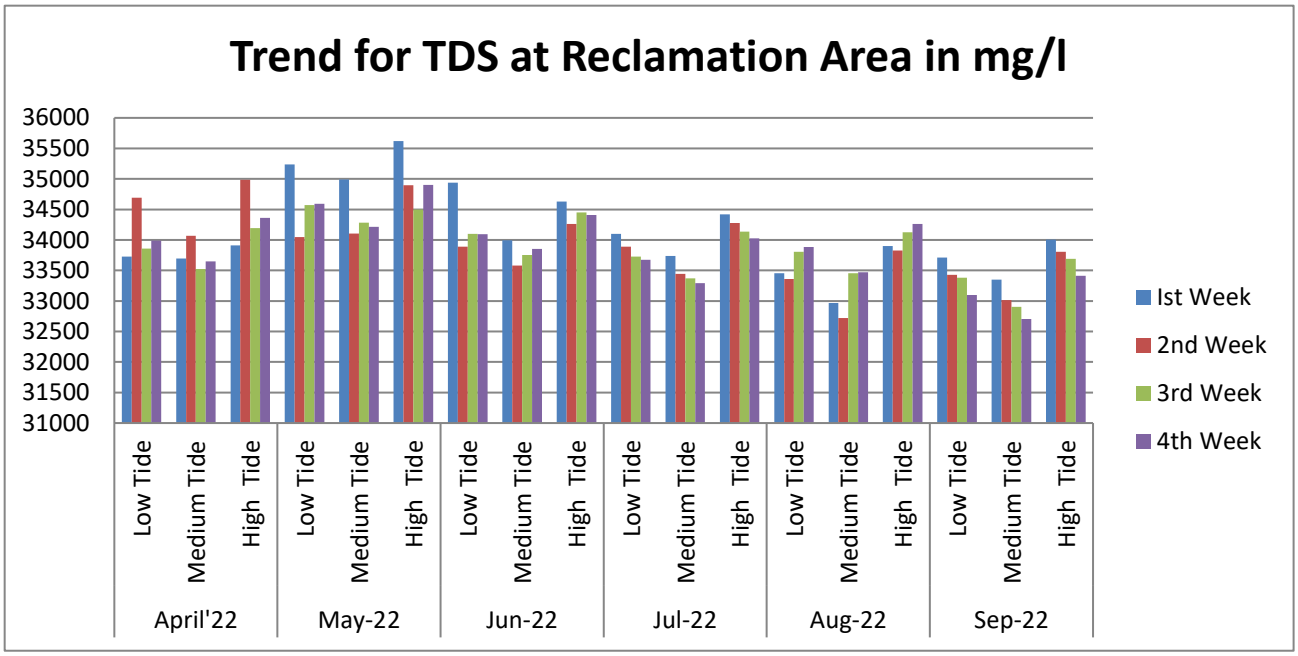
Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	32860	33089	32826	32689	July'22	Low Tide	32810	32518	32528	32489
	Medium Tide	32520	32779	32460	32339		Medium Tide	32344	32241	32180	32107
	High Tide	33069	33369	33269	32989		High Tide	33250	32890	32906	32760
May'22	Low Tide	33069	33126	33569	33369	Aug'22	Low Tide	32526	32036	32989	32726
	Medium Tide	32762	32869	32999	32916		Medium Tide	31831	31601	32641	32369
	High Tide	33371	33402	33628	33690		High Tide	32989	32521	33306	33158
June'22	Low Tide	32989	32690	32896	33110	Sep'22	Low Tide	32610	32489	32298	33098
	Medium Tide	32590	32350	32492	32701		Medium Tide	32130	31920	31810	32705
	High Tide	33346	33062	33262	33406		High Tide	33026	32815	32582	33411



Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	32899	33469	32967	32826	July'22	Low Tide	32986	32706	32790	32490
	Medium Tide	32688	32859	32628	32544		Medium Tide	33736	32330	32377	31929
	High Tide	33105	33789	33369	33286		High Tide	34421	33105	33152	32814
May'22	Low Tide	33298	33398	33425	33429	Aug'22	Low Tide	32089	31989	32362	32698
	Medium Tide	32914	33008	33140	33063		Medium Tide	31660	31506	31991	32208
	High Tide	33626	33792	33759	33810		High Tide	32525	32488	32725	33036
June'22	Low Tide	33269	32875	33026	33096	Sep'22	Low Tide	32398	32274	31989	31925
	Medium Tide	32738	32509	32742	32840		Medium Tide	31953	31872	31568	31512
	High Tide	33528	33201	33428	33389		High Tide	32603	32596	32361	32421



Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	32568	33248	32569	32468	July'22	Low Tide	32554	32419	32790	32472
	Medium Tide	32336	32617	32250	32155		Medium Tide	32260	32097	32377	32039
	High Tide	32790	33596	32890	32825		High Tide	32985	33105	33152	32799
May'22	Low Tide	32986	33069	33098	33024	Aug'22	Low Tide	32310	32369	32813	32736
	Medium Tide	32698	32718	32767	32677		Medium Tide	31806	31665	32278	32374
	High Tide	33325	33411	33269	33426		High Tide	32698	32725	33418	33189
June'22	Low Tide	32811	32520	32426	32969	Sep'22	Low Tide	32580	32421	32204	32036
	Medium Tide	32450	32226	32036	32592		Medium Tide	32296	32084	31879	31634
	High Tide	33194	32962	32807	33262		High Tide	32839	32819	32601	32468

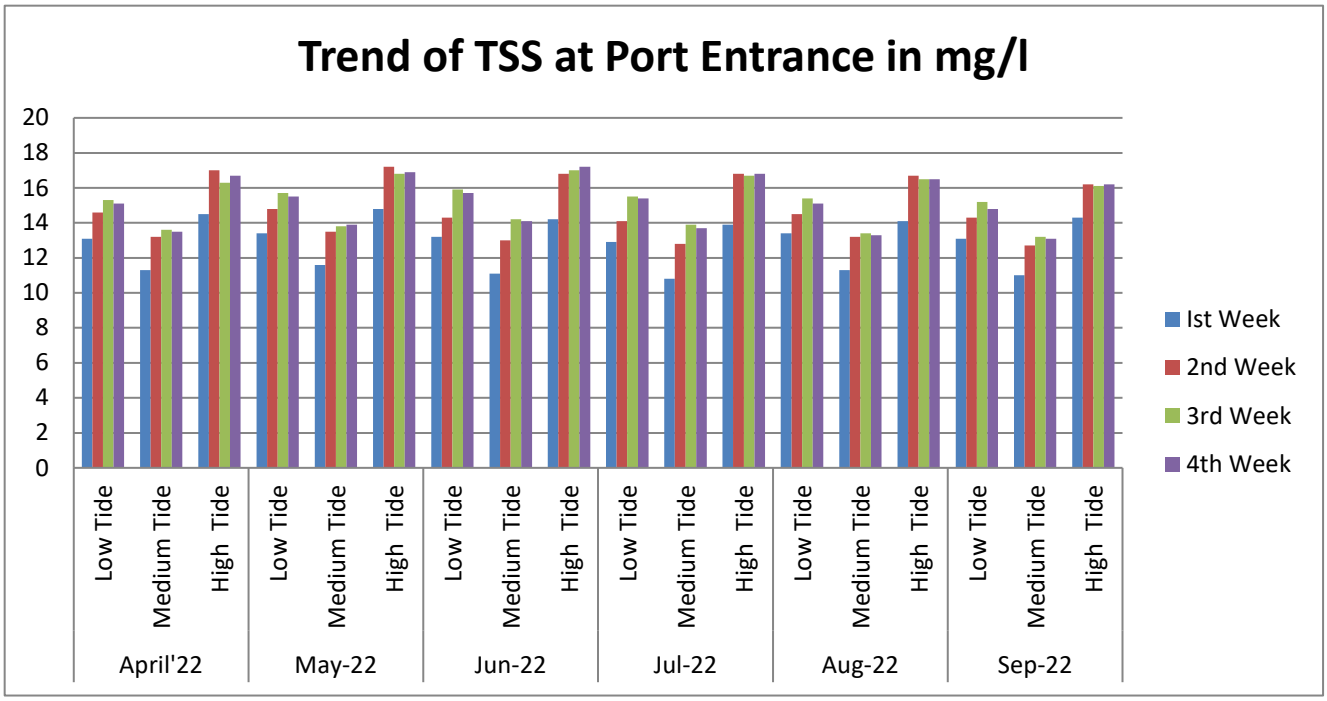


Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	33726	34690	33856	33989	July'22	Low Tide	34098	33890	33728	33676
	Medium Tide	33695	34069	33524	33651		Medium Tide	33736	33446	33370	33290
	High Tide	33909	34985	34196	34362		High Tide	34421	34276	34137	34027
May'22	Low Tide	35236	34046	34569	34592	Aug'22	Low Tide	33456	33358	33804	33887
	Medium Tide	34992	34107	34281	34213		Medium Tide	32967	32722	33452	33469
	High Tide	35620	34896	34498	34899		High Tide	33901	33826	34126	34262
June'22	Low Tide	34936	33890	34098	34092	Sep'22	Low Tide	33712	33428	33382	33098
	Medium Tide	33993	33579	33751	33851		Medium Tide	33352	33014	32906	32705
	High Tide	34629	34264	34452	34408		High Tide	34007	33806	33688	33411

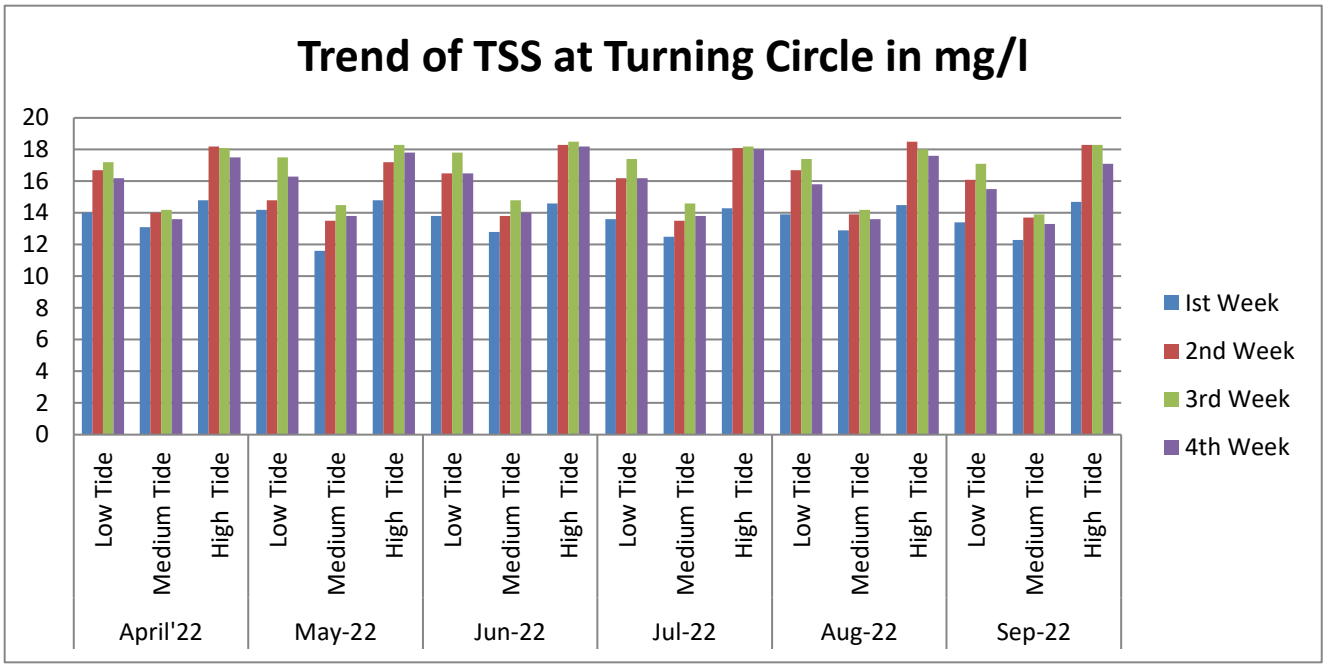
Summary of TDS of Marinne water quality results

- **TDS** - Values are in the range of 31601 to 33690 mg/l at Port Entrance (Approach Channel).
  - Values are in the range of 31506 to 34421 mg/l at Turning Circle
  - Values are in the range of 31634 to 33596 mg/l at Coal Berth
  - Values are in range of 32705 to 35620 at Reclamation Area

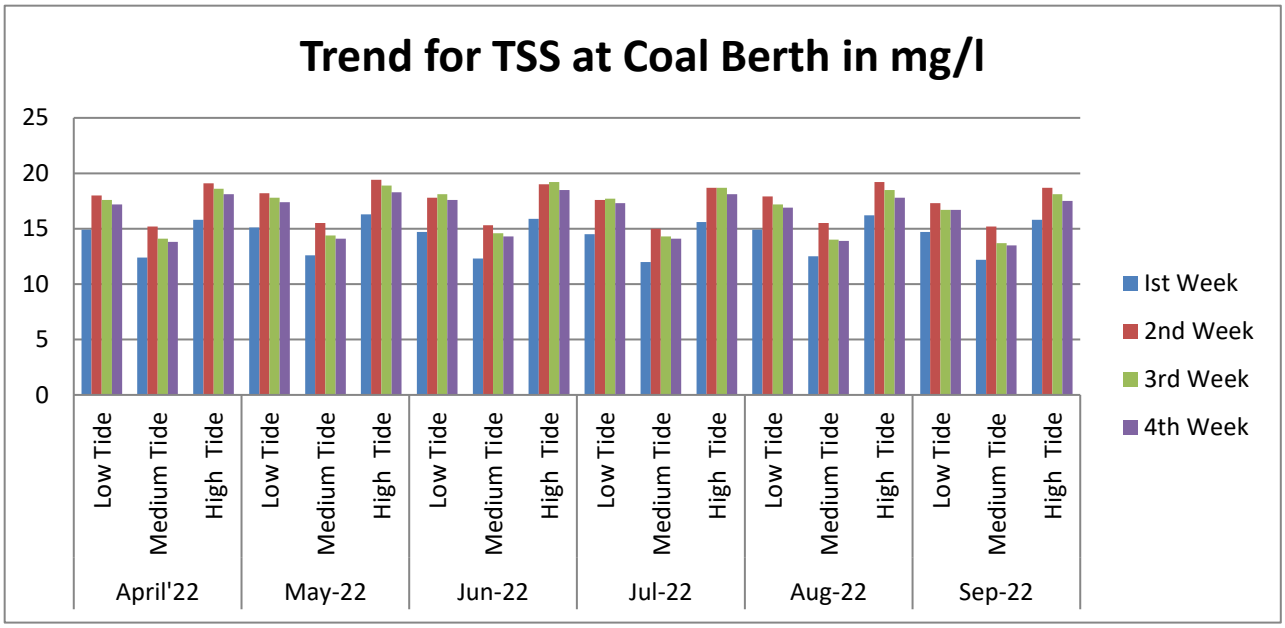
Status of Total Suspended Solids in Marine Water



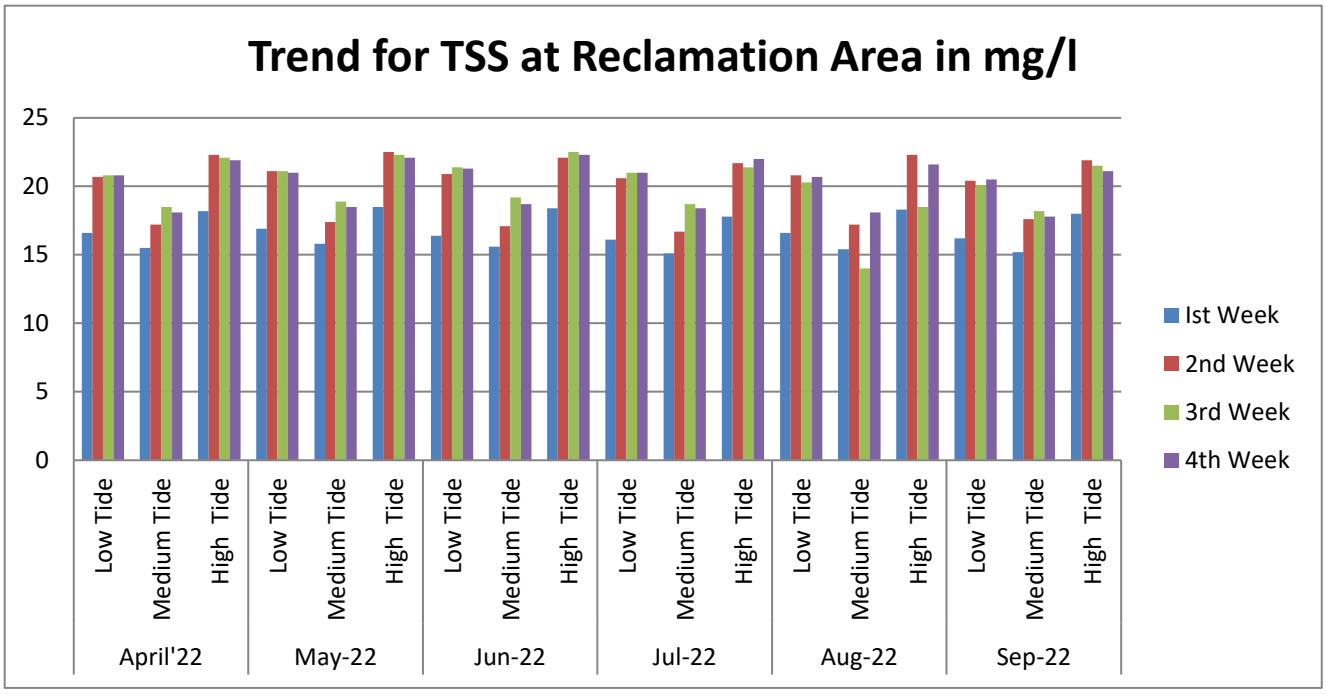
Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	13.1	14.6	15.3	15.1	July'22	Low Tide	12.9	14.1	15.5	15.4
	Medium Tide	11.3	13.2	13.6	13.5		Medium Tide	10.8	12.8	13.9	13.7
	High Tide	14.5	17.0	16.3	16.7		High Tide	13.9	16.8	16.7	16.8
May'22	Low Tide	13.4	14.8	15.7	15.5	Aug'22	Low Tide	13.4	14.5	15.4	15.1
	Medium Tide	11.6	13.5	13.8	13.9		Medium Tide	11.3	13.2	13.4	13.3
	High Tide	14.8	17.2	16.8	16.9		High Tide	14.1	16.7	16.5	16.5
June'22	Low Tide	13.2	14.3	15.9	15.7	Sep'22	Low Tide	13.1	14.3	15.2	14.8
	Medium Tide	11.1	13.0	14.2	14.1		Medium Tide	11.0	12.7	13.2	13.1
	High Tide	14.2	16.8	17.0	17.2		High Tide	14.3	16.2	16.1	16.2



Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	14.0	16.7	17.2	16.2	July'22	Low Tide	13.6	16.2	17.4	16.2
	Medium Tide	13.1	14.0	14.2	13.6		Medium Tide	12.5	13.5	14.6	13.8
	High Tide	14.8	18.2	18.1	17.5		High Tide	14.3	18.1	18.2	18.0
May'22	Low Tide	14.2	14.8	17.5	16.3	Aug'22	Low Tide	13.9	16.7	17.4	15.8
	Medium Tide	11.6	13.5	14.5	13.8		Medium Tide	12.9	13.9	14.2	13.6
	High Tide	14.8	17.2	18.3	17.8		High Tide	14.5	18.5	18.0	17.6
June'22	Low Tide	13.8	16.5	17.8	16.5	Sep'22	Low Tide	13.4	16.1	17.1	15.5
	Medium Tide	12.8	13.8	14.8	14.0		Medium Tide	12.3	13.7	13.9	13.3
	High Tide	14.6	18.3	18.5	18.2		High Tide	14.7	18.3	18.3	17.1

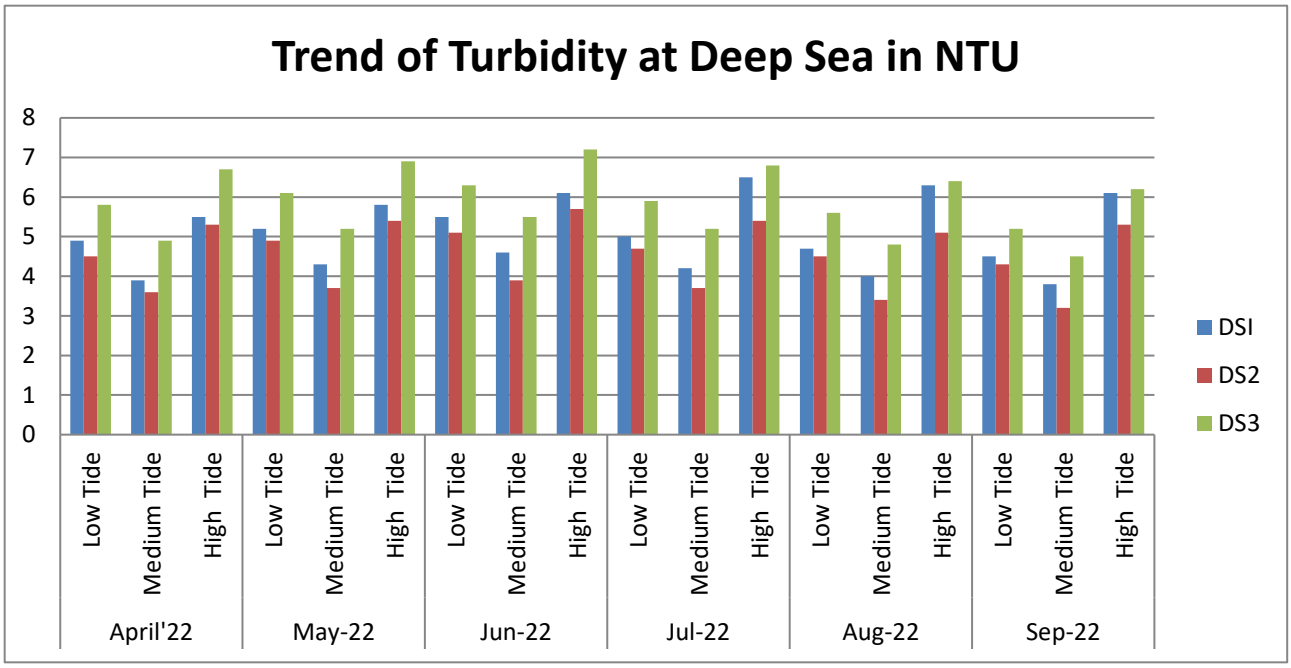


Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	14.9	18.0	17.6	17.2	July'22	Low Tide	14.5	17.6	17.7	17.3
	Medium Tide	12.4	15.2	14.1	13.8		Medium Tide	12.0	15.0	14.3	14.1
	High Tide	15.8	19.1	18.6	18.1		High Tide	15.6	18.7	18.7	18.1
May'22	Low Tide	15.1	18.2	17.8	17.4	Aug'22	Low Tide	14.9	17.9	17.2	16.9
	Medium Tide	12.6	15.5	14.4	14.1		Medium Tide	12.5	15.5	14.0	13.9
	High Tide	16.3	19.4	18.9	18.3		High Tide	16.2	19.2	18.5	17.8
June'22	Low Tide	14.7	17.8	18.1	17.6	Sep'22	Low Tide	14.7	17.3	16.7	16.7
	Medium Tide	12.3	15.3	14.6	14.3		Medium Tide	12.2	15.2	13.7	13.5
	High Tide	15.9	19.0	19.2	18.5		High Tide	15.8	18.7	18.1	17.5

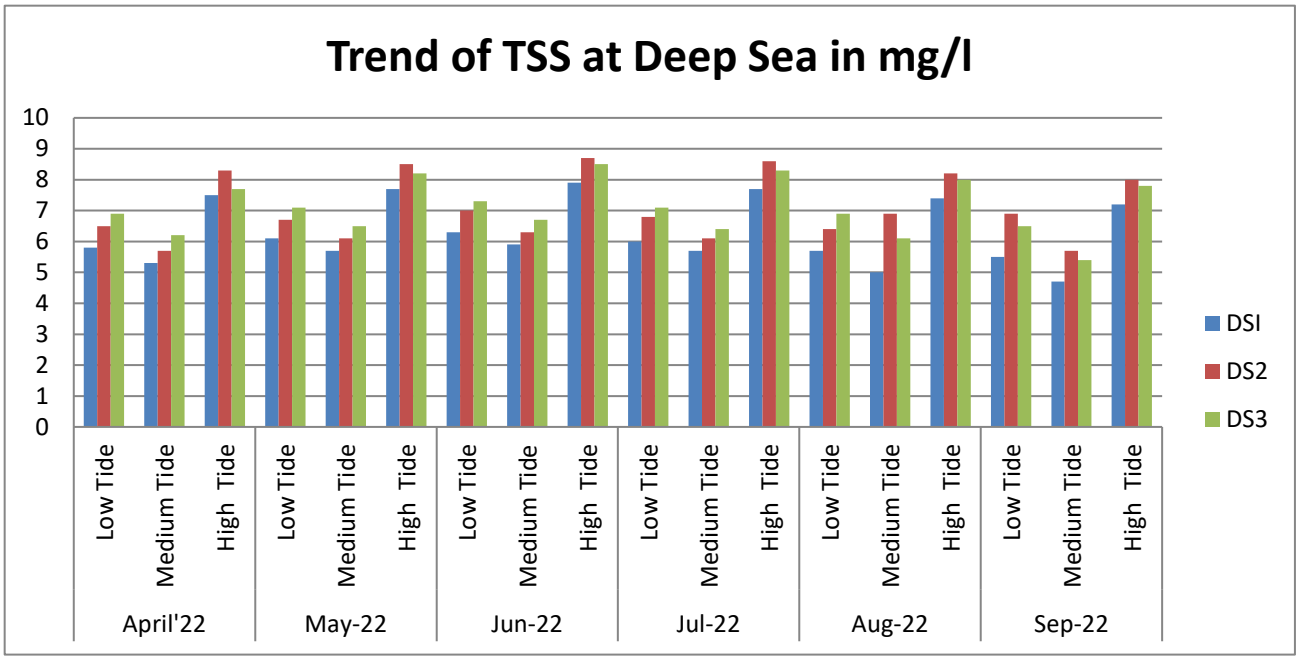


Month		Ist Week	2nd Week	3rd Week	4th Week	Month		Ist Week	2nd Week	3rd Week	4th Week
April'22	Low Tide	16.6	20.7	20.8	20.8	July'22	Low Tide	16.1	20.6	21.0	21.0
	Medium Tide	15.5	17.2	18.5	18.1		Medium Tide	15.1	16.7	18.7	18.4
	High Tide	18.2	22.3	22.1	21.9		High Tide	17.8	21.7	21.4	22.0
May'22	Low Tide	16.9	21.1	21.1	21.0	Aug'22	Low Tide	16.6	20.8	20.3	20.7
	Medium Tide	15.8	17.4	18.9	18.5		Medium Tide	15.4	17.2	14.0	18.1
	High Tide	18.5	22.5	22.3	22.1		High Tide	18.3	22.3	18.5	21.6
June'22	Low Tide	16.4	20.9	21.4	21.3	Sep'22	Low Tide	16.2	20.4	20.1	20.5
	Medium Tide	15.6	17.1	19.2	18.7		Medium Tide	15.2	17.6	18.2	17.8
	High Tide	18.4	22.1	22.5	22.3		High Tide	18.0	21.9	21.5	21.1

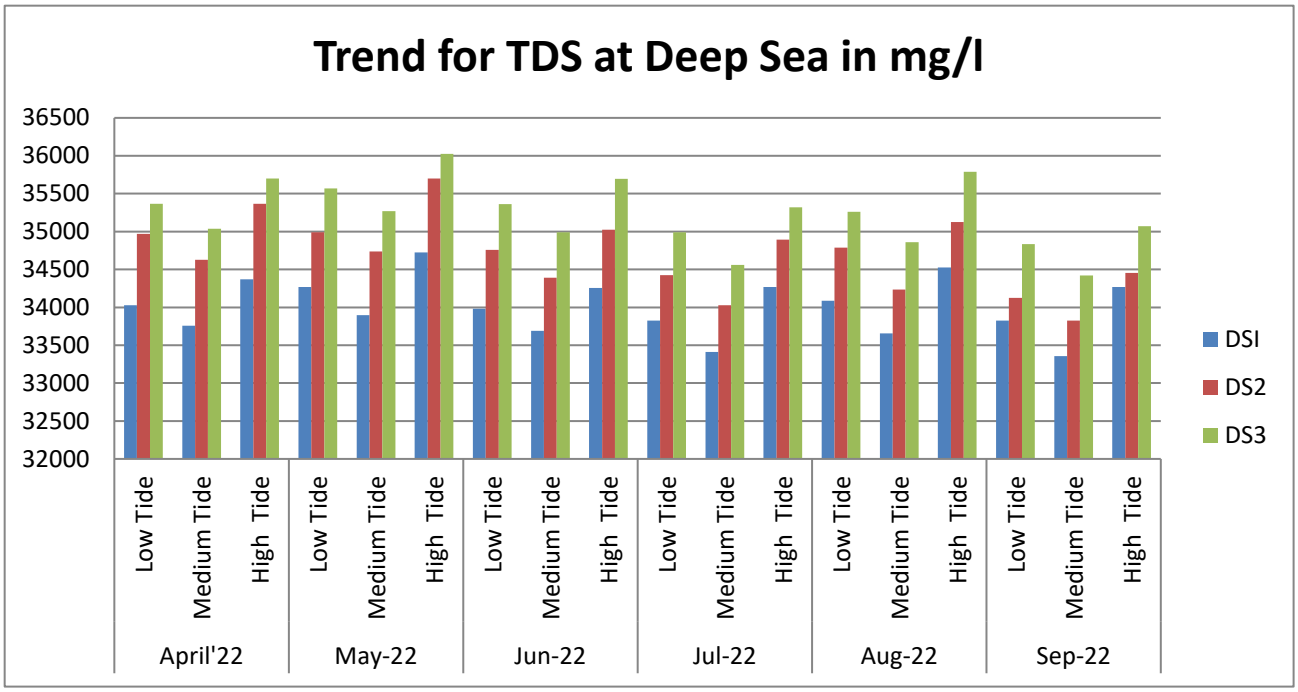
Status of Deep Sea Water Quality



Month		DSI	DS2	DS3	Month		DSI	DS2	DS3
April'22	Low Tide	4.9	4.5	5.8	July'22	Low Tide	5.0	4.7	5.9
	Medium Tide	3.9	3.6	4.9		Medium Tide	4.2	3.7	5.2
	High Tide	5.5	5.3	6.7		High Tide	6.5	5.4	6.8
May'22	Low Tide	5.2	4.9	6.1	Aug'22	Low Tide	4.7	4.5	5.6
	Medium Tide	4.3	3.7	5.2		Medium Tide	4.0	3.4	4.8
	High Tide	5.8	5.4	6.9		High Tide	6.3	5.1	6.4
June'22	Low Tide	5.5	5.1	6.3	Sep'22	Low Tide	4.5	4.3	5.2
	Medium Tide	4.6	3.9	5.5		Medium Tide	3.8	3.2	4.5
	High Tide	6.1	5.7	7.2		High Tide	6.1	5.3	6.2



Month		DSI	DS2	DS3	Month		DSI	DS2	DS3
April'22	Low Tide	5.8	6.5	6.9	July'22	Low Tide	6.0	6.8	7.1
	Medium Tide	5.3	5.7	6.2		Medium Tide	5.7	6.1	6.4
	High Tide	7.5	8.3	7.7		High Tide	7.7	8.6	8.3
May'22	Low Tide	6.1	6.7	7.1	Aug'22	Low Tide	5.7	6.4	6.9
	Medium Tide	5.7	6.1	6.5		Medium Tide	5.0	6.9	6.1
	High Tide	7.7	8.5	8.2		High Tide	7.4	8.2	8.0
June'22	Low Tide	6.3	7.0	7.3	Sep'22	Low Tide	5.5	6.9	6.5
	Medium Tide	5.9	6.3	6.7		Medium Tide	4.7	5.7	5.4
	High Tide	7.9	8.7	8.5		High Tide	7.2	8.0	7.8



Month		DSI	DS2	DS3	Month		DSI	DS2	DS3
April'22	Low Tide	34026	34969	35368	July'22	Low Tide	33825	34426	34989
	Medium Tide	33756	34628	35039		Medium Tide	33410	34029	34558
	High Tide	34369	35365	35698		High Tide	34269	34892	35321
May'22	Low Tide	34269	34992	35570	Aug'22	Low Tide	34089	34788	35262
	Medium Tide	33896	34738	35269		Medium Tide	33658	34236	34861
	High Tide	34726	35698	36025		High Tide	34526	35125	35789
June'22	Low Tide	33982	34759	35360	Sep'22	Low Tide	33825	34125	34836
	Medium Tide	33689	34389	34989		Medium Tide	33358	33826	34421
	High Tide	34255	35026	35697		High Tide	34269	34456	35069

4.6 Marine Sediment Quality

4.6.1 Sampling Locations

The Marine sediment sampling is carried out once in every week at four locations in the port listed below**.**

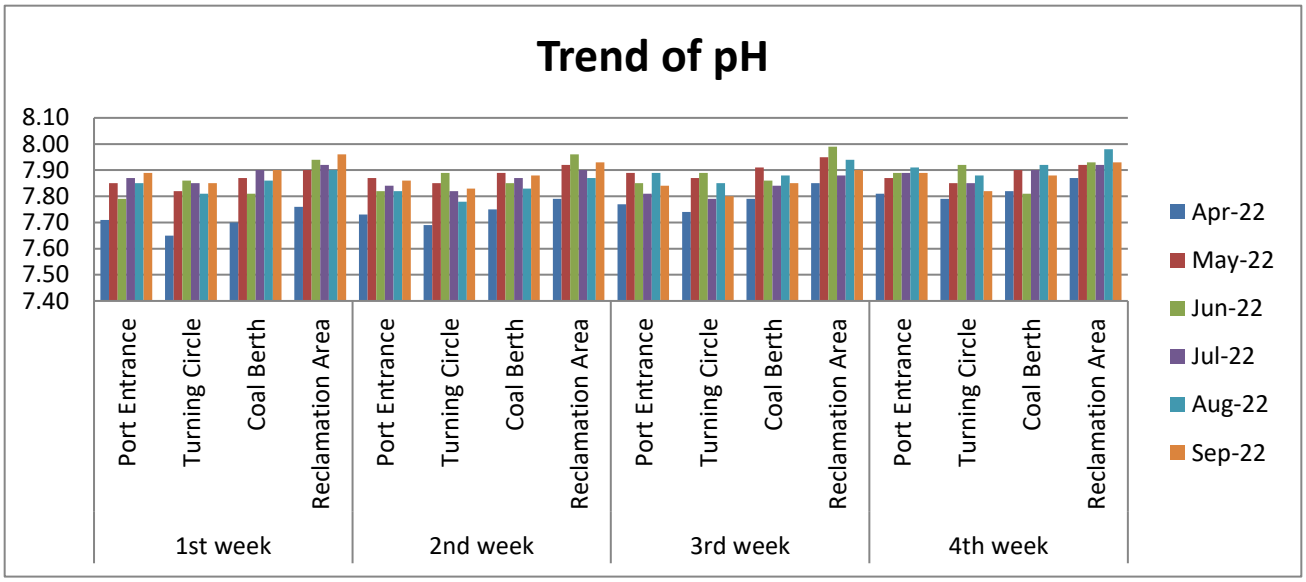
MARINE SEDIMENT MONITORING LOCATIONS

SI.No	Location
1	Port Entrance
2	Turning Circle
3	Coal Berth
4	Reclamations Area

4.6.2 Method of Sampling

Marine sediment samples are collected using Van Veen Grab Sampler for analyzing Physical, Chemical and Biological parameters and presence of Heavy metals.

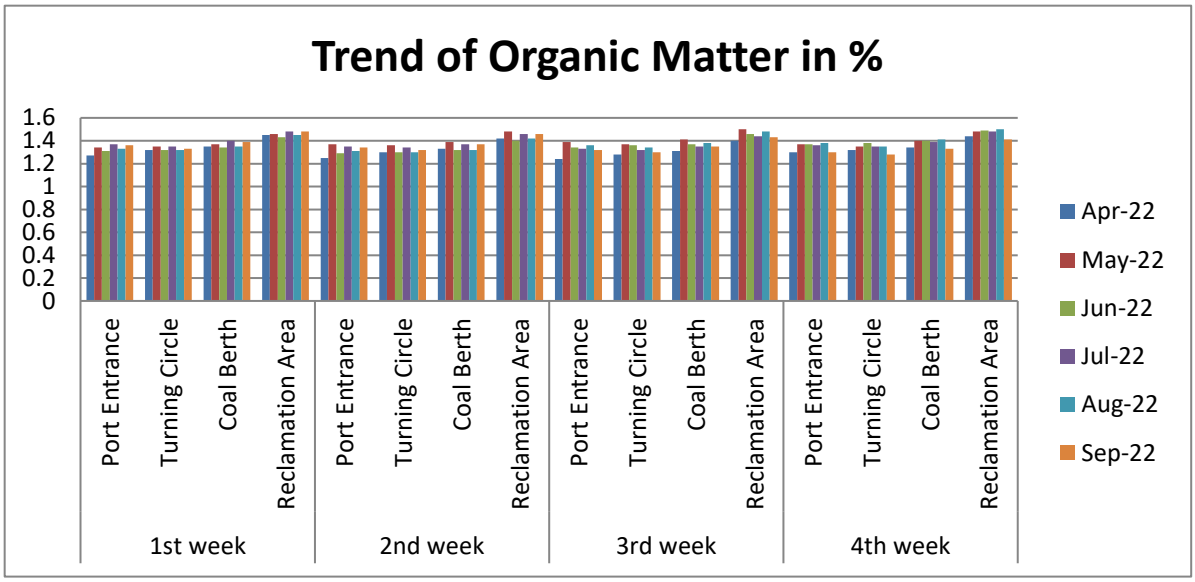
Status of Marine Sediments Quality



pH in Marine sediment varied between 7.65 to 7.99

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	7.71	7.65	7.70	7.76	7.73	7.69	7.75	7.79
May'22	7.85	7.82	7.87	7.90	7.87	7.85	7.89	7.92
June'22	7.79	7.86	7.81	7.94	7.82	7.89	7.85	7.96
July'22	7.87	7.85	7.90	7.92	7.84	7.82	7.87	7.90
Aug'22	7.85	7.81	7.86	7.90	7.82	7.78	7.83	7.87
Sep'22	7.89	7.85	7.90	7.96	7.86	7.83	7.88	7.93

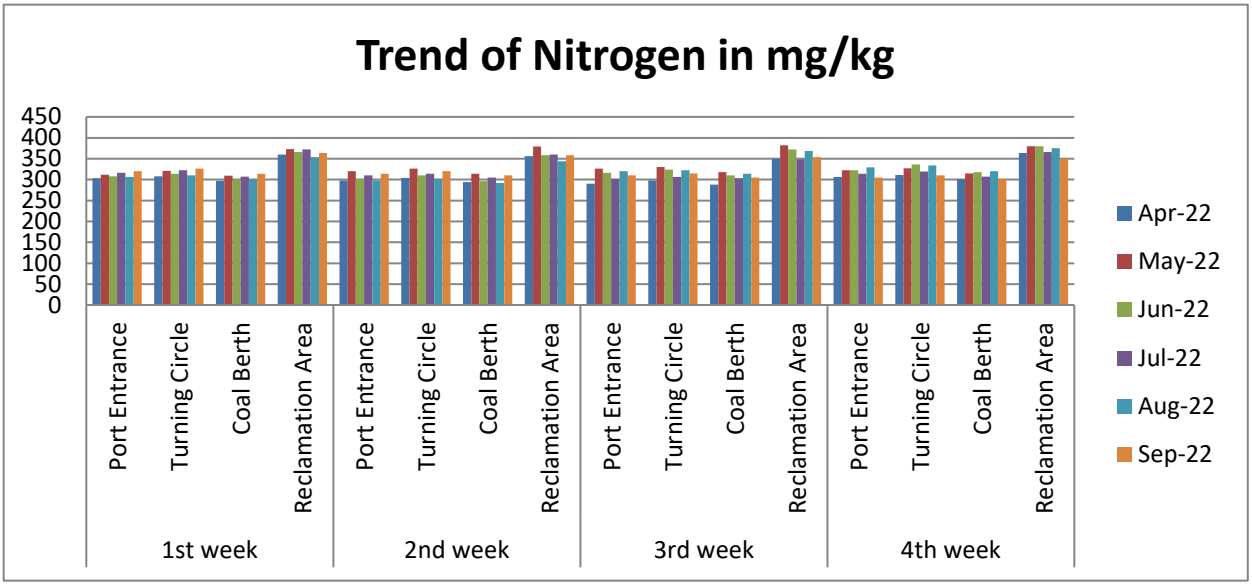
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	7.77	7.74	7.79	7.85	7.81	7.79	7.82	7.87
May'22	7.89	7.87	7.91	7.95	7.87	7.85	7.90	7.92
June'22	7.85	7.89	7.86	7.99	7.89	7.92	7.81	7.93
July'22	7.81	7.79	7.84	7.88	7.89	7.85	7.90	7.92
Aug'22	7.89	7.85	7.88	7.94	7.91	7.88	7.92	7.98
Sep'22	7.84	7.80	7.85	7.90	7.89	7.82	7.88	7.93



Organic Matter in Marine sediment varied between 1.24 to 1.50 %

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1.27	1.32	1.35	1.45	1.25	1.30	1.33	1.42
May'22	1.34	1.35	1.37	1.46	1.37	1.36	1.39	1.48
June'22	1.31	1.32	1.34	1.43	1.29	1.30	1.32	1.40
July'22	1.37	1.35	1.40	1.48	1.35	1.34	1.37	1.46
Aug'22	1.33	1.32	1.35	1.45	1.31	1.30	1.32	1.42
Sep'22	1.36	1.33	1.39	1.48	1.34	1.32	1.37	1.46

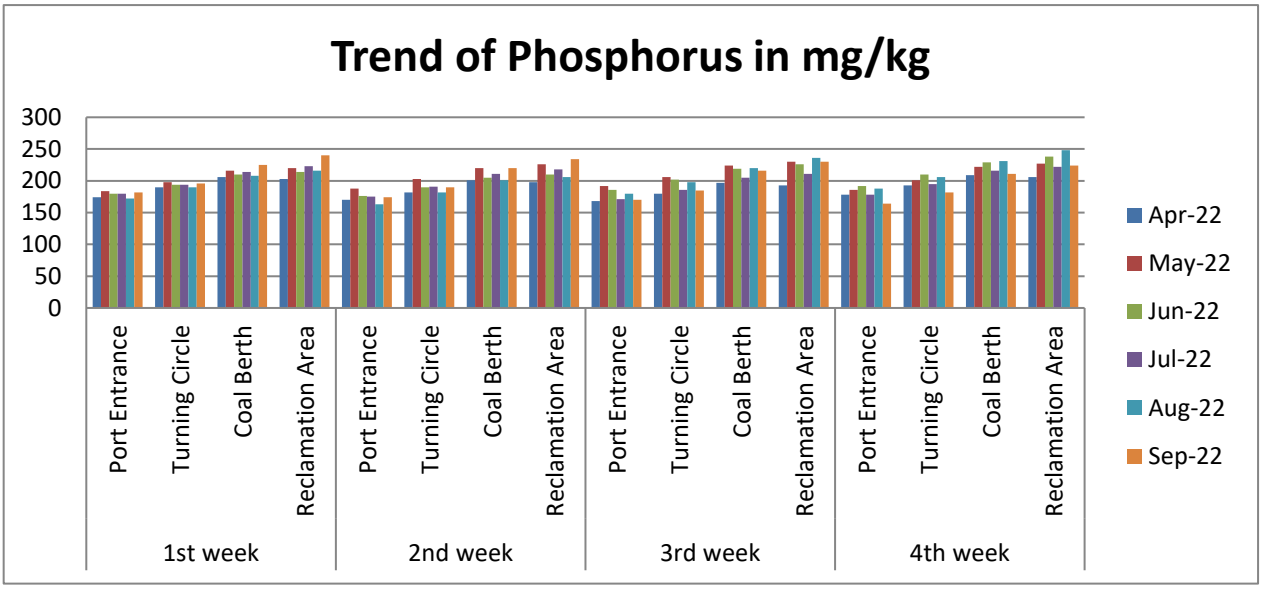
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1.24	1.28	1.31	1.40	1.30	1.32	1.34	1.44
May'22	1.39	1.37	1.41	1.50	1.37	1.35	1.40	1.48
June'22	1.34	1.36	1.37	1.46	1.37	1.38	1.40	1.49
July'22	1.33	1.32	1.35	1.44	1.36	1.35	1.39	1.48
Aug'22	1.36	1.34	1.38	1.48	1.38	1.35	1.41	1.50
Sep'22	1.32	1.30	1.35	1.43	1.30	1.28	1.33	1.41



Nitrogen In Marine sediment varied between 288 to 382 mg/kg

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	303	308	297	360	298	304	294	356
May'22	312	321	309	373	320	326	314	379
June'22	308	314	301	366	302	310	296	358
July'22	316	322	307	372	310	314	305	360
Aug'22	306	310	301	354	298	302	292	344
Sep'22	320	326	314	364	314	320	310	358

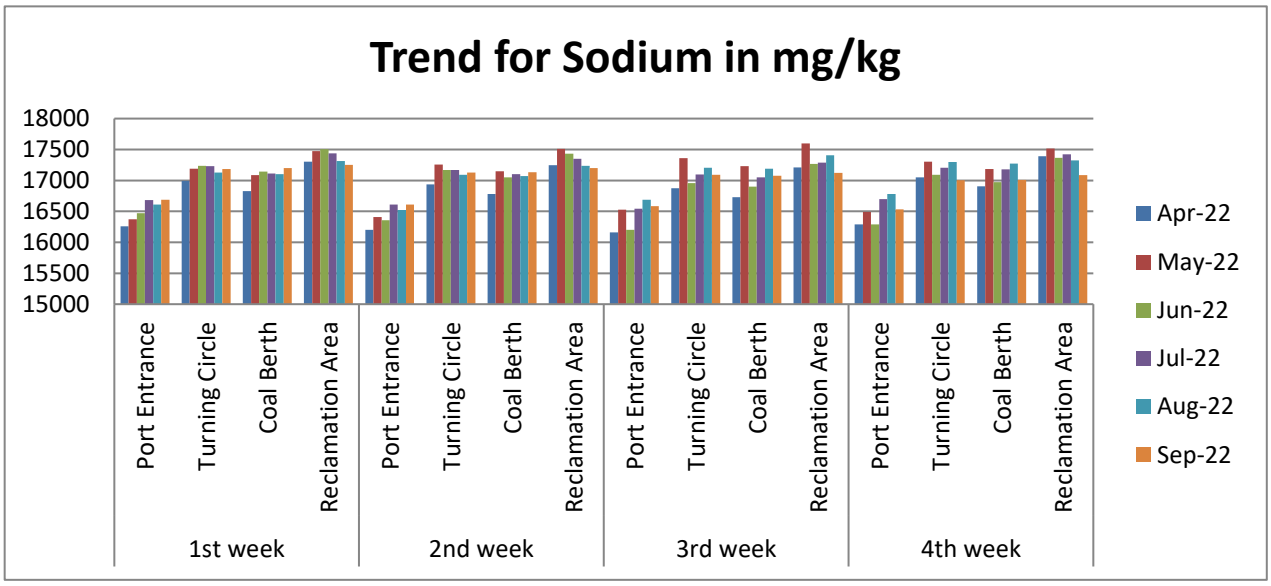
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	290	298	288	350	306	311	301	364
May'22	326	330	318	382	322	327	315	380
June'22	316	324	310	372	322	336	318	380
July'22	302	306	303	348	314	319	307	366
Aug'22	320	322	314	368	329	334	320	375
Sep'22	310	315	305	354	305	310	301	350



Phosphorous in Marine sediment varied between 163 to 248 mg/kg

Month	1st Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	174	190	206	203	170	182	201	198
May'22	184	198	216	220	188	203	220	226
June'22	180	194	210	214	176	190	205	210
July'22	180	194	214	223	175	191	211	218
Aug'22	172	190	208	216	163	182	201	206
Sep'22	182	196	225	240	174	190	220	234

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	168	180	197	193	178	193	209	206
May'22	192	206	224	230	186	201	222	227
June'22	186	202	219	226	192	210	229	238
July'22	171	186	205	211	178	195	216	222
Aug'22	180	198	220	236	188	206	231	248
Sep'22	170	185	216	230	164	182	211	224



Sodium in Marine sediment varied between 16159 to 17598 mg/kg

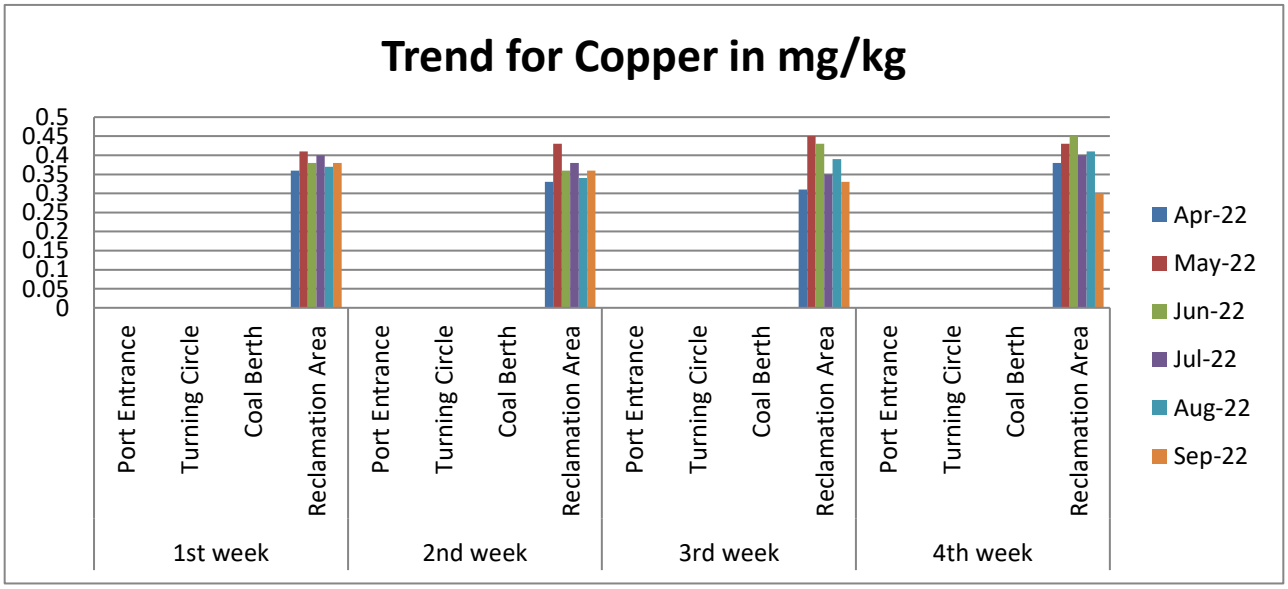
Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	16259	16995	16830	17305	16203	16934	16780	17245
May'22	16375	17189	17084	17472	16410	17256	17148	17510
June'22	16469	17238	17142	17506	16358	17169	17052	17432
July'22	16682	17229	17113	17437	16610	17170	17104	17352
Aug'22	16610	17126	17104	17316	16524	17089	17071	17234
Sep'22	16690	17182	17199	17253	16612	17127	17134	17199

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	16159	16876	16728	17210	16289	17052	16904	17389
May'22	16526	17362	17232	17598	16489	17306	17184	17516
June'22	16203	16956	16901	17269	16289	17092	16973	17363
July'22	16542	17098	17052	17289	16698	17205	17178	17424
Aug'22	16690	17205	17189	17406	16782	17298	17270	17324
Sep'22	16584	17092	17075	17124	16532	17002	17011	17085

Potassium in Marine sediment varied between 301 to 385 mg/kg

Month	1st Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	316	360	324	362	303	352	313	355
May'22	331	374	340	374	337	380	345	378
June'22	320	362	329	365	314	354	323	360
July'22	329	362	338	371	324	354	334	365
Aug'22	322	350	332	358	313	348	324	350
Sep'22	340	365	344	370	335	360	340	364

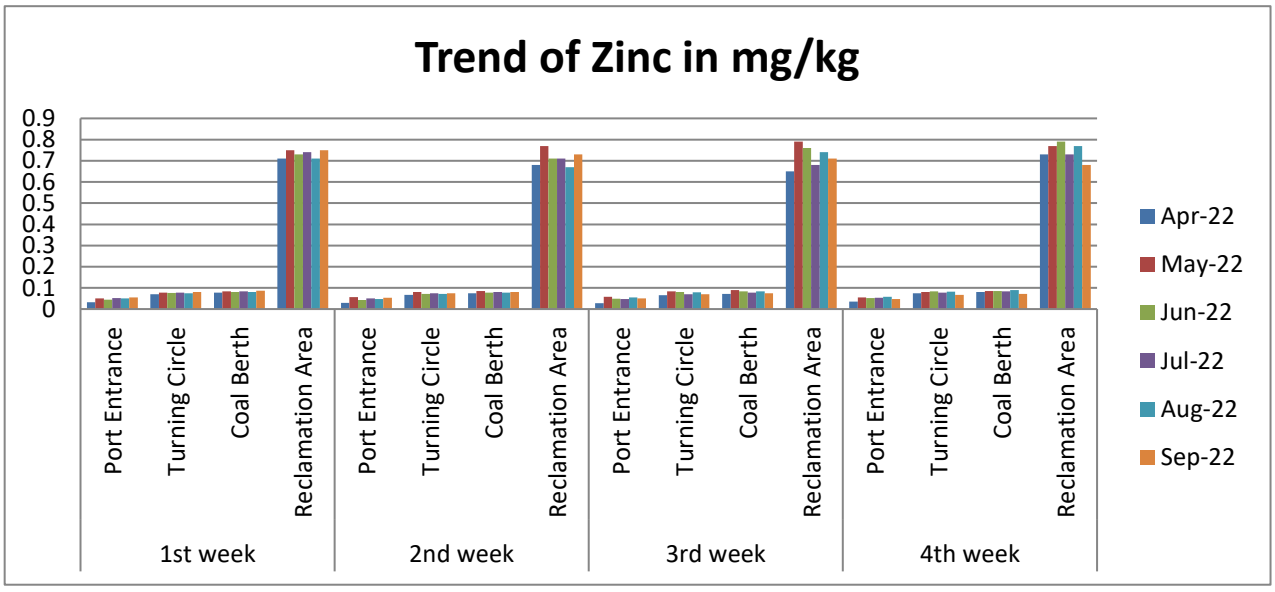
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	301	346	308	352	322	366	328	365
May'22	340	385	349	382	336	381	345	377
June'22	332	370	340	379	341	382	350	385
July'22	320	350	330	362	327	358	337	369
Aug'22	334	360	344	370	346	372	351	379
Sep'22	331	354	332	358	325	350	326	352



Copper in Marine Sediment varied between 0.30 to 0.45 mg/kg

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	< 0.01	< 0.01	< 0.01	0.36	< 0.01	< 0.01	< 0.01	0.33
May'22	< 0.01	< 0.01	< 0.01	0.41	< 0.01	< 0.01	< 0.01	0.43
June'22	< 0.01	< 0.01	< 0.01	0.38	< 0.01	< 0.01	< 0.01	0.36
July'22	< 0.01	< 0.01	< 0.01	0.40	< 0.01	< 0.01	< 0.01	0.38
Aug'22	< 0.01	< 0.01	< 0.01	0.37	< 0.01	< 0.01	< 0.01	0.34
Sep'22	< 0.01	< 0.01	< 0.01	0.38	< 0.01	< 0.01	< 0.01	0.36

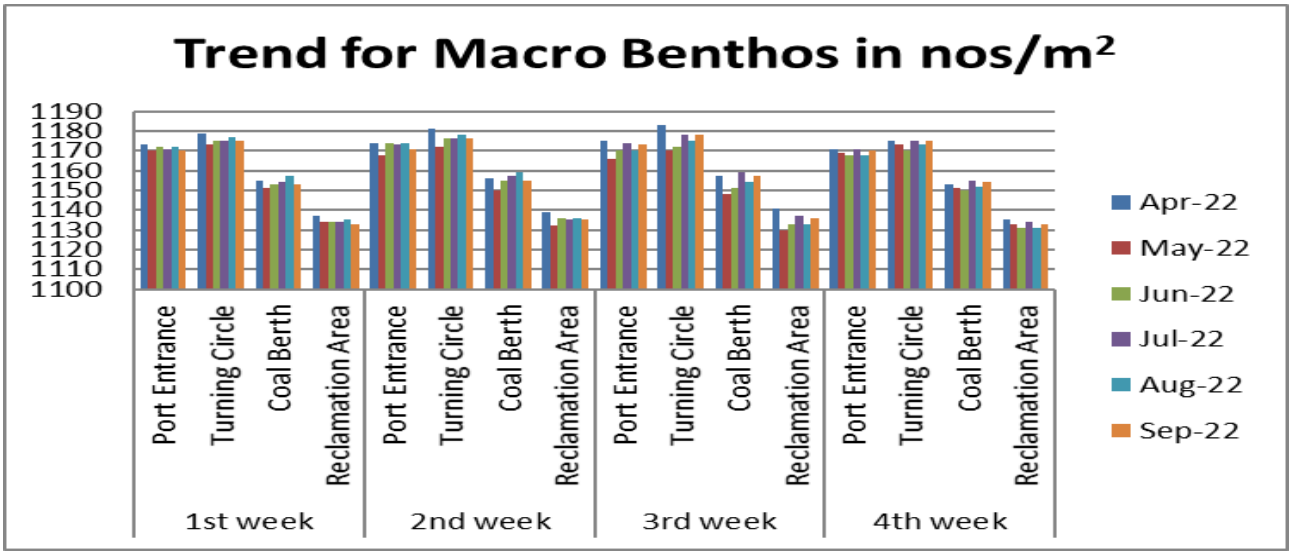
Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	< 0.01	< 0.01	< 0.01	0.31	< 0.01	< 0.01	< 0.01	0.38
May'22	< 0.01	< 0.01	< 0.01	0.45	< 0.01	< 0.01	< 0.01	0.43
June'22	< 0.01	< 0.01	< 0.01	0.43	< 0.01	< 0.01	< 0.01	0.45
July'22	< 0.01	< 0.01	< 0.01	0.35	< 0.01	< 0.01	< 0.01	0.40
Aug'22	< 0.01	< 0.01	< 0.01	0.39	< 0.01	< 0.01	< 0.01	0.41
Sep'22	< 0.01	< 0.01	< 0.01	0.33	< 0.01	< 0.01	< 0.01	0.30



Zinc in Marine sediment varied between 0.028 to 0.79 mg/kg

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	0.032	0.070	0.078	0.71	0.030	0.067	0.075	0.68
May'22	0.050	0.078	0.083	0.75	0.056	0.081	0.085	0.77
June'22	0.045	0.076	0.080	0.73	0.043	0.072	0.077	0.71
July'22	0.052	0.078	0.083	0.74	0.050	0.074	0.080	0.71
Aug'22	0.051	0.075	0.080	0.71	0.048	0.071	0.078	0.67
Sep'22	0.055	0.080	0.086	0.75	0.053	0.074	0.080	0.73

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	0.028	0.065	0.072	0.65	0.035	0.074	0.080	0.73
May'22	0.058	0.083	0.089	0.79	0.055	0.080	0.085	0.77
June'22	0.049	0.080	0.083	0.76	0.052	0.083	0.085	0.79
July'22	0.048	0.070	0.077	0.68	0.053	0.077	0.083	0.73
Aug'22	0.055	0.079	0.084	0.74	0.058	0.082	0.089	0.77
Sep'22	0.050	0.070	0.074	0.71	0.048	0.067	0.071	0.68



Macro Benthos in Marine Sediment varied between 1130 to 1183 nos/m^2

Month	Ist Week				2nd Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1173	1179	1155	1137	1174	1181	1156	1139
May'22	1170	1173	1151	1134	1168	1172	1150	1132
June'22	1172	1175	1153	1134	1174	1176	1155	1136
July'22	1171	1175	1154	1134	1173	1176	1157	1135
Aug'22	1172	1177	1157	1135	1174	1178	1159	1136
Sep'22	1170	1175	1153	1133	1171	1176	1155	1135

Month	3rd Week				4th Week			
	Port Entrance	Turning Circle	Coal Berth	Reclamation Area	Port Entrance	Turning Circle	Coal Berth	Reclamation Area
April'22	1175	1183	1157	1141	1171	1175	1153	1135
May'22	1166	1170	1148	1130	1169	1173	1151	1133
June'22	1170	1172	1151	1133	1168	1170	1150	1131
July'22	1174	1178	1159	1137	1171	1175	1155	1134
Aug'22	1170	1175	1154	1133	1168	1173	1152	1131
Sep'22	1173	1178	1157	1136	1170	1175	1154	1133

Summary of marine sediments quality results for Six months of April'22 - Sep'22

- Organic matter - value are in the range 1.24 to 1.50 %
- Nitrogen -value are in the range 288 to 382 mg/kg
- Phosphorous - value are in the range 163 to 248 mg/kg
- Sodium - value are in the range 16159 to 17598 mg/kg
- Potassium - value are in the range 301 to 385 mg/kg
- Copper - value are in the range 0.30 to 0.45 mg/kg
- Zinc -value are in the range 0.028 to 0.79 mg/kg
- Macro Benthos - value are in the range 1130 to 1183 nos/m^2

4.7 GROUND WATER QUALITY

4.7.1 Sampling Locations

Ground Water sampling is carried out once in six months at four locations in and around the Port. The Ground water sampling locations are listed below**.**

GROUND WATER QUALITY MONITORING LOCATIONS

Location Code	Location
GW1	Port Site
GW2	South Side of the Port
GW3	Gopalapuram Village
GW4	Krishnapatnam Village

TEST REPORT OF GROUND WATER SAMPLES

DATE OF COLLECTION : 25-05-2022

S. No.	Parameter	Unit	Port Site (Bore Well)	Krishnapatnam Village	South Side of the Port	Gopalpuram Village	IS: 10500-2012 Specification
1.	pH	--	7.16	7.28	7.31	7.25	6.5 – 8.5
2	Electrical Conductivity	µmhos	1638	924	1495	972	-
3	TDS	mg/l	984	558	920	583	500
4	Total Alkalinity as $CaCO_3$	mg/l	264	224	348	207	200
5	Chlorides as Cl^-	mg/l	445	209	369	191	250
6	Sodium	mg/l	180	92.7	192	94.0	-
7	Potassium	mg/l	45	18.2	41	21	-
8	Fluorides as F^-	mg/l	0.68	0.51	0.75	0.49	1.0
9	Nitrates as NO^-_3	mg/l	7.04	6.97	5.69	5.82	45
10	Cyanide as CN	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	0.05
11	Total Hardness as $CaCO_3$	mg/l	146	89.5	123	102	200
12	Salinity	ppt	0.089	0.042	0.072	0.039	-
13	Sulphates as SO^{-2}_4	mg/l	124	71.9	77.1	82.5	200
14	COD	mg/l	< 10.0	< 10.0	< 10.0	< 10.0	-
15	Mercury as Hg	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	0.001
16	Cadmium as Cd	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	0.003
17	Arsenic as As	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01
18	Selenium	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	-
19	Iron as Fe	mg/l	0.09	0.10	0.12	0.08	0.3
20	Lead as Pb	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01
21	Zinc as Zn	mg/l	0.14	0.08	0.10	0.15	5.0
22	Chromium as Cr^{6+}	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	0.05
23	Total Coliforms	CFU/ml	Not Detected	Not Detected	Not Detected	Not Detected	Shall not be detected in 100ml
24	Fecal Coliforms	CFU/ml	Not Detected	Not Detected	Not Detected	Not Detected	Shall not be detected in 100ml

Note: . All the above parameters have been tested as per APHA 23rd Edition, 2017.

4.8 SOIL QUALITY

For studying soil profile of the region, sampling locations are selected to assess the existing soil characteristics in and around the port area representing various land use conditions.

4.8.1 Sampling Locations

A total two number of samples collected from the sampling sites. The details of the soil sampling locations are given below.

The soil samples are collected and analyzed once in six months.

SOIL QUALITY MONITORING LOCATIONS

Location Code	Name of the Location
S1	Storage area towards west Buckingham Canal
S2	Storage Area at Port

TEST REPORT OF SOIL SAMPLES

DATE OF COLLECTION : 25-05-2022

S. NO.	PARAMETER	UNIT	S1	S2
1.	pH(1:5)	--	7.46	7.56
2.	EC(1:5)	µmhos	510	669
3.	Texture			
	a. Sand	%	68.4	73.1
	b. Silt	%	13.2	13.5
	c. Clay	%	18.4	13.4
4	Available Nitrogen	kg/ha	242	256
5	Available Phosphorus	kg/ha	16	18
6	Available Potassium	kg/ha	510	527
7	Exchangeable Sodium	mg/kg	188	203
8	Exchangeable Calcium	mg/kg	117	153
9	Exchangeable Magnesium	mg/kg	31	40
10	SAR (SAR)	-	1.8	1.7
11	Water Soluble Chlorides	mg/kg	149	164
12	Organic Carbon	%	0.40	0.47
13	Lead	mg/kg	7.8	6.2
14	Cadmium	mg/kg	0.15	0.12
15	Copper	mg/kg	6.75	7.1
16	Zinc	mg/kg	6.9	7.4

4.9 STP INLET AND OUTLET ANALYSIS

Frequency: STP Inlet and Outlet samples are collected monthly once.

TEST REPORT OF STP INLET

S.No	Parameter	Unit	April'22	May'22	June'22	July'22	Aug'22	Sep'22
1	pH	-	7.16	7.08	7.18	7.10	7.24	7.18
2	Total Solids	mg/l	2040	1956	2076	1930	2025	1884
3	Total Dissolved Solids	mg/l	1910	1832	1944	1804	1886	1754
4	Total Suspended Solids	mg/l	130	124	132	126	139	130
5	COD	mg/l	299	276	294	268	284	246
6	BOD 3day 27°C	mg/l	114	102	110	102	112	104
7	Oil & Grease	mg/l	4.3	4.0	4.2	3.8	4.0	3.2

TEST REPORT OF STP OUTLET

S.No	Parameter	Unit	April'22	May'22	June'22	July'22	Aug'22	Sep'22
1	pH	-	7.60	7.50	7.66	7.58	7.69	7.54
2	Total Solids	mg/l	1705	1596	1688	1575	1655	1566
3	Total Dissolved Solids	mg/l	1692	1586	1674	1564	1639	1554
4	Total Suspended Solids	mg/l	13.0	10.0	14.0	11.0	16.0	12.0
5	COD	mg/l	74.3	62.4	80.6	58.6	69.1	60.0
6	BOD 3day 27°C	mg/l	22.0	20.0	22.0	21.0	24.0	20.0
7	Oil & Grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

5.0 STACK EMISSION MONITORING

Sampling of Flue gas emissions of DG Sets was done and their emissions were determined. The Detailed report has been enclosed here.

SAMPLE PARTICULARS : **DG SET EMISSION**

SOURCE OF COLLECTION : 1) 500 KVA DG SET (CT YARD)
2) 500 KVA DG SET (CT YARD)
3) 320 KVA DG SET (Admin Block)
4) 320 KVA DG SET (SOUTH PORT)
5) 250 KVA DG SET (SS-2)

DATE OF MONITORING : 25-08-2022

TEST REPORT

S.No.	DESCRIPTION	UNIT	RESULT				
			1	2	3	4	5
1.	Diameter of the Stack	mts	0.16	0.16	0.16	0.16	0.16
2.	C/s Area of Stack	sq.mt	0.02	0.02	0.02	0.02	0.02
3.	Pitot Coefficient	-	0.87	0.87	0.87	0.87	0.87
4.	Sp: gravity of Fluid	-	1.0	1.0	1.0	1.0	1.0
5.	Temperature @ DGM	^{0}C	30	31	33	34	34
6.	Stack temperature	^{0}C	164	168	157	163	135
7.	Nozzle Diameter	mm	10	10	10	10	10
8.	Exit Velocity	m/sec	11.2	15.3	13.8	14.2	11.9
9.	Gas Quantity	m^3/hr	806	1101	993	1022	856
10.	Duration of Sampling	minutes	30	30	30	30	30
11.	Fuel used	-	Diesel				

EMISSION RATE

S.NO.	PARAMETER	UNIT	METHOD	RESULT				
				1	2	3	4	5
1.	Particulate Matter – PM	g/kw-hr	IS:11255-P-1	0.16	0.22	0.17	0.20	0.15
2.	Oxides of Nitrogen – NOx	g/kw-hr	IS:11255-P-2	1.40	1.46	1.39	1.49	1.63
3.	Carbon Monoxide – CO	g/kw-hr	IS:11255-P-7	0.43	0.48	0.79	0.85	0.64
4.	Hydrocarbons - HC	g/kw-hr	IS:11255	0.14	0.19	0.18	0.19	0.14

SAMPLE PARTICULARS : **DG SET EMISSION**

SOURCE OF COLLECTION : 6) 250 KVA DG SET (MCG)
7) 250 KVA DG SET (GARRAGE)
8) 160 KVA DG SET (SS)

DATE OF START : 22-02-2022

TEST REPORT

S.No.	DESCRIPTION	UNIT	RESULT		
			6	7	8
1.	Diameter of the Stack	mts	0.16	0.16	0.16
2.	C/s Area of Stack	sq.mt	0.02	0.02	0.02
3.	Pitot Coefficient	-	0.87	0.87	0.87
4.	Sp: gravity of Fluid	-	1.0	1.0	1.0
5.	Temperature @ DGM	^{0}C	33	32	30
6.	Stack temperature	^{0}C	131	124	120
7.	Nozzle Diameter	mm	10	10	10
8.	Exit Velocity	m/sec	12.5	11.6	10.2
9.	Gas Quantity	m^3/hr	900	835	734
10.	Duration of Sampling	minutes	30	30	30
11.	Fuel used	-	Diesel		

EMISSION RATE

S.NO.	PARAMETER	UNIT	METHOD	RESULT		
				6	7	8
1.	Particulate Matter – PM	g/kw-hr	IS:11255-P-1	0.13	0.11	0.10
2.	Oxides of Nitrogen – NOx	g/kw-hr	IS:11255-P-2	1.70	1.57	1.31
3.	Carbon Monoxide – CO	g/kw-hr	IS:11255-P-7	0.73	0.68	0.53
4.	Hydrocarbons - HC	g/kw-hr	IS:11255	0.21	0.14	0.12

ANNEXURES

ANNEXURE1

NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION
New Delhi, the 18th November, 2009

No.B-29016/20/90/PCI-L—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No. 14 of 1981), and in super session of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and Other Area	Ecologically sensitive area (notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	• Improved West and Geake • Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	• Modified Jacob & Hochheiser (Na-Arsenite) • Chemiluminescence
		24 hours**	80	80	
3	Particulate Matter (size less than 10 µm) or PM_{10} µg/m³	Annual*	60	60	• Gravimetric • TOEM • Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5 microns) or $PM_{2.5}$ µg/m³	Annual*	40	40	• Gravimetric • TOEM • Beta attenuation
		24 hours**	60	60	
5	Ozone (O_3) µg/m³	8 hours **	100	100	• UV photometric • Chemiluminescence • Chemical method
		1 hour **	180	180	
6	Lead (Pb) µg/m³	Annual*	0.5	0.5	• ASS / ICP method after sampling on EPM 2000 or equivalent filter paper • ED – XRF using
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours**	2	2	Non Dispersive Infra RED (NDIR) Spectroscopy
		1 hour**	4	4	
8	Ammonia (NH_3) µg/m³	Annual*	100	100	• Chemiluminescence • Indophenol blue method
		24 hours**	400	400	
9	Benzene (C_6H_6) µg/m³	Annual*	5	5	• Gas chromatography based continuous analyser • Adsorption and desorption followed by GC analysis
10	Benzo (a) Pyrene (BaP) – particulate phase only ng/m³	Annual*	1	1	Solvent extraction followed by HPLC / GC analysis
11	Arsenic (As) ng/m³	Annual*	6	6	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni) ng/m³	Annual*	20	20	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper

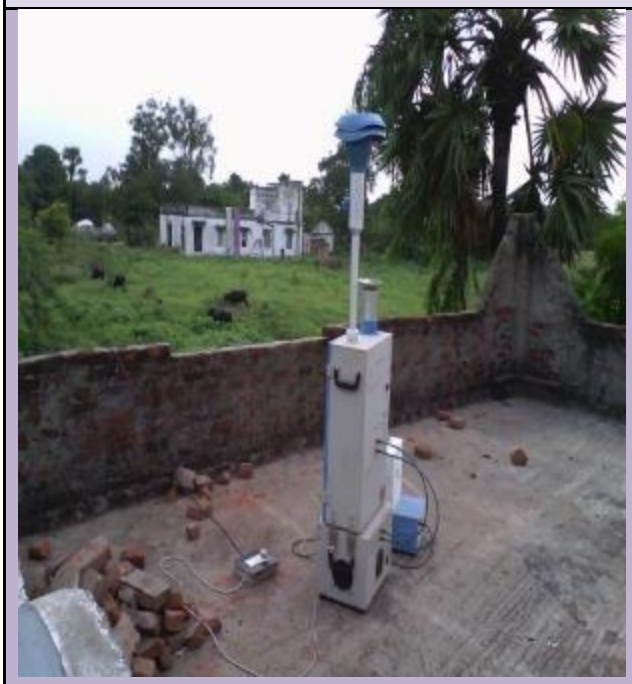
* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

PHOTOGRAPHS

AMBIENT AIR QUALITY SAMPLING LOCATIONS

Thamminipatnam village	**Gopalapuram village**
	
Chalivendram	**Krishnapatnam village**
	

AMBIENT AIR QUALITY SAMPLING LOCATIONS

New Light House	Zero Point
	
Amenities Complex (CVR)	
	
WATER SAMPLING	**SEDMENT SAMPLING**

PHYTOPLANKTON SAMPLING

NOISE MONITORING