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<b>Compliance of Environmental Clearance conditions for the period 1<sup>st</sup> October, 2022 to 31<sup>st</sup> March, 2023</b>		
<b>Project: Setting up a Grass Root 9 MMTPA Refinery cum Petrochemical Complex project at Tehsil Pachpadra, District Barmer (Rajasthan) by M/s Hindustan Petroleum Corporation Limited (HPCL)</b>		
<b>Reference No.: F. No. J-11011/87/2013-IA-II(I) dated 13<sup>th</sup> September, 2017 and its amendment dated 31<sup>st</sup> January, 2020 by Ministry of Environment, Forests and Climate Change, Gol.</b>		
<b>15. Compliance of terms and conditions (Specific Conditions)</b>		
(i)	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	Complied. CTE obtained on 8 <sup>th</sup> Jan 2018 from RSPCB (order no: 2017-2018/HDF/2618). Further, CTE extension obtained upto November, 2024 from RSPCB vide letter no. F5/(O&G-329)/RSPCB/OGM/584-586; dated: 10/08/2022.
(ii)	As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises. The effluent discharge, if any, shall conform to the standards prescribed under the Environment (Protection) Rules, 1986.	Zero Liquid Discharge for the refinery is ensured and no waste/treated water shall be discharged outside the premises. All effluent discharge shall conform to the standards prescribed under the Environment (Protection) Rules, 1986.
(iii)	Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.	Shall be complied with. This item has been addressed and included in item (i)-CTE issued from RSPCB.
(iv)	Environmental Standards for Petroleum Oil Refinery dated 18th March 2008 and Environmental Standards for Petrochemical (Basic and Intermediates) dated on 9 <sup>th</sup> November, 2012, and its amendments from time to time shall be followed.	Shall be complied with.
(v)	To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. Multi-cyclone followed by bag filter shall be provided to the DCU coke based CFBC boiler to control particulate emissions within permissible limit. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines.	Shall be complied with. Dust Extraction system is provided at outlet of Coke crusher within DCU and at bunker loading area of Captive Power Plant (CPP). All transfer point of conveyors is provided with dry fog type dust suppression system. Coke storage at coke yard is provided with Sprinkler Type dust suppression system. Adequate stack height is provided in all stacks as per CPCB/SPCB

		guidelines.
(vi)	Total water requirement shall not exceed 5300 cum/hr to be met from Indira Gandhi Canal. Necessary permission in this regard shall be obtained from the concerned regulatory authority. No ground water shall be used without prior permission from the CGWA.	Noted. Permission for withdrawal of water from Indira Gandhi Nahar Pariyojana (IGNP) is in place. No ground water shall be used without prior permission from the Central Ground Water Authority (CGWA).
(vii)	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.	Shall be complied with.
(viii)	Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm, and solvent transfer to be done through pumps.	Shall be complied with.
(ix)	Process organic residue and spent carbon shall be sent to cement industries. ETP sludge, process inorganic & evaporation salt shall be disposed off to the TSDF. The ash from boiler shall be sold to brick manufacturers/cement industry.	Shall be complied with. During operation of CPP, efforts will be made to sell the fly ash produced from CFBC boilers to brick manufacturers/cement industry as advised in the EC letter granted by MoEF&CC. ETP sludge will be routed to Delayed Coker Unit (DCU) for processing.
(x)	The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.	Shall be complied with.
(xi)	Fly ash should be stored separately. as per CPCB guidelines so that it should not adversely affect the air quality, becoming air borne by wind or water regime during rainy season by flowing along with the storm water. Direct exposure of workers to fly ash & dust should be avoided.	Noted. Fly ash collected from different locations of the boiler (including ESP, APH) shall be conveyed to Reinforced Cement Concrete (RCC) silo through dense phase system (closed conveying). RCC sump to collect floor wash at different location of fly ash handling shall be provided. Separate silos shall be provided for fly ash and bed ash. There shall be one common RCC silo for fly ash collection from two Circulating Fluidized Bed Combustion (CFBC) boilers in each power block with capacity of 5 days of operation of both CFBC boilers at MCR. Ash from all silos shall be directly unloaded into container trucks in dry form through unloading spout. There shall be two such unloading spout in each silo so that unloading can be done through two trucks simultaneously. Provision shall also be made at each fly ash silo to moisture the ash and unload it in the open truck for further disposal outside the refinery complex.
(xii)	The company shall undertake waste minimization measures as below: - (a) Metering and control of quantities of active ingredients to minimize waste.	Noted. (a) – (e) Shall be complied with, as applicable.

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	<p>(b) Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.</p> <p>(c) Use of automated filling to minimize spillage.</p> <p>(d) Use of Close Feed system into batch reactors.</p> <p>(e) Venting equipment through vapour recovery system.</p> <p>(f) Use of high pressure hoses for equipment clearing to reduce wastewater generation.</p>	<p>(f) Shall be complied with during the operation and maintenance phase of the project.</p>
(xiii)	<p>The green belt of at least 10 m width shall be developed in more than 33% of the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. As many as 25000 trees to be planted per year during first five years. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.</p>	<p>Noted.</p> <p>HRRL has acquired 4380.71 acres area from Government of Rajasthan. Total plot area of refinery and petrochemical (including Marketing Terminal) is 4126.95 acres. Total plot area of refinery and petrochemical (excluding Marketing Terminal) is 3876.95 acres. The allocated greenbelt of refinery area is 1279.38 acres and Marketing Terminal is 82.5 acres which is 33% of the total plot area within the Boundary line. Total greenbelt area of the refinery and marketing terminal is 1362 acres considering the total plot of 4126.9 acres. Green Belt will be developed in 33 % of the plot area within Boundary Line which is ~ 1362 Acre.</p> <p>Greenbelt Development Plan was prepared and discussed with DFO, Barmer district for further execution. As per Forest Department suggestion, a Detailed Project Report (DPR) was to be prepared and submitted to Forest Dept. AFRI has completed the Green Belt study and released DPR to HRRL. The DPR which has been prepared with Details of Green Belt Plan has been handed over to Forest department of Govt of Rajasthan for necessary action. Response of Forest Deptt. Govt. of Rajasthan to execute the works is awaited. .</p>
(xiv)	<p>All the commitment made regarding issues raised during the Public Hearing/ consultation meeting held on 30<sup>th</sup> May, 2014 shall be satisfactorily implemented.</p>	<p>Noted and will be implemented.</p>
(xv)	<p>At least 2.5% of the total project cost shall be allocated for Enterprise Social Commitment based on Public Hearing and item-wise details along with the time bound action plan shall be prepared and submitted to the Ministry's Regional Office.</p>	<p>MoEF&amp;CC has accorded amendment in the EC vide letter no. F. No. J-11011/87/2013-IA-II(I) dated 31<sup>st</sup> January, 2020. The revised EC Condition is stated below:</p> <p>“At least Rs. 107.82 Crores (0.25% of the total project cost) shall be allocated for Corporate Environmental responsibility based on Public Hearing issues.”</p> <p>CER proposals have been finalized in consultation with Government of Rajasthan (GOR):</p>

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		<ul style="list-style-type: none"> <li>➤ Construction of Hospital of 50 bed capacity - Topography survey completed. Award of Hospital construction work has been done. Preliminary design works is in progress. Building completion targeted by Mar 2024</li> <li>➤ Construction of Senior Secondary School (sambhra Village) - Topography survey completed. Engineering / tender development done for site development and boundary wall. Field work i.e., Foundation works are underway. The building completion is targeted by December 2023</li> <li>➤ Sambhra-Jerla Road: Road works completed and handed over to PWD in August 2022.</li> <li>➤ SajiyaliRoad: HRRL has requested DC to carryout the road construction work by PWD and raise the demand note for funding by HRRL</li> <li>➤ Avenue Plantation plan has been finalized in consultation with DC, Barmer. AFRI have conducted site survey and sample collection and released a DPR for the same. DPR handed over to Forest department for carrying out the Avenue plantation with funding by HRRL</li> </ul>
(xvi)	For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.	Shall be complied with.
(xvii)	The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Firefighting system shall be as per the norms.	Shall be complied with.
(xviii)	Continuous online (24x7) monitoring system. Both for emissions and the effluent shall be installed within the plant site for measurement of discharge and pollutants concentration. Data shall be uploaded on the company's website and provided to the respective RO's of MoEF&CC, CPCB and SPCB.	Shall be complied with.
(xix)	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Shall be complied with during the operation phase of the project.
(xx)	Wetland habitat shall be provided for migratory bird namely, Demoiselle	Shall be complied with.

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	crane, at the reservoir and green belt areas.	<p>The Pachpadra lake is a rain water lake formed mostly during rainy seasons and it has created a natural wetland habitation which attracts migratory bird like Demoiselle cranes. This natural habitation is not affected and no impact on migratory birds has been noticed during a recent site visit and survey carried out in the vicinity of the project site and in and around Pachpadra lake by Biological expert from Environment Consultant M/s EIL. This action on the natural wetland can be further enhanced or developed by taking guidance from subject matter expert agency in future as we progress.</p> <p>In this regard a Site survey &amp; study conducted by JNVU, Jodhpur has been completed. DPR submitted by the agency. execution tenders being developed.</p>
(xxi)	At least 10 natural surface water bodies shall be rejuvenated and developed as complete eco-system with the tree plantation development and growth using satellite imageries.	<p>Shall be complied with.</p> <p>A comprehensive list of 15 more water bodies is identified and obtained concurrence from DC Barmer. The following water bodies (10 Nos) have been identified by DC Barmer for rejuvenation: Sarla Nada, Kasaiyon Ki Nadi, Kher ka Talav, Bhaibahan Ka Nada, Gulab Sagar, Tejori Nadi, Kola Nada, Khari Nadi, Ram Ghat Talav, Navoda Talav.</p> <p>State watershed management department to develop technical details and undertake implementation of work with funding by HRRL.</p>
(xxii)	The international boundary is reportedly at a distance of 100-150 km from the project site. In view of the security apprehensions, necessary permission required, if any, shall be obtained from the Ministry of Defense and/or Ministry of Home Affairs.	NOC has been issued by the IAF HQ SWAC vide letter SWAC/S2551/4/9/ATC dated 9th Aug 2018 and its amendment letter dated 27 <sup>th</sup> May 2019.
<b>15.1</b>	<b>Compliance of other general conditions</b>	
(i)	The project authorities must strictly adhere to the stipulations made by the State Government, Central Pollution Control Board, State Pollution Control Board and any other statutory authority.	Noted and shall be complied with. Stipulations of RSPCB vide CTE dated January 8, 2018 shall be complied with.
(ii)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be	Noted and shall be complied with.

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	made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	
(iii)	The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.	The locations of ambient air quality monitoring stations have been decided in consultation with the Rajasthan State Pollution Control Board (RSPCB). Three (03) nos. of continuous ambient air quality monitoring stations will be installed. One no. station each will be installed in the upwind, downwind direction and where maximum ground level concentrations are anticipated.
(iv)	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16 <sup>th</sup> November, 2009 shall be followed.	Shall be complied with.
(v)	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall, conform to the standards prescribed. Under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	Necessary specification details shall be included in all the Engineering, Procurement & Construction (EPC) Contracts for implementation.
(vi)	The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and use the same water for the process activities of the project to conserve fresh water.	All water will be collected through storm water system in Guard Pond. recharging the ground water is not envisaged due to High salinity of Ground water.
(vii)	Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.	Shall be complied with. During the project phase, EPC Contractors are providing training to concerned workers and engineers who are involved in chemical handling. Pre-employment medical examination is being carried out for all workers and staff.
(viii)	The company shall also comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management and risk mitigation measures relating to the project shall be implemented.	Shall be complied with.
(ix)	The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villages and administration.	Shall be complied with.
(x)	The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.	Shall be complied with.
(xi)	The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State	Fund provision has been envisaged for capital /recurring cost towards environment pollution control measures.

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	Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/pollution control measures shall not be diverted for any other purpose.	
(xii)	A copy of clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal.	Complied. EC letter sent to following agencies: BDO - Panchayat Samiti – Balotra, CEO, Zilla Parishad – Barmer, Sarpanch - Sambhra Village, Sarpanch - SRK Village, RSPCB RO-Jodhpur, vide our letter dated October 5 and 9, 2017.
(xiii)	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.	The compliance status is being submitted regularly on six monthly basis (April to September by 1st December and from October to March by 1st June) as per EIA Notification dated 14.09.2006 after grant of EC in Sept, 2017. The 9 <sup>th</sup> six monthly report for October 2021 to March 2022 was submitted in April 2022 to all statutory authorities and posted on HRRL website. The 10 <sup>th</sup> six monthly report for April 2022 to September 2022 is submitted on Dec 1, 2022. The 11 <sup>th</sup> Six monthly report dated Oct 22 to March 2023 is being released on June 1, 2023.
(xiv)	The environmental statement for each financial year ending 31 <sup>st</sup> March in Form-V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.	Shall be complied. Form-V, Environmental statement shall be submitted to Rajasthan State Pollution Control Board after the Consent to Operate (CTO) is obtained before commissioning of the Project.
(xv)	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry at <a href="http://moef.nic.in">http://moef.nic.in</a> . This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry.	Complied. Environmental Clearance has been advertised on September 27, 2017 in Times of India (English) and Rajasthan Patrika (Hindi) Newspapers. A copy of the same has been sent to MoEF&CC Regional Office at Lucknow vide HPCL letter dated October 5, 2017.
(xvi)	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.	Final approval of the project from MoPNG has been obtained on 9 <sup>th</sup> October 2017. Financial closure was completed on 28 <sup>th</sup> January 2019. Detail Engineering Design of the process units is in progress.
16	The Ministry may revoke or suspend the clearance, at subsequent stages, if implementation of any of the above conditions is not satisfactory.	Noted

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17	The Ministry reserves the right to stipulate additional conditions, if found necessary. The company in a time bound manner will implement these conditions.	Noted
18	The above conditions will be enforced, inter alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Water Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	Noted

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# **Post Environmental Monitoring Report**

For

**M/s HPCL Rajasthan Refinery Limited  
(HRRL)**

At

**Barmer, Rajasthan**

Period : **October – December 2022**

Prepared by



**Netel (India) Limited**

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**POST ENVIRONMENTAL DATA COLLECTION AT BARMER, RAJASTHAN**

Name of Client M/s HPCL Rajasthan Refinery Limited (HRRL)  
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Project Management Consultant (PMC)

M/s. Engineers India Limited (EIL)  
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Name of Contractor NETEL (INDIA) LIMITED  
Environment Management Services  
W-408. Pipeline Road, MIDC Rabale  
TTC Industrial Area, Navi Mumbai – 400 701

Work Order HRRL/LOA/2020/18, Dated 21.08.2020

Nature of Job Environmental Baseline Data Collection

 Prepared By Sr. Chemist	 Approved By Technical Manager	 Issued By Quality Manager
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### 1. AMBIENT AIR QUALITY

Parameter Details:

Sr. No.	Parameters	Unit	Analysis Method	CPCB limit
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 23)	100
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 24)	60
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 2)	80
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 6)	80
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	IS 5182 (Part 10)	2
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 9)	100
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 11)	5

Results:

Sr. No.	Parameters	Unit	Richholi Village		
			03.10.2022	17.10.2022	02.11.2022
---	<b>Date of Sampling</b>	---	03.10.2022	17.10.2022	02.11.2022
---	<b>Sample Code</b>	---	NIL/OT/10/22/072	NIL/OT/10/22/286	NIL/OT/11/22/030
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	69.8	71.3	73.5
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	36.9	34.3	29.5
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	8.2	8.4	7.4
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	14.8	13.5	12.1
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.14	0.48	0.75
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	10.0	12.8	9.7
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.2	<1.0

Sr. No.	Parameters	Unit	Richholi Village		
			16.11.2022	02.12.2022	16.12.2022
---	<b>Date of Sampling</b>	---	16.11.2022	02.12.2022	16.12.2022
---	<b>Sample Code</b>	---	NIL/OT/11/22/258	NIL/OT/12/22/226	NIL/OT/12/22/232
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	70.7	76.9	69.0
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	36.0	33.0	30.4
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	9.9	10.8	9.4
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	12.1	15.8	16.2
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.96	1.07	0.99
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	14.7	4.6	10.7
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.0	1.0

Results:

Sr. No.	Parameters	Unit	Kiyar Village		
			05.10.2022	19.10.2022	04.11.2022
---	Date of Sampling	---	05.10.2022	19.10.2022	04.11.2022
---	Sample Code	---	NIL/OT/10/22/073	NIL/OT/10/22/287	NIL/OT/11/22/031
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	58.8	58.1	56.5
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	31.7	26.0	26.5
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	10.3	12.4	12.0
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	9.2	10.8	11.6
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.79	0.62	0.52
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	4.5	4.8	13.6
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.3	<1.0	<1.0

Sr. No.	Parameters	Unit	Kiyar Village		
			18.11.2022	04.12.2022	18.12.2022
---	Date of Sampling	---	18.11.2022	04.12.2022	18.12.2022
---	Sample Code	---	NIL/OT/11/22/259	NIL/OT/12/22/227	NIL/OT/12/22/233
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	60.2	61.8	57.9
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	24.7	29.5	26.0
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	9.7	12.2	12.8
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	9.2	15.5	8.0
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.92	0.46	0.95
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	3.3	9.3	13.3
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.0	1.4	1.2

## Results:

Sr. No.	Parameters	Unit	Sajiyali Village		
			05.10.2022	19.10.2022	04.11.2022
---	<b>Date of Sampling</b>	---	05.10.2022	19.10.2022	04.11.2022
---	<b>Sample Code</b>	---	NIL/OT/10/22/074	NIL/OT/10/22/288	NIL/OT/11/22/032
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	70.5	69.7	72.6
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	34.7	33.4	38.6
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	13.6	11.2	10.0
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	12.3	14.0	20.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.93	1.02	0.89
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	11.8	6.0	9.1
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	<1.0	1.5

Sr. No.	Parameters	Unit	Sajiyali Village		
			18.11.2022	04.12.2022	18.12.2022
---	<b>Date of Sampling</b>	---	18.11.2022	04.12.2022	18.12.2022
---	<b>Sample Code</b>	---	NIL/OT/11/22/260	NIL/OT/12/22/228	NIL/OT/12/22/234
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	80.7	72.1	73.2
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	42.1	33.9	33.9
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	15.5	15.0	12.3
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	15.0	16.2	19.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.65	0.80	0.68
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	8.7	11.8	9.5
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.2	<1.0



Results:

Sr. No.	Parameters	Unit	Samra ki Dhani		
			07.10.2022	21.10.2022	06.11.2022
---	Date of Sampling	---	07.10.2022	21.10.2022	06.11.2022
---	Sample Code	---	NIL/OT/10/22/075	NIL/OT/10/22/289	NIL/OT/11/22/033
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	79.4	79.5	68.9
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	35.6	43.8	33.0
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	12.5	17.3	14.6
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	13.4	14.4	16.0
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.16	0.85	0.80
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	5.3	9.1	5.8
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.1	<1.0	<1.0

Sr. No.	Parameters	Unit	Samra ki Dhani		
			20.11.2022	06.12.2022	20.12.2022
---	Date of Sampling	---	20.11.2022	06.12.2022	20.12.2022
---	Sample Code	---	NIL/OT/11/22/261	NIL/OT/12/22/229	NIL/OT/12/22/235
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	75.2	77.6	67.8
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	34.7	38.6	33.4
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	13.6	15.1	15.1
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	14.7	15.9	20.4
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.16	1.02	0.61
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	12.1	6.5	8.1
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.2	1.5	<1.0

## Results:

Sr. No.	Parameters	Unit	Kasajiyon Ki Dhani		
			07.10.2022	21.10.2022	06.11.2022
---	Date of Sampling	---	07.10.2022	21.10.2022	06.11.2022
---	Sample Code	---	NIL/OT/10/22/076	NIL/OT/10/22/290	NIL/OT/11/22/034
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	60.3	62.5	64.7
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	31.3	30.8	30.4
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	6.0	6.2	10.2
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	9.7	11.1	14.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.02	0.43	0.57
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	13.2	6.5	10.6
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.4	1.1

Sr. No.	Parameters	Unit	Kasajiyon Ki Dhani		
			20.11.2022	06.12.2022	20.12.2022
---	Date of Sampling	---	20.11.2022	06.12.2022	20.12.2022
---	Sample Code	---	NIL/OT/11/22/262	NIL/OT/12/22/230	NIL/OT/12/22/236
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	56.8	56.6	62.1
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	30.8	24.3	27.3
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	10.8	7.8	6.9
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	11.8	15.0	9.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.94	0.73	0.92
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	11.4	12.9	7.8
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.2	1.1



Results:

Sr. No.	Parameters	Unit	Pachpadra		
			03.10.2022	17.10.2022	02.11.2022
---	<b>Date of Sampling</b>	---	03.10.2022	17.10.2022	02.11.2022
---	<b>Sample Code</b>	---	NIL/OT/10/22/071	NIL/OT/10/22/285	NIL/OT/11/22/029
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	69.7	61.1	72.0
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	35.6	33.0	39.5
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	7.4	14.5	14.1
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	12.4	11.0	15.3
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.58	0.81	0.69
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	8.3	8.0	8.9
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.6	<1.0	1.2

Sr. No.	Parameters	Unit	Pachpadra		
			16.11.2022	02.12.2022	16.12.2022
---	<b>Date of Sampling</b>	---	16.11.2022	02.12.2022	16.12.2022
---	<b>Sample Code</b>	---	NIL/OT/11/22/257	NIL/OT/12/22/225	NIL/OT/12/22/231
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	66.0	68.5	65.5
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	26.5	34.7	32.1
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	14.8	8.6	8.3
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	12.8	13.5	12.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.73	0.58	0.48
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	7.4	11.2	8.3
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.1	1.0	<1.0

## 2. WATER QUALITY

### Parameter Details:

Sr. No.	Parameters	Unit	IS 10500 Limits (Desirable / Permissible)	Analysis Method
1	Temperature	°C	---	IS 3025 (Part 9)
2	Colour	Hazen	5 / 15	IS 3025 (Part 4)
3	Odour	–	Agreeable	IS 3025 (Part 5)
4	Taste	–	Agreeable	IS 3025 (Part 7 & 8)
5	pH	–	6.5 – 8.5	IS 3025 (Part 11)
6	Turbidity	NTU*	1 / 5	IS 3025 (Part 10)
7	Total Dissolved Solids	mg/lit	500 / 2000	IS 3025 (Part 16)
8	Total Suspended Solids	mg/lit	---	IS 3025 (Part 17)
9	Total Alkalinity	mg/lit	200 / 600	IS 3025 (Part 23)
10	Total Hardness	mg/lit	200 / 600	IS 3025 (Part 21)
11	Calcium Hardness	mg/lit	---	IS 3025 (Part 40)
12	Magnesium Hardness	mg/lit	---	IS 3025 (Part 21 & 40)
13	COD	mg/lit	---	IS 3025 (Part 58)
14	BOD	mg/lit	---	IS 3025 (Part 44)
15	Chloride	mg/lit	250 / 1000	APHA 4500-Cl
16	Salinity	ppt	---	IS 3025 (Part 32)
17	Sulphate	mg/lit	200 / 400	IS 3025 (Part 24)
18	Fluoride	mg/lit	1 / 1.5	IS 3025 (Part 60)
19	Nitrate	mg/lit	45	IS 3025 (Part 34)
20	Total Phosphorus	mg/lit	---	APHA 4500-P-C
21	Total Nitrogen	mg/lit	---	IS 3025 (Part 34)
22	Sodium	mg/lit	---	IS 3025 (Part 45)
23	Potassium	mg/lit	---	IS 3025 (Part 45)
24	Iron	mg/lit	0.3	APHA 3111-B
25	Manganese	mg/lit	0.1 / 0.3	APHA 3111-B
26	Cadmium	mg/lit	0.003	APHA 3111-B
27	Lead	mg/lit	0.01	APHA 3111-B
28	Zinc	mg/lit	5 / 15	APHA 3111-B
29	Nickel	mg/lit	0.02	APHA 3111-B
30	Copper	mg/lit	0.05 / 1.5	APHA 3111-B
31	Total Coliform	MPN/100ml	Absent	IS 1622 : 1981
32	Faecal Coliform	–	Absent	IS 1622 : 1981

Note: \* Nephelometric Turbidity Unit

Results: Surface Water

Sr. No.	Parameters	Unit	Gulab Sagar Lake (S/W)		
			04.10.2022	03.11.2022	03.12.2022
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022
---	Sample Code	---	NIL/OT/10/22/065	NIL/OT/11/22/023	NIL/OT/12/22/219
1	Temperature	°C	26.5	26.2	24.8
2	Colour	Hazen	47	53	50
3	Odour	–	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable
5	pH	–	7.33	8.05	7.25
6	Turbidity	NTU	25.7	28.8	25.7
7	Total Dissolved Solids	mg/lit	138	133	153
8	Total Suspended Solids	mg/lit	18	14	18
9	Total Alkalinity	mg/lit	87.5	78.9	80.7
10	Total Hardness	mg/lit	43.7	49.0	49.4
11	Calcium Hardness	mg/lit	35.3	31.5	37.4
12	Magnesium Hardness	mg/lit	12.6	14.2	12.6
13	COD	mg/lit	9	7	9
14	BOD	mg/lit	<5	<5	<5
15	Chloride	mg/lit	15.6	17.0	16.4
16	Salinity	ppt	0.07	0.05	0.05
17	Sulphate	mg/lit	2.9	2.9	2.7
18	Fluoride	mg/lit	0.3	0.3	0.3
19	Nitrate	mg/lit	<0.5	<0.5	<0.5
20	Total Phosphorus	mg/lit	1.0	0.9	1.1
21	Total Nitrogen	mg/lit	2.2	2.4	2.1
22	Sodium	mg/lit	14.8	12.6	14.1
23	Potassium	mg/lit	<0.05	<0.05	<0.05
24	Iron	mg/lit	0.54	0.57	0.61
25	Manganese	mg/lit	<0.1	<0.1	<0.1
26	Cadmium	mg/lit	<0.003	<0.003	<0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05
29	Nickel	mg/lit	<0.01	<0.01	<0.01
30	Copper	mg/lit	<0.04	<0.04	<0.04
31	Total Coliform	MPN/100ml	6	10	14
32	Faecal Coliform	–	Absent	Absent	Absent

Results: Surface Water

Sr. No.	Parameters	Unit	Kumbhariya Ka Talaw (S/W)		
			04.10.2022	03.11.2022	03.12.2022
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022
---	Sample Code	---	NIL/OT/10/22/066	NIL/OT/11/22/024	NIL/OT/12/22/220
1	Temperature	°C	25.0	25.0	25.6
2	Colour	Hazen	19	14	17
3	Odour	–	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable
5	pH	–	7.23	7.46	6.99
6	Turbidity	NTU	6.1	6.9	6.6
7	Total Dissolved Solids	mg/lit	622	550	550
8	Total Suspended Solids	mg/lit	5	5	5
9	Total Alkalinity	mg/lit	67.3	71.9	68.6
10	Total Hardness	mg/lit	252.0	261.6	261.6
11	Calcium Hardness	mg/lit	119.8	114.0	125.6
12	Magnesium Hardness	mg/lit	136.0	136.0	124.8
13	COD	mg/lit	23	28	25
14	BOD	mg/lit	8.6	8.2	8.7
15	Chloride	mg/lit	150.9	176.1	184.5
16	Salinity	ppt	0.38	0.35	0.28
17	Sulphate	mg/lit	31.6	31.9	33.9
18	Fluoride	mg/lit	0.5	0.5	0.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5
20	Total Phosphorus	mg/lit	<1	<1	<1
21	Total Nitrogen	mg/lit	2.2	2.2	2.0
22	Sodium	mg/lit	5573.4	6179.2	6663.8
23	Potassium	mg/lit	1342.3	1448.6	1422
24	Iron	mg/lit	<0.1	<0.1	<0.1
25	Manganese	mg/lit	<0.1	<0.1	<0.1
26	Cadmium	mg/lit	<0.003	<0.003	<0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05
29	Nickel	mg/lit	<0.01	<0.01	<0.01
30	Copper	mg/lit	<0.04	<0.04	<0.04
31	Total Coliform	MPN/100ml	12	20	17
32	Faecal Coliform	–	Absent	Absent	Absent



Results: Ground Water

Sr. No.	Parameters	Unit	Akarli Village (G/W)			Limits*
			04.10.2022	03.11.2022	03.12.2022	
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022	---
---	Sample Code	---	NIL/OT/10/22/061	NIL/OT/11/22/019	NIL/OT/12/22/215	---
1	Temperature	°C	24.9	24.8	26.5	---
2	Colour	Hazen	59	59	53	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.16	8.58	8.07	6.5 – 8.5
6	Turbidity	NTU	<1	<1	<1	1 / 5
7	Total Dissolved Solids	mg/lit	8774	9688	9506	500 / 2000
8	Total Suspended Solids	mg/lit	19	19	22	---
9	Total Alkalinity	mg/lit	521.7	516.1	572.2	200 / 600
10	Total Hardness	mg/lit	310.1	319.9	300.3	200 / 600
11	Calcium Hardness	mg/lit	192.2	200.6	204.9	---
12	Magnesium Hardness	mg/lit	109.4	124.4	103.7	---
13	COD	mg/lit	87	86	81	---
14	BOD	mg/lit	28.3	28.8	30.5	---
15	Chloride	mg/lit	3909.8	3600.1	3948.5	250 / 1000
16	Salinity	ppt	7.44	5.83	5.62	---
17	Sulphate	mg/lit	769.9	706.3	699.2	200 / 400
18	Fluoride	mg/lit	1.0	1.0	0.9	1 / 1.5
19	Nitrate	mg/lit	29.7	32.1	31.8	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2620.6	2787.9	2927.3	---
22	Sodium	mg/lit	6418.7	6174.1	6113	---
23	Potassium	mg/lit	1557.6	1300.4	1571.9	---
24	Iron	mg/lit	<0.1	<0.1	<0.1	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	25	31	39	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)

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Results: Ground Water

Sr. No.	Parameters	Unit	Meghwali Ki Dhani (G/W)			Limits*
			04.10.2022	03.11.2022	03.12.2022	
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022	---
---	Sample Code	---	NIL/OT/10/22/062	NIL/OT/11/22/020	NIL/OT/12/22/216	---
1	Temperature	°C	26.2	25.5	26.1	---
2	Colour	Hazen	39	45	45	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	7.86	8.91	8.34	6.5 – 8.5
6	Turbidity	NTU	23.1	23.3	20.0	1 / 5
7	Total Dissolved Solids	mg/lit	3848	3404	3626	500 / 2000
8	Total Suspended Solids	mg/lit	681	697	730	---
9	Total Alkalinity	mg/lit	221.5	219.5	196.5	200 / 600
10	Total Hardness	mg/lit	269.6	232.1	229.6	200 / 600
11	Calcium Hardness	mg/lit	249.6	241.8	239.2	---
12	Magnesium Hardness	mg/lit	118.5	124.2	113.9	---
13	COD	mg/lit	108	109	113	---
14	BOD	mg/lit	159	160.5	141	---
15	Chloride	mg/lit	2600.0	2400.0	2725.0	250 / 1000
16	Salinity	ppt	8.10	8.83	7.45	---
17	Sulphate	mg/lit	299.0	341.3	338.0	200 / 400
18	Fluoride	mg/lit	5.4	4.9	5.3	1 / 1.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5	45
20	Total Phosphorus	mg/lit	2.2	2.5	2.5	---
21	Total Nitrogen	mg/lit	2.1	2.4	2.2	---
22	Sodium	mg/lit	605	583	605	---
23	Potassium	mg/lit	17.6	14.4	17.6	---
24	Iron	mg/lit	7.8	8.72	7.28	0.3
25	Manganese	mg/lit	0.24	0.24	0.22	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.36	0.40	0.39	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	15	21	26	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)



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Results: Ground Water

Sr. No.	Parameters	Unit	Kiyar Village (G/W)			Limits*
			04.10.2022	03.11.2022	03.12.2022	
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022	---
---	Sample Code	---	NIL/OT/10/22/063	NIL/OT/11/22/021	NIL/OT/12/22/217	---
1	Temperature	°C	24.7	25.2	24.9	---
2	Colour	Hazen	13	13	13	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.29	8.62	9.04	6.5 – 8.5
6	Turbidity	NTU	30.4	29.8	34.2	1 / 5
7	Total Dissolved Solids	mg/lit	3136	3264	3264	500 / 2000
8	Total Suspended Solids	mg/lit	15	18	14	---
9	Total Alkalinity	mg/lit	184.8	192.2	197.6	200 / 600
10	Total Hardness	mg/lit	391.7	345.6	414.7	200 / 600
11	Calcium Hardness	mg/lit	110.4	112.7	103.5	---
12	Magnesium Hardness	mg/lit	275.6	270.0	253.3	---
13	COD	mg/lit	136	145	117	---
14	BOD	mg/lit	48.2	41.9	46.8	---
15	Chloride	mg/lit	3015.5	3384.7	2769.3	250 / 1000
16	Salinity	ppt	5.21	5.88	5.77	---
17	Sulphate	mg/lit	763.0	693.0	658.0	200 / 400
18	Fluoride	mg/lit	0.2	0.2	0.2	1 / 1.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2.4	2.4	2.3	---
22	Sodium	mg/lit	578.1	584.3	596.6	---
23	Potassium	mg/lit	14.3	14.1	15.5	---
24	Iron	mg/lit	1.9	1.90	2.18	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.13	0.12	0.13	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	<1.8	<1.8	<1.8	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)



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Results: Ground Water

Sr. No.	Parameters	Unit	Sajiyali Village (G/W)			Limits*
			04.10.2022	03.11.2022	03.12.2022	
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022	---
---	Sample Code	---	NIL/OT/10/22/064	NIL/OT/11/22/022	NIL/OT/12/22/218	---
1	Temperature	°C	24.9	25.3	26.0	---
2	Colour	Hazen	76	79	66	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.26	7.29	7.61	6.5 – 8.5
6	Turbidity	NTU	<1	<1	<1	1 / 5
7	Total Dissolved Solids	mg/lit	14367	14774	13690	500 / 2000
8	Total Suspended Solids	mg/lit	13	10	13	---
9	Total Alkalinity	mg/lit	341.0	325.5	285.2	200 / 600
10	Total Hardness	mg/lit	170.3	168.6	168.6	200 / 600
11	Calcium Hardness	mg/lit	68.5	67.9	60.5	---
12	Magnesium Hardness	mg/lit	106.9	115.3	104.8	---
13	COD	mg/lit	88	101	72	---
14	BOD	mg/lit	24	25.3	23.8	---
15	Chloride	mg/lit	2149.7	2066.2	2274.9	250 / 1000
16	Salinity	ppt	7.36	7.64	10.49	---
17	Sulphate	mg/lit	570.0	592.8	587.1	200 / 400
18	Fluoride	mg/lit	5.4	5.3	4.6	1 / 1.5
19	Nitrate	mg/lit	0.5	0.5	0.5	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2.1	2.1	2.0	---
22	Sodium	mg/lit	643.5	689	591.5	---
23	Potassium	mg/lit	13.5	14	14.3	---
24	Iron	mg/lit	<0.1	<0.1	<0.1	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.24	0.22	0.23	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	<1.8	<1.8	<1.8	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)



### 3. SOIL QUALITY

Parameter Details:

Sr. No.	Parameters	Unit	Analysis Method
1	Particle Size Distribution		
	i. Sand	%	International Pipette Method
	ii. Silt	%	International Pipette Method
	iii Clay	%	International Pipette Method
2	Texture	–	International Pipette Method
3	pH Value	–	IS 2720 (Part 26)
4	Electrical Conductivity	mS/cm	IS 14767
5	Specific Gravity	mg/kg	ASTM D854
6	Bulk Density	g/cm <sup>3</sup>	Note 1*
7	Organic Matter	%	Lab SOP No. NIL/SOP/05***
8	Sodium Absorption Ratio (SAR)	–	IS 11624
9	Porosity	%	Note 2**
10	NPK Value	mg/kg	APHA 4500-N-C and Lab SOP No. NIL/SOP/10***

**Note :**

1. \* Environmental Analysis – Water, Soil and Air, by M.M. Saxena
2. \*\* Soil Sampling, Preparation and Analysis (2<sup>nd</sup> Edition) by Kim H. Tan
3. \*\*\* Based on Manual of Soil testing in India, Ministry of Agriculture, GOI, 2011



Results:

Sr. No.	Parameters	Unit	Near Project Site (Dewal Ki Dhani)		
			04.10.2022	03.11.2022	03.12.2022
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022
---	Sample Code	---	NIL/OT/10/22/067	NIL/OT/11/22/025	NIL/OT/12/22/221
1	Particle Size Distribution				
	i. Sand	%	98.9	99.3	99.2
	ii. Silt	%	1.0	0.6	0.3
	iii Clay	%	0.1	0.1	0.5
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	8.03	7.71	7.87
4	Electrical Conductivity	mS/cm	2.585	2.511	2.831
5	Specific Gravity	mg/kg	2.60	2.44	2.65
6	Bulk Density	g/cm <sup>3</sup>	1.93	1.85	1.87
7	Organic Matter	%	2.06	1.90	2.26
8	Sodium Absorption Ratio (SAR)	–	1.43	1.47	1.28
9	Porosity	%	19.3	17.7	19.9
10	NPK Value	mg/kg	345.3	347.9	303.9

Sr. No.	Parameters	Unit	Kasajiyon ki Dhani		
			04.10.2022	03.11.2022	03.12.2022
---	Date of Sampling	---	04.10.2022	03.11.2022	03.12.2022
---	Sample Code	---	NIL/OT/10/22/068	NIL/OT/11/22/026	NIL/OT/12/22/222
1	Particle Size Distribution				
	i. Sand	%	98.2	99.0	98.3
	ii. Silt	%	1.2	0.5	1.2
	iii Clay	%	0.6	0.5	0.5
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	8.32	8.24	8.49
4	Electrical Conductivity	mS/cm	0.216	0.180	0.180
5	Specific Gravity	mg/kg	2.52	2.55	2.89
6	Bulk Density	g/cm <sup>3</sup>	1.97	2.07	2.25
7	Organic Matter	%	1.49	1.68	1.52
8	Sodium Absorption Ratio (SAR)	–	2.78	2.49	2.52
9	Porosity	%	21.3	25.0	24.8
10	NPK Value	mg/kg	746.6	843.9	910.0

Results:

Sr. No.	Parameters	Unit	Sajiyali Village		
			04.10.2022	03.11.2022	03.12.2022
---	<b>Date of Sampling</b>	---	<b>04.10.2022</b>	<b>03.11.2022</b>	<b>03.12.2022</b>
---	<b>Sample Code</b>	---	<b>NIL/OT/10/22/069</b>	<b>NIL/OT/11/22/027</b>	<b>NIL/OT/12/22/223</b>
1	Particle Size Distribution				
	i. Sand	%	<b>98.3</b>	<b>98.3</b>	<b>98.8</b>
	ii. Silt	%	<b>1.0</b>	<b>1.1</b>	<b>0.5</b>
	iii Clay	%	<b>0.7</b>	<b>0.6</b>	<b>0.7</b>
2	Texture	–	<b>Sand</b>	<b>Sand</b>	<b>Sand</b>
3	pH Value	–	<b>8.08</b>	<b>8.50</b>	<b>8.67</b>
4	Electrical Conductivity	mS/cm	<b>0.139</b>	<b>0.139</b>	<b>0.124</b>
5	Specific Gravity	mg/kg	<b>2.06</b>	<b>1.95</b>	<b>1.84</b>
6	Bulk Density	g/cm <sup>3</sup>	<b>1.93</b>	<b>1.93</b>	<b>2.26</b>
7	Organic Matter	%	<b>0.83</b>	<b>0.90</b>	<b>0.97</b>
8	Sodium Absorption Ratio (SAR)	–	<b>8.18</b>	<b>6.79</b>	<b>7.59</b>
9	Porosity	%	<b>18.6</b>	<b>16.3</b>	<b>20.6</b>
10	NPK Value	mg/kg	<b>336.6</b>	<b>304.3</b>	<b>339.9</b>

Sr. No.	Parameters	Unit	Godaro Ki Dhani		
			04.10.2022	03.11.2022	03.12.2022
---	<b>Date of Sampling</b>	---	<b>04.10.2022</b>	<b>03.11.2022</b>	<b>03.12.2022</b>
---	<b>Sample Code</b>	---	<b>NIL/OT/10/22/070</b>	<b>NIL/OT/11/22/028</b>	<b>NIL/OT/12/22/224</b>
1	Particle Size Distribution				
	i. Sand	%	<b>99.5</b>	<b>98.6</b>	<b>99.4</b>
	ii. Silt	%	<b>0.3</b>	<b>0.9</b>	<b>0.5</b>
	iii Clay	%	<b>0.2</b>	<b>0.5</b>	<b>0.1</b>
2	Texture	–	<b>Sand</b>	<b>Sand</b>	<b>Sand</b>
3	pH Value	–	<b>8.84</b>	<b>8.76</b>	<b>8.08</b>
4	Electrical Conductivity	mS/cm	<b>0.107</b>	<b>0.088</b>	<b>0.100</b>
5	Specific Gravity	mg/kg	<b>2.77</b>	<b>2.60</b>	<b>2.52</b>
6	Bulk Density	g/cm <sup>3</sup>	<b>2.27</b>	<b>2.35</b>	<b>2.14</b>
7	Organic Matter	%	<b>0.53</b>	<b>0.63</b>	<b>0.64</b>
8	Sodium Absorption Ratio (SAR)	–	<b>5.58</b>	<b>5.21</b>	<b>5.27</b>
9	Porosity	%	<b>23.5</b>	<b>21.9</b>	<b>24.0</b>
10	NPK Value	mg/kg	<b>3404.3</b>	<b>3072.8</b>	<b>3795.9</b>

#### 4. NOISE LEVEL MONITORING

Standard:

As per the Noise Pollution (Regulation and Control) Rules, 2000 the Ambient Air Quality Standards in respect of Noise are as below:

Area Code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

- Note:-**
1. Day time mean from 6.00 a.m. to 10.00 p.m.
  2. Night time mean from 10.00 p.m. to 6.00 a.m.
  3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
  4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

\* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.



Result:

LOCATION		Kiyar					
DATE		10.10.2022	20.10.2022	05.11.2022	19.11.2022	05.12.2022	19.12.2022
Hourly $L_{eq}$	06:00 - 07:00	50.8	45.8	50.8	45.6	48.0	56.2
	07:00 - 08:00	48.8	53.7	51.4	46.6	49.6	54.1
	08:00 - 09:00	48.0	49.6	55.8	48.0	50.3	52.8
	09:00 - 10:00	52.5	50.2	53.3	48.6	54.0	55.7
	10:00 - 11:00	52.0	52.8	54.6	54.2	48.2	57.5
	11:00 - 12:00	52.2	49.1	56.8	49.3	46.6	59.6
	12:00 - 13:00	51.8	56.1	56.6	50.2	45.5	61.7
	13:00 - 14:00	50.8	52.9	44.7	44.6	45.0	52.6
	14:00 - 15:00	53.7	52.4	56.1	49.1	47.3	57.9
	15:00 - 16:00	55.8	53.4	57.0	49.9	47.1	59.2
	16:00 - 17:00	53.2	51.5	53.1	49.9	50.3	57.7
	17:00 - 18:00	53.7	53.1	55.8	49.5	52.6	62.4
	18:00 - 19:00	51.7	53.0	55.6	50.4	52.1	57.8
	19:00 - 20:00	53.9	54.3	54.9	47.2	50.6	60.0
	20:00 - 21:00	48.8	52.6	50.6	47.7	47.6	48.7
	21:00 - 22:00	54.0	54.5	50.3	48.8	52.4	48.4
	22:00 - 23:00	41.5	49.2	45.3	40.2	44.8	41.7
	23:00 - 00:00	42.2	46.4	47.2	36.5	43.7	48.4
	00:00 - 01:00	39.4	41.3	43.1	37.8	43.0	44.1
	01:00 - 02:00	40.8	37.7	47.1	35.1	44.7	46.4
02:00 - 03:00	40.8	34.8	47.6	35.6	44.2	46.5	
03:00 - 04:00	41.3	33.2	50.2	35.1	42.2	46.5	
04:00 - 05:00	46.6	34.4	48.5	32.8	43.7	45.3	
05:00 - 06:00	45.8	41.1	43.1	41.3	44.3	47.2	
$L_{eq}$ Day		52.4	52.7	54.5	49.3	50.0	57.9
$L_{eq}$ Night		43.0	43.2	47.1	37.6	43.9	46.1
$L_{DN}$		52.6	52.9	55.5	48.8	51.7	57.4

Note: All Values in dB(A)

Result

LOCATION		Akarli					
DATE		06.10.2022	20.10.2022	05.11.2022	19.11.2022	05.12.2022	19.12.2022
Hourly Leq	06:00 - 07:00	53.0	55.5	45.1	50.4	52.6	50.0
	07:00 - 08:00	50.1	57.0	40.2	44.5	55.1	50.5
	08:00 - 09:00	49.0	50.8	40.8	44.1	56.1	50.6
	09:00 - 10:00	51.3	52.5	50.5	49.3	57.7	52.4
	10:00 - 11:00	51.7	53.2	56.0	45.0	58.9	53.3
	11:00 - 12:00	51.0	54.5	49.7	45.6	57.6	52.0
	12:00 - 13:00	52.4	54.7	50.2	49.6	61.5	52.4
	13:00 - 14:00	47.8	47.8	43.3	43.6	59.0	48.0
	14:00 - 15:00	48.5	52.8	48.3	48.4	57.4	50.6
	15:00 - 16:00	51.7	53.0	48.8	48.5	57.2	52.2
	16:00 - 17:00	48.0	53.1	47.2	47.1	57.7	51.9
	17:00 - 18:00	49.8	52.4	47.8	47.6	58.2	52.3
	18:00 - 19:00	52.1	54.6	48.2	44.4	59.9	51.9
	19:00 - 20:00	52.4	50.6	46.2	45.6	59.5	50.1
	20:00 - 21:00	46.3	52.6	38.3	41.6	58.2	48.8
	21:00 - 22:00	50.6	50.1	41.3	42.5	56.9	51.7
	22:00 - 23:00	40.1	47.9	33.9	34.8	54.8	45.8
	23:00 - 00:00	41.2	43.1	48.8	36.6	51.0	45.3
	00:00 - 01:00	43.2	43.7	44.8	43.8	45.3	46.7
	01:00 - 02:00	47.4	39.4	41.7	44.9	44.5	46.5
02:00 - 03:00	54.0	36.2	44.4	37.9	42.6	46.8	
03:00 - 04:00	54.1	35.8	40.6	38.9	42.7	45.4	
04:00 - 05:00	44.1	34.7	44.0	43.6	43.1	45.3	
05:00 - 06:00	45.8	47.7	46.1	46.6	46.8	45.4	
Leq Day		50.7	53.3	48.6	46.9	58.1	51.4
Leq Night		49.2	43.6	44.6	42.6	48.7	45.9
LDN		55.5	53.4	51.6	49.7	58.3	53.5

Note: All Values in dB(A)

Result

LOCATION		Dewal ki Dhani					
DATE		10.10.2022	24.10.2022	09.11.2022	23.11.2022	09.12.2022	23.12.2022
Hourly $L_{eq}$	06:00 - 07:00	46.7	45.5	41.5	50.8	50.5	52.4
	07:00 - 08:00	41.0	42.3	57.9	50.4	55.2	45.9
	08:00 - 09:00	37.2	38.9	34.8	50.6	55.6	46.7
	09:00 - 10:00	41.3	40.9	42.7	53.2	53.3	52.6
	10:00 - 11:00	45.2	55.0	38.1	53.3	54.8	48.6
	11:00 - 12:00	44.0	48.1	43.9	52.0	55.1	48.3
	12:00 - 13:00	43.3	44.8	43.2	53.9	54.7	52.7
	13:00 - 14:00	33.2	49.0	36.7	52.8	47.8	50.0
	14:00 - 15:00	41.2	58.3	34.7	52.6	49.7	48.3
	15:00 - 16:00	44.3	53.4	37.8	58.7	53.8	48.6
	16:00 - 17:00	43.8	45.2	40.2	58.8	54.1	47.7
	17:00 - 18:00	42.6	43.6	39.0	63.0	47.5	48.3
	18:00 - 19:00	42.6	33.9	38.5	61.6	50.5	48.3
	19:00 - 20:00	40.5	49.4	33.2	54.9	53.3	51.6
	20:00 - 21:00	37.1	46.0	34.3	57.9	47.5	48.5
	21:00 - 22:00	36.8	45.2	39.4	52.0	51.6	46.8
	22:00 - 23:00	33.0	41.9	36.4	46.1	49.9	41.8
	23:00 - 00:00	33.8	43.6	32.5	44.0	42.7	45.0
	00:00 - 01:00	38.1	42.7	37.3	39.1	45.2	37.6
	01:00 - 02:00	37.7	29.4	38.0	37.1	42.1	41.6
02:00 - 03:00	33.5	42.6	25.5	31.3	40.2	36.6	
03:00 - 04:00	38.3	40.0	33.3	30.8	39.9	37.9	
04:00 - 05:00	35.0	38.6	35.0	33.2	40.9	43.6	
05:00 - 06:00	37.3	40.8	36.3	38.4	41.6	40.7	
$L_{eq}$ Day		42.5	50.2	46.7	56.7	53.0	49.6
$L_{eq}$ Night		36.3	41.2	35.4	40.5	44.2	41.5
$L_{DN}$		44.2	50.6	46.3	55.4	53.4	50.3

Note: All Values in dB(A)



Result

LOCATION		Panch Padra					
DATE		05.10.2022	19.10.2022	04.11.2022	18.11.2022	06.12.2022	20.12.2022
Hourly $L_{eq}$	06:00 - 07:00	51.4	45.4	49.8	53.9	50.9	50.8
	07:00 - 08:00	49.1	45.0	56.7	52.1	49.5	51.8
	08:00 - 09:00	54.1	44.9	52.8	58.4	51.1	53.3
	09:00 - 10:00	52.1	45.5	55.1	54.7	56.9	55.6
	10:00 - 11:00	55.5	45.7	54.8	58.3	57.0	50.7
	11:00 - 12:00	54.3	45.7	55.0	57.1	61.5	49.6
	12:00 - 13:00	56.2	45.6	54.5	58.9	56.7	48.2
	13:00 - 14:00	50.4	44.8	54.5	54.2	62.4	47.7
	14:00 - 15:00	54.3	45.2	55.1	57.3	58.4	49.3
	15:00 - 16:00	53.2	45.1	56.3	56.2	58.7	49.8
	16:00 - 17:00	53.0	46.3	55.1	55.3	58.8	53.0
	17:00 - 18:00	53.2	46.4	54.1	56.2	60.2	55.3
	18:00 - 19:00	55.0	42.9	56.0	57.8	57.0	55.4
	19:00 - 20:00	53.2	43.9	52.8	55.8	57.4	53.0
	20:00 - 21:00	53.3	44.3	54.1	55.8	55.9	50.8
	21:00 - 22:00	51.7	45.1	53.4	54.8	55.0	54.9
	22:00 - 23:00	49.0	40.4	47.0	50.0	46.2	46.9
	23:00 - 00:00	46.2	39.7	44.5	49.7	43.5	46.4
	00:00 - 01:00	46.9	40.2	40.7	50.7	46.6	45.5
	01:00 - 02:00	42.6	39.9	39.7	46.2	42.6	47.1
02:00 - 03:00	40.0	40.7	40.0	42.2	40.4	47.1	
03:00 - 04:00	43.8	40.1	42.9	45.3	40.8	45.0	
04:00 - 05:00	42.3	40.6	42.5	44.8	51.6	46.8	
05:00 - 06:00	41.1	41.2	44.5	44.5	49.5	47.1	
<b><math>L_{eq}</math> Day</b>		<b>53.5</b>	<b>45.2</b>	<b>54.6</b>	<b>56.4</b>	<b>57.9</b>	<b>52.5</b>
<b><math>L_{eq}</math> Night</b>		<b>45.0</b>	<b>40.4</b>	<b>43.4</b>	<b>47.6</b>	<b>46.8</b>	<b>46.5</b>
<b><math>L_{DN}</math></b>		<b>54.1</b>	<b>47.7</b>	<b>54.2</b>	<b>56.8</b>	<b>57.6</b>	<b>54.3</b>

Note: All Values in dB(A)



# **Post Environmental Monitoring Report**

For

**M/s HPCL Rajasthan Refinery Limited  
(HRRL)**

At

**Barmer, Rajasthan**

**Period : January – March 2023**

Prepared by



**Netel (India) Limited**

W-408, MIDC Rabale, TTC Industrial Area

Navi Mumbai – 400 701, Maharashtra

Phone : 022 27606016

email : [ems@netel-india.com](mailto:ems@netel-india.com)



**POST ENVIRONMENTAL DATA COLLECTION AT BARMER, RAJASTHAN**

Name of Client M/s HPCL Rajasthan Refinery Limited (HRRL)  
Tel Bhavan, Sahkar Marg Lal Kothi Vistar  
Jyoti Nagar, Jaipur – 302 005  
Rajasthan.

Project Management Consultant (PMC)

M/s. Engineers India Limited (EIL)  
Sector-16 (on NH-8),  
Gurugram, Haryana 122001

Name of Contractor NETEL (INDIA) LIMITED  
Environment Management Services  
W-408. Pipeline Road, MIDC Rabale  
TTC Industrial Area, Navi Mumbai – 400 701

Work Order HRRL/LOA/2020/18, Dated 21.08.2020

Nature of Job Environmental Baseline Data Collection

 Prepared By Sr. Chemist	 Approved By Technical Manager	 Issued By Quality Manager
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1	AMBIENT AIR QUALITY	1
2	WATER QUALITY	7
3	SOIL QUALITY	14
4	NOISE LEVEL MONITORING	17

## 1. AMBIENT AIR QUALITY

Parameter Details:

Sr. No.	Parameters	Unit	Analysis Method	CPCB limit
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 23)	100
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 24)	60
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 2)	80
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 6)	80
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	IS 5182 (Part 10)	2
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 9)	100
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	IS 5182 (Part 11)	5

Results:

Sr. No.	Parameters	Unit	Richholi Village		
			02.01.2023	16.01.2023	01.02.2023
---	Date of Sampling	---	02.01.2023	16.01.2023	01.02.2023
---	Sample Code	---	NIL/OT/01/23/163	NIL/OT/01/23/169	NIL/OT/02/23/188
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	73.8	74.1	75.1
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	35.6	39.1	31.7
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	12.3	10.9	11.2
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	17.2	11.2	11.7
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.46	0.91	0.65
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	11.5	8.6	12.8
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	<1.0	1.1

Sr. No.	Parameters	Unit	Richholi Village		
			15.02.2023	01.03.2023	22.03.2023
---	Date of Sampling	---	15.02.2023	01.03.2023	22.03.2023
---	Sample Code	---	NIL/OT/02/23/194	NIL/OT/03/23/523	NIL/OT/03/23/529
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	73.0	68.7	68.1
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	31.3	33.9	29.9
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	10.3	8.3	11.2
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	15.3	15.1	14.4
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.71	0.63	0.45
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	11.4	9.5	12.2
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.0	<1.0

Results:

Sr. No.	Parameters	Unit	Kiyar Village		
			04.01.2023	18.01.2023	03.02.2023
---	<b>Date of Sampling</b>	---	04.01.2023	18.01.2023	03.02.2023
---	<b>Sample Code</b>	---	NIL/OT/01/23/164	NIL/OT/01/23/170	NIL/OT/02/23/189
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	60.9	60.2	61.7
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	31.3	33.0	29.5
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	11.3	12.5	11.6
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	11.2	11.6	11.7
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.67	0.70	0.35
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	14.1	4.4	13.5
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.2	<1.0	1.0

Sr. No.	Parameters	Unit	Kiyar Village		
			17.02.2023	03.03.2023	24.03.2023
---	<b>Date of Sampling</b>	---	17.02.2023	03.03.2023	24.03.2023
---	<b>Sample Code</b>	---	NIL/OT/02/23/195	NIL/OT/03/23/524	NIL/OT/03/23/530
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	58.8	60.7	60.4
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	29.9	33.0	24.3
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	7.4	9.8	5.7
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	7.4	7.7	10.9
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.35	0.42	1.04
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	4.9	13.5	6.2
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	<1.0	<1.0



Results:

Sr. No.	Parameters	Unit	Sajiyali Village		
			04.01.2023	18.01.2023	03.02.2023
---	<b>Date of Sampling</b>	---	04.01.2023	18.01.2023	03.02.2023
---	<b>Sample Code</b>	---	NIL/OT/01/23/165	NIL/OT/01/23/171	NIL/OT/02/23/190
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	78.3	79.3	68.9
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	36.0	37.3	33.0
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	15.6	9.4	9.1
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	15.6	20.9	19.3
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.59	0.75	1.09
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	9.6	8.8	5.6
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.3	<1.0	<1.0

Sr. No.	Parameters	Unit	Sajiyali Village		
			17.02.2023	03.03.2023	24.03.2023
---	<b>Date of Sampling</b>	---	17.02.2023	03.03.2023	24.03.2023
---	<b>Sample Code</b>	---	NIL/OT/02/23/196	NIL/OT/03/23/525	NIL/OT/03/23/531
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	77.9	70.8	69.1
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	35.2	28.2	33.9
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	13.4	13.2	15.3
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	13.2	21.5	20.4
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.72	0.62	0.77
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	6.1	12.6	8.5
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.1	1.4	<1.0

Results:

Sr. No.	Parameters	Unit	Samra ki Dhani		
			06.01.2023	20.01.2023	05.02.2023
---	Date of Sampling	---	06.01.2023	20.01.2023	05.02.2023
---	Sample Code	---	NIL/OT/01/23/166	NIL/OT/01/23/172	NIL/OT/02/23/191
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	75.8	79.2	76.4
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	33.4	41.2	37.3
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	10.0	9.3	16.8
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	16.3	21.2	13.4
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.77	0.90	0.95
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	10.3	7.2	7.3
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	<1.0	<1.0

Sr. No.	Parameters	Unit	Samra ki Dhani		
			19.02.2023	05.03.2023	26.03.2023
---	Date of Sampling	---	19.02.2023	05.03.2023	26.03.2023
---	Sample Code	---	NIL/OT/02/23/197	NIL/OT/03/23/526	NIL/OT/03/23/532
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	67.7	75.0	78.4
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	34.7	33.0	33.0
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	12.6	12.4	11.8
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	13.8	16.8	11.6
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.04	0.66	0.80
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	6.2	8.3	11.0
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	1.3	<1.0

Results:

Sr. No.	Parameters	Unit	Kasajiyon Ki Dhani		
			06.01.2023	20.01.2023	05.02.2023
---	Date of Sampling	---	06.01.2023	20.01.2023	05.02.2023
---	Sample Code	---	NIL/OT/01/23/167	NIL/OT/01/23/173	NIL/OT/02/23/192
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	63.0	56.1	56.2
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	25.2	26.5	26.5
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	9.8	8.0	12.8
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	9.2	11.2	11.8
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.85	0.54	0.89
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	9.6	8.4	11.9
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	<1.0	<1.0	1.1

Sr. No.	Parameters	Unit	Kasajiyon Ki Dhani		
			19.02.2023	05.03.2023	26.03.2023
---	Date of Sampling	---	19.02.2023	05.03.2023	26.03.2023
---	Sample Code	---	NIL/OT/02/23/198	NIL/OT/03/23/527	NIL/OT/03/23/533
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	56.5	58.7	64.8
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	28.6	23.4	35.6
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	11.3	11.5	11.9
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	13.6	10.9	15.4
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.94	0.89	0.70
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	7.6	11.6	13.7
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.3	<1.0	1.0



Results:

Sr. No.	Parameters	Unit	Pachpadra		
			02.01.2023	16.01.2023	01.02.2023
---	Date of Sampling	---	02.01.2023	16.01.2023	01.02.2023
---	Sample Code	---	NIL/OT/01/23/162	NIL/OT/01/23/168	NIL/OT/02/23/187
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	63.8	60.9	68.0
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	32.6	29.1	27.3
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	12.0	10.4	10.5
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	17.5	17.2	17.5
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	1.09	0.79	0.64
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	8.6	7.4	7.3
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.2	<1.0	1.1

Sr. No.	Parameters	Unit	Pachpadra		
			15.02.2023	01.03.2023	22.03.2023
---	Date of Sampling	---	15.02.2023	01.03.2023	22.03.2023
---	Sample Code	---	NIL/OT/02/23/193	NIL/OT/03/23/522	NIL/OT/03/23/528
1	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	72.0	68.1	64.1
2	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	28.6	32.1	32.1
3	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	8.5	10.1	14.7
4	Oxides of Nitrogen (NO <sub>x</sub> )	µg/m <sup>3</sup>	15.0	13.0	17.1
5	Carbon Monoxide (CO)	mg/m <sup>3</sup>	0.47	0.98	0.56
6	Ozone (O <sub>3</sub> )	µg/m <sup>3</sup>	8.1	5.0	8.4
7	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	1.4	<1.0	<1.0

## 2. WATER QUALITY

### Parameter Details:

Sr. No.	Parameters	Unit	IS 10500 Limits (Desirable / Permissible)	Analysis Method
1	Temperature	°C	---	IS 3025 (Part 9)
2	Colour	Hazen	5 / 15	IS 3025 (Part 4)
3	Odour	—	Agreeable	IS 3025 (Part 5)
4	Taste	—	Agreeable	IS 3025 (Part 7 & 8)
5	pH	—	6.5 – 8.5	IS 3025 (Part 11)
6	Turbidity	NTU*	1 / 5	IS 3025 (Part 10)
7	Total Dissolved Solids	mg/lit	500 / 2000	IS 3025 (Part 16)
8	Total Suspended Solids	mg/lit	---	IS 3025 (Part 17)
9	Total Alkalinity	mg/lit	200 / 600	IS 3025 (Part 23)
10	Total Hardness	mg/lit	200 / 600	IS 3025 (Part 21)
11	Calcium Hardness	mg/lit	---	IS 3025 (Part 40)
12	Magnesium Hardness	mg/lit	---	IS 3025 (Part 21 & 40)
13	COD	mg/lit	---	IS 3025 (Part 58)
14	BOD	mg/lit	---	IS 3025 (Part 44)
15	Chloride	mg/lit	250 / 1000	APHA 4500-Cl
16	Salinity	ppt	---	IS 3025 (Part 32)
17	Sulphate	mg/lit	200 / 400	IS 3025 (Part 24)
18	Fluoride	mg/lit	1 / 1.5	IS 3025 (Part 60)
19	Nitrate	mg/lit	45	IS 3025 (Part 34)
20	Total Phosphorus	mg/lit	---	APHA 4500-P-C
21	Total Nitrogen	mg/lit	---	IS 3025 (Part 34)
22	Sodium	mg/lit	---	IS 3025 (Part 45)
23	Potassium	mg/lit	---	IS 3025 (Part 45)
24	Iron	mg/lit	0.3	APHA 3111-B
25	Manganese	mg/lit	0.1 / 0.3	APHA 3111-B
26	Cadmium	mg/lit	0.003	APHA 3111-B
27	Lead	mg/lit	0.01	APHA 3111-B
28	Zinc	mg/lit	5 / 15	APHA 3111-B
29	Nickel	mg/lit	0.02	APHA 3111-B
30	Copper	mg/lit	0.05 / 1.5	APHA 3111-B
31	Total Coliform	MPN/100ml	Absent	IS 1622 : 1981
32	Faecal Coliform	—	Absent	IS 1622 : 1981

Note: \* Nephelometric Turbidity Unit

## Results: Surface Water

Sr. No.	Parameters	Unit	Gulab Sagar Lake (S/W)		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/156	NIL/OT/02/23/181	NIL/OT/03/23/516
1	Temperature	°C	26.2	26.5	25.9
2	Colour	Hazen	47	49	51
3	Odour	–	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable
5	pH	–	7.89	8.37	8.05
6	Turbidity	NTU	26.5	27.6	27.1
7	Total Dissolved Solids	mg/lit	142	153	153
8	Total Suspended Solids	mg/lit	18	20	16
9	Total Alkalinity	mg/lit	82.4	78.9	90.9
10	Total Hardness	mg/lit	49.9	54.1	56.6
11	Calcium Hardness	mg/lit	33.3	37.4	36.4
12	Magnesium Hardness	mg/lit	16.6	16.6	20.2
13	COD	mg/lit	8	8	9
14	BOD	mg/lit	<5	<5	<5
15	Chloride	mg/lit	15.6	14.8	15.7
16	Salinity	ppt	0.05	0.05	0.05
17	Sulphate	mg/lit	3.3	3.0	2.9
18	Fluoride	mg/lit	0.3	0.3	0.3
19	Nitrate	mg/lit	<0.5	<0.5	<0.5
20	Total Phosphorus	mg/lit	0.9	1.1	0.9
21	Total Nitrogen	mg/lit	2.4	2.2	2.2
22	Sodium	mg/lit	13.2	12.2	12.6
23	Potassium	mg/lit	<0.05	<0.05	<0.05
24	Iron	mg/lit	0.63	0.62	0.65
25	Manganese	mg/lit	<0.1	<0.1	<0.1
26	Cadmium	mg/lit	<0.003	<0.003	<0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05
29	Nickel	mg/lit	<0.01	<0.01	<0.01
30	Copper	mg/lit	<0.04	<0.04	<0.04
31	Total Coliform	MPN/100ml	5	6	6
32	Faecal Coliform	–	Absent	Absent	Absent

Results: Surface Water

Sr. No.	Parameters	Unit	Kumbhariya Ka Talaw (S/W)		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/157	NIL/OT/02/23/182	NIL/OT/03/23/517
1	Temperature	°C	25.1	26.8	25.1
2	Colour	Hazen	15	14	14
3	Odour	–	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable
5	pH	–	7.54	7.61	6.99
6	Turbidity	NTU	6.0	6.8	6.6
7	Total Dissolved Solids	mg/lit	658	658	556
8	Total Suspended Solids	mg/lit	5	6	6
9	Total Alkalinity	mg/lit	72.6	72.6	60.7
10	Total Hardness	mg/lit	233.0	241.3	238.4
11	Calcium Hardness	mg/lit	124.8	129.0	133.3
12	Magnesium Hardness	mg/lit	108.2	112.3	105.0
13	COD	mg/lit	24	28	31
14	BOD	mg/lit	7.4	7.5	8.2
15	Chloride	mg/lit	169.4	184.5	161.0
16	Salinity	ppt	0.31	0.35	0.31
17	Sulphate	mg/lit	33.3	30.6	37.0
18	Fluoride	mg/lit	0.5	0.5	0.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5
20	Total Phosphorus	mg/lit	<1	<1	<1
21	Total Nitrogen	mg/lit	2.4	2.0	2.1
22	Sodium	mg/lit	6421.5	5512.8	5997.4
23	Potassium	mg/lit	1435.3	1329.0	1196.1
24	Iron	mg/lit	<0.1	<0.1	<0.1
25	Manganese	mg/lit	<0.1	<0.1	<0.1
26	Cadmium	mg/lit	<0.003	<0.003	<0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05
29	Nickel	mg/lit	<0.01	<0.01	<0.01
30	Copper	mg/lit	<0.04	<0.04	<0.04
31	Total Coliform	MPN/100ml	7	9	6
32	Faecal Coliform	–	Absent	Absent	Absent

Results: Ground Water

Sr. No.	Parameters	Unit	Akarli Village (G/W)			Limits*
			03.01.2023	02.02.2023	02.03.2023	
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023	---
---	Sample Code	---	NIL/OT/01/23/152	NIL/OT/02/23/177	NIL/OT/03/23/512	---
1	Temperature	°C	26.2	25.6	26.4	---
2	Colour	Hazen	54	52	58	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.66	8.07	8.83	6.5 – 8.5
6	Turbidity	NTU	<1	<1	<1	1 / 5
7	Total Dissolved Solids	mg/lit	9963	9323	8592	500 / 2000
8	Total Suspended Solids	mg/lit	19	19	17	---
9	Total Alkalinity	mg/lit	577.8	566.6	611.5	200 / 600
10	Total Hardness	mg/lit	312.0	307.8	315.1	200 / 600
11	Calcium Hardness	mg/lit	212.2	199.7	202.0	---
12	Magnesium Hardness	mg/lit	99.8	108.2	113.1	---
13	COD	mg/lit	75	88	88	---
14	BOD	mg/lit	28.6	30.2	30.8	---
15	Chloride	mg/lit	3561.4	3522.7	3793.7	250 / 1000
16	Salinity	ppt	8.14	7.58	7.23	---
17	Sulphate	mg/lit	727.5	776.9	776.9	200 / 400
18	Fluoride	mg/lit	1.1	1.1	1.0	1 / 1.5
19	Nitrate	mg/lit	32.4	32.1	29.7	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2815.8	2815.8	2899.4	---
22	Sodium	mg/lit	5990.7	6357.5	5501.7	---
23	Potassium	mg/lit	1514.7	1443.3	1500.5	---
24	Iron	mg/lit	<0.1	<0.1	<0.1	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	<0.05	<0.05	<0.05	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	28	21	23	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)

Post Environmental Monitoring Report for HRRL, Rajasthan

Results: Ground Water

Sr. No.	Parameters	Unit	Meghwali Ki Dhani (G/W)			Limits*
			03.01.2023	02.02.2023	02.03.2023	
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023	---
---	Sample Code	---	NIL/OT/01/23/153	NIL/OT/02/23/178	NIL/OT/03/23/513	---
1	Temperature	°C	26.3	25.5	25.4	---
2	Colour	Hazen	45	39	42	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	7.70	8.34	7.29	6.5 – 8.5
6	Turbidity	NTU	19.8	23.8	21.1	1 / 5
7	Total Dissolved Solids	mg/lit	3367	3848	3441	500 / 2000
8	Total Suspended Solids	mg/lit	754	763	853	---
9	Total Alkalinity	mg/lit	192.3	198.6	192.3	200 / 600
10	Total Hardness	mg/lit	272.1	254.6	232.1	200 / 600
11	Calcium Hardness	mg/lit	257.4	260.0	249.6	---
12	Magnesium Hardness	mg/lit	104.7	104.7	109.3	---
13	COD	mg/lit	144	97	134	---
14	BOD	mg/lit	147.0	142.5	144.0	---
15	Chloride	mg/lit	2750.0	2725.0	2550.0	250 / 1000
16	Salinity	ppt	10.21	7.54	8.92	---
17	Sulphate	mg/lit	302.3	321.8	347.8	200 / 400
18	Fluoride	mg/lit	4.7	5.5	4.7	1 / 1.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5	45
20	Total Phosphorus	mg/lit	2.2	2.2	2.4	---
21	Total Nitrogen	mg/lit	2.1	2.2	2.1	---
22	Sodium	mg/lit	605.0	539.0	544.5	---
23	Potassium	mg/lit	17.0	16.8	17.1	---
24	Iron	mg/lit	8.48	7.20	8.56	0.3
25	Manganese	mg/lit	0.24	0.25	0.22	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.40	0.36	0.42	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	14	8	10	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)

Post Environmental Monitoring Report for HRRL, Rajasthan

Results: Ground Water

Sr. No.	Parameters	Unit	Kiyar Village (G/W)			Limits*
			03.01.2023	02.02.2023	02.03.2023	
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023	---
---	Sample Code	---	NIL/OT/01/23/154	NIL/OT/02/23/179	NIL/OT/03/23/514	---
1	Temperature	°C	25.0	25.5	25.0	---
2	Colour	Hazen	12	13	13	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.04	8.62	7.63	6.5 – 8.5
6	Turbidity	NTU	30.4	29.4	31.0	1 / 5
7	Total Dissolved Solids	mg/lit	3264	2880	3488	500 / 2000
8	Total Suspended Solids	mg/lit	16	16	19	---
9	Total Alkalinity	mg/lit	199.5	166.5	201.3	200 / 600
10	Total Hardness	mg/lit	387.8	390.4	403.2	200 / 600
11	Calcium Hardness	mg/lit	108.1	104.7	103.5	---
12	Magnesium Hardness	mg/lit	281.2	306.2	281.2	---
13	COD	mg/lit	133	120	119	---
14	BOD	mg/lit	48.2	41.4	45.5	---
15	Chloride	mg/lit	3384.7	2923.2	3230.9	250 / 1000
16	Salinity	ppt	5.32	4.98	5.21	---
17	Sulphate	mg/lit	658.0	735.0	749.0	200 / 400
18	Fluoride	mg/lit	0.2	0.2	0.2	1 / 1.5
19	Nitrate	mg/lit	<0.5	<0.5	<0.5	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2.3	2.1	2.1	---
22	Sodium	mg/lit	670.4	602.7	645.8	---
23	Potassium	mg/lit	16.1	14.1	14.0	---
24	Iron	mg/lit	2.08	2.08	1.82	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.12	0.20	0.14	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	Absent	Absent	Absent	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)

Results: Ground Water

Sr. No.	Parameters	Unit	Sajiyali Village (G/W)			Limits*
			03.01.2023	02.02.2023	02.03.2023	
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023	---
---	Sample Code	---	NIL/OT/01/23/155	NIL/OT/02/23/180	NIL/OT/03/23/515	---
1	Temperature	°C	25.6	25.3	25.6	---
2	Colour	Hazen	72	77	68	5 / 15
3	Odour	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable
5	pH	–	8.34	7.53	8.10	6.5 – 8.5
6	Turbidity	NTU	<1	<1	<1	1 / 5
7	Total Dissolved Solids	mg/lit	14232	14638	14503	500 / 2000
8	Total Suspended Solids	mg/lit	12	10	11	---
9	Total Alkalinity	mg/lit	279.0	313.1	294.5	200 / 600
10	Total Hardness	mg/lit	170.3	166.8	172.0	200 / 600
11	Calcium Hardness	mg/lit	71.2	73.2	63.8	---
12	Magnesium Hardness	mg/lit	113.2	109.0	112.1	---
13	COD	mg/lit	101	92	70	---
14	BOD	mg/lit	23.5	26.3	25.0	---
15	Chloride	mg/lit	2087.1	1961.9	1920.1	250 / 1000
16	Salinity	ppt	10.12	8.83	8.10	---
17	Sulphate	mg/lit	615.6	547.2	513.0	200 / 400
18	Fluoride	mg/lit	5.1	4.9	4.6	1 / 1.5
19	Nitrate	mg/lit	0.5	0.5	0.5	45
20	Total Phosphorus	mg/lit	<1	<1	<1	---
21	Total Nitrogen	mg/lit	2.0	1.8	2.1	---
22	Sodium	mg/lit	656.5	637.0	591.5	---
23	Potassium	mg/lit	16.4	15.9	15.3	---
24	Iron	mg/lit	<0.1	<0.1	<0.1	0.3
25	Manganese	mg/lit	<0.1	<0.1	<0.1	0.1 / 0.3
26	Cadmium	mg/lit	<0.001	<0.001	<0.001	0.003
27	Lead	mg/lit	<0.01	<0.01	<0.01	0.01
28	Zinc	mg/lit	0.24	0.24	0.25	5 / 15
29	Nickel	mg/lit	<0.01	<0.01	<0.01	0.02
30	Copper	mg/lit	<0.04	<0.04	<0.04	0.05 / 1.5
31	Total Coliform	MPN/100ml	Absent	Absent	Absent	Absent
32	Faecal Coliform	–	Absent	Absent	Absent	Absent

Note: \*As per IS10500:2012 (Desirable/Permissible)



### 3. SOIL QUALITY

Parameter Details:

Sr. No.	Parameters	Unit	Analysis Method
1	Particle Size Distribution		
	i. Sand	%	International Pipette Method
	ii. Silt	%	International Pipette Method
	iii Clay	%	International Pipette Method
2	Texture	–	International Pipette Method
3	pH Value	–	IS 2720 (Part 26)
4	Electrical Conductivity	mS/cm	IS 14767
5	Specific Gravity	mg/kg	ASTM D854
6	Bulk Density	g/cm <sup>3</sup>	Note 1*
7	Organic Matter	%	Lab SOP No. NIL/SOP/05***
8	Sodium Absorption Ratio (SAR)	–	IS 11624
9	Porosity	%	Note 2**
10	NPK Value	mg/kg	APHA 4500-N-C and Lab SOP No. NIL/SOP/10***

Note :

1. \* Environmental Analysis – Water, Soil and Air, by M.M. Saxena
2. \*\* Soil Sampling, Preparation and Analysis (2<sup>nd</sup> Edition) by Kim H. Tan
3. \*\*\* Based on Manual of Soil testing in India, Ministry of Agriculture, GOI, 2011



Results:

Sr. No.	Parameters	Unit	Near Project Site (Dewal Ki Dhani)		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/158	NIL/OT/02/23/183	NIL/OT/03/23/518
1	Particle Size Distribution				
	i. Sand	%	99.3	99.5	99.2
	ii. Silt	%	0.4	0.3	0.5
	iii Clay	%	0.3	0.2	0.3
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	7.95	8.11	8.35
4	Electrical Conductivity	mS/cm	2.364	2.585	2.364
5	Specific Gravity	mg/kg	2.52	2.96	2.88
6	Bulk Density	g/cm <sup>3</sup>	1.87	2.13	2.19
7	Organic Matter	%	1.94	1.82	2.04
8	Sodium Absorption Ratio (SAR)	–	1.41	1.15	1.34
9	Porosity	%	19.3	18.7	18.1
10	NPK Value	mg/kg	348.5	341.6	337.2

Sr. No.	Parameters	Unit	Kasajiyon ki Dhani		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/159	NIL/OT/02/23/184	NIL/OT/03/23/519
1	Particle Size Distribution				
	i. Sand	%	98.8	98.8	98.7
	ii. Silt	%	0.5	0.9	0.8
	iii Clay	%	0.7	0.3	0.5
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	8.32	8.67	8.41
4	Electrical Conductivity	mS/cm	0.214	0.192	0.190
5	Specific Gravity	mg/kg	2.71	2.97	2.76
6	Bulk Density	g/cm <sup>3</sup>	1.81	2.03	2.01
7	Organic Matter	%	1.59	1.53	1.70
8	Sodium Absorption Ratio (SAR)	–	2.46	2.93	2.80
9	Porosity	%	23.3	22.3	25.2
10	NPK Value	mg/kg	912.6	811.9	836.1

Results:

Sr. No.	Parameters	Unit	Sajiyali Village		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/160	NIL/OT/02/23/185	NIL/OT/03/23/520
1	Particle Size Distribution				
	i. Sand	%	98.8	98.8	99.0
	ii. Silt	%	0.7	0.7	0.5
	iii Clay	%	0.5	0.5	0.5
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	8.50	8.25	8.84
4	Electrical Conductivity	mS/cm	0.113	0.122	0.123
5	Specific Gravity	mg/kg	1.87	2.34	2.43
6	Bulk Density	g/cm <sup>3</sup>	2.11	1.80	1.85
7	Organic Matter	%	0.73	0.90	0.79
8	Sodium Absorption Ratio (SAR)	–	7.23	6.42	6.50
9	Porosity	%	18.1	19.0	18.8
10	NPK Value	mg/kg	300.2	324.7	308.8

Sr. No.	Parameters	Unit	Godaro Ki Dhani		
			03.01.2023	02.02.2023	02.03.2023
---	Date of Sampling	---	03.01.2023	02.02.2023	02.03.2023
---	Sample Code	---	NIL/OT/01/23/161	NIL/OT/02/23/186	NIL/OT/03/23/521
1	Particle Size Distribution				
	i. Sand	%	98.8	98.8	99.3
	ii. Silt	%	0.9	0.7	0.6
	iii Clay	%	0.3	0.5	0.1
2	Texture	–	Sand	Sand	Sand
3	pH Value	–	8.25	8.50	8.00
4	Electrical Conductivity	mS/cm	0.089	0.094	0.092
5	Specific Gravity	mg/kg	2.69	2.33	2.52
6	Bulk Density	g/cm <sup>3</sup>	2.00	2.37	1.75
7	Organic Matter	%	0.71	0.62	0.70
8	Sodium Absorption Ratio (SAR)	–	6.36	6.97	6.48
9	Porosity	%	21.7	21.2	21.9
10	NPK Value	mg/kg	3398.2	3904.3	2898.2



#### 4. NOISE LEVEL MONITORING

Standard:

As per the Noise Pollution (Regulation and Control) Rules, 2000 the Ambient Air Quality Standards in respect of Noise are as below:

Area Code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

- Note:-**
1. Day time mean from 6.00 a.m. to 10.00 p.m.
  2. Night time mean from 10.00 p.m. to 6.00 a.m.
  3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
  4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

\* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.



Result:

LOCATION		Kiyar					
DATE	06.01.2023	20.01.2023	05.02.2023	19.02.2023	05.03.2023	26.03.2023	
Hourly $L_{eq}$	06:00 - 07:00	52.9	51.6	51.6	55.3	48.5	47.5
	07:00 - 08:00	51.5	49.7	52.8	56.6	55.4	48.2
	08:00 - 09:00	50.4	49.6	54.2	57.8	51.3	52.1
	09:00 - 10:00	54.7	57.9	55.2	60.6	52.6	50.2
	10:00 - 11:00	54.7	55.1	60.3	55.1	54.5	51.7
	11:00 - 12:00	55.1	54.7	54.9	53.5	51.1	53.2
	12:00 - 13:00	54.2	56.9	56.1	52.8	57.4	52.9
	13:00 - 14:00	52.3	48.4	50.5	52.0	55.4	41.3
	14:00 - 15:00	55.5	60.6	55.1	54.4	54.8	52.8
	15:00 - 16:00	57.1	62.9	56.2	54.5	54.9	53.8
	16:00 - 17:00	55.5	69.7	55.4	57.3	53.9	49.9
	17:00 - 18:00	56.2	63.7	55.4	59.8	55.6	52.7
	18:00 - 19:00	53.8	57.0	56.6	59.6	54.5	52.4
	19:00 - 20:00	56.4	55.1	53.1	57.8	56.4	51.6
	20:00 - 21:00	51.1	44.2	54.0	55.0	54.7	46.7
	21:00 - 22:00	56.0	44.0	54.4	60.4	55.6	47.6
	22:00 - 23:00	48.7	42.0	50.8	56.7	56.3	46.7
	23:00 - 00:00	49.0	48.8	47.3	55.9	52.8	48.8
	00:00 - 01:00	46.6	44.6	48.4	55.1	48.2	44.4
	01:00 - 02:00	47.8	47.2	46.1	56.7	44.5	48.8
02:00 - 03:00	48.1	47.4	46.6	56.7	41.9	49.6	
03:00 - 04:00	49.0	47.4	46.4	54.7	40.3	52.3	
04:00 - 05:00	53.7	45.7	43.8	56.2	42.4	50.4	
05:00 - 06:00	53.0	47.1	51.1	56.1	47.8	44.5	
$L_{eq}$ Day	54.6	60.5	55.3	57.2	54.6	51.2	
$L_{eq}$ Night	50.2	46.7	48.2	56.1	50.1	48.9	
$L_{DN}$	57.3	59.6	56.5	62.3	57.3	55.4	

Note: All Values in dB(A)

Result

LOCATION		Akarli					
DATE	05.01.2023	19.01.2023	04.02.2023	18.02.2023	04.03.2023	25.03.2023	
Hourly $L_{eq}$	06:00 - 07:00	53.0	58.0	55.3	49.5	52.7	53.2
	07:00 - 08:00	53.5	51.1	56.6	52.9	47.2	50.3
	08:00 - 09:00	53.6	50.5	50.7	53.4	46.7	49.1
	09:00 - 10:00	55.3	56.0	52.1	55.2	57.6	51.5
	10:00 - 11:00	56.0	51.6	53.1	55.8	62.8	51.9
	11:00 - 12:00	55.0	52.2	54.1	55.2	56.3	51.2
	12:00 - 13:00	55.0	56.5	54.4	58.3	56.4	52.7
	13:00 - 14:00	51.1	50.2	47.6	56.2	50.3	47.9
	14:00 - 15:00	54.2	55.0	52.7	54.2	54.6	48.6
	15:00 - 16:00	54.8	55.1	52.7	54.7	55.6	52.7
	16:00 - 17:00	54.8	54.0	53.5	55.3	53.8	48.3
	17:00 - 18:00	55.3	54.3	52.2	54.9	54.5	49.8
	18:00 - 19:00	55.1	51.3	54.8	57.4	55.2	52.6
	19:00 - 20:00	53.3	52.8	50.6	56.4	52.8	52.2
	20:00 - 21:00	51.7	48.1	52.8	55.2	45.2	46.2
	21:00 - 22:00	54.8	49.4	49.8	54.7	47.7	51.6
	22:00 - 23:00	53.5	46.5	52.4	57.3	45.6	45.1
	23:00 - 00:00	53.6	48.2	48.1	53.5	61.0	46.6
	00:00 - 01:00	54.4	55.7	48.4	47.2	55.4	47.9
	01:00 - 02:00	54.6	56.3	44.5	46.6	53.3	52.7
02:00 - 03:00	55.0	49.8	41.2	44.7	55.6	58.9	
03:00 - 04:00	53.5	50.8	40.7	45.0	52.6	59.2	
04:00 - 05:00	53.3	55.3	39.9	45.5	56.0	49.5	
05:00 - 06:00	53.4	58.2	51.7	48.6	56.7	50.9	
$L_{eq}$ Day	54.3	53.7	53.2	55.3	55.4	51.0	
$L_{eq}$ Night	54.0	54.2	48.1	51.1	56.1	54.3	
$L_{DN}$	60.1	60.1	55.5	58.2	62.0	59.9	

Note: All Values in dB(A)



Result

LOCATION		Dewal ki Dhani					
DATE		09.01.2023	23.01.2023	08.02.2023	22.02.2023	08.03.2023	29.03.2023
Hourly L <sub>eq</sub>	06:00 - 07:00	58.5	50.7	48.0	49.1	44.0	52.0
	07:00 - 08:00	51.7	45.0	44.7	49.3	59.2	56.8
	08:00 - 09:00	53.2	41.1	40.9	50.1	37.5	56.2
	09:00 - 10:00	59.2	45.1	43.4	52.5	44.7	55.3
	10:00 - 11:00	54.8	48.9	57.8	52.7	40.6	57.2
	11:00 - 12:00	54.9	48.5	50.6	51.4	47.0	57.0
	12:00 - 13:00	58.7	47.2	47.4	52.3	45.4	56.0
	13:00 - 14:00	56.6	37.2	51.2	51.3	40.2	49.8
	14:00 - 15:00	54.3	45.8	60.6	51.9	37.2	51.9
	15:00 - 16:00	54.5	49.1	56.0	57.4	40.3	55.7
	16:00 - 17:00	54.5	47.7	47.9	57.7	42.6	56.5
	17:00 - 18:00	54.2	46.9	46.0	62.0	41.8	49.2
	18:00 - 19:00	54.2	46.7	36.4	60.7	41.6	52.5
	19:00 - 20:00	56.9	44.1	52.4	54.1	36.2	54.1
	20:00 - 21:00	54.3	41.1	48.5	56.6	36.7	49.5
	21:00 - 22:00	53.2	40.9	47.4	51.4	42.2	54.2
	22:00 - 23:00	52.9	41.6	49.1	50.4	44.0	56.0
	23:00 - 00:00	57.1	43.1	50.9	48.6	39.7	49.7
	00:00 - 01:00	48.7	48.0	50.1	43.4	45.4	51.7
	01:00 - 02:00	52.8	46.8	37.2	41.2	45.5	48.2
02:00 - 03:00	47.7	42.7	50.2	35.7	33.1	47.5	
03:00 - 04:00	49.7	47.9	47.3	35.5	41.1	47.0	
04:00 - 05:00	55.2	44.3	46.3	37.5	42.4	47.4	
05:00 - 06:00	51.5	44.6	48.1	41.6	42.9	48.3	
L <sub>eq</sub> Day		55.8	46.6	52.7	55.7	48.3	54.7
L <sub>eq</sub> Night		53.0	45.5	48.6	44.9	42.9	50.7
L <sub>DN</sub>		59.6	51.7	55.6	55.4	50.4	57.7

Note: All Values in dB(A)



Result

LOCATION		Panch Padra					
DATE		04.01.2023	18.01.2023	03.02.2023	17.02.2023	03.03.2023	24.03.2023
Hourly L <sub>eq</sub>	06:00 - 07:00	59.5	58.0	50.8	54.6	55.2	58.5
	07:00 - 08:00	60.5	57.9	49.4	60.5	52.9	56.6
	08:00 - 09:00	61.7	57.7	51.3	57.8	57.6	62.8
	09:00 - 10:00	64.4	58.1	57.0	59.7	55.7	59.3
	10:00 - 11:00	59.2	58.3	56.8	59.4	58.9	62.3
	11:00 - 12:00	57.6	58.4	60.0	60.1	58.2	61.5
	12:00 - 13:00	56.7	58.2	56.6	59.6	59.4	63.4
	13:00 - 14:00	56.0	57.4	61.5	58.9	54.3	58.3
	14:00 - 15:00	58.1	57.9	58.1	59.6	58.0	61.4
	15:00 - 16:00	58.3	58.1	58.7	61.4	56.9	60.7
	16:00 - 17:00	61.1	58.7	58.6	59.8	56.6	60.0
	17:00 - 18:00	63.6	58.6	60.1	59.2	56.7	60.7
	18:00 - 19:00	63.4	55.9	57.1	60.7	58.5	62.2
	19:00 - 20:00	61.8	56.3	57.0	57.5	56.6	60.1
	20:00 - 21:00	58.8	56.9	56.2	59.0	57.0	60.2
	21:00 - 22:00	64.4	57.7	55.3	58.1	54.9	58.7
	22:00 - 23:00	60.5	57.9	51.0	56.6	57.0	60.0
	23:00 - 00:00	59.7	57.9	48.8	54.4	54.9	58.9
	00:00 - 01:00	58.9	57.9	51.7	50.5	55.0	59.7
	01:00 - 02:00	60.6	57.5	48.7	49.7	51.2	55.1
02:00 - 03:00	60.7	57.9	44.7	49.8	48.7	51.5	
03:00 - 04:00	58.6	57.7	45.3	53.2	51.8	55.6	
04:00 - 05:00	60.1	58.1	56.6	52.4	50.9	54.2	
05:00 - 06:00	59.9	58.4	54.0	53.8	48.8	52.1	
L <sub>eq</sub> Day		61.1	57.8	57.5	59.4	57.0	60.8
L <sub>eq</sub> Night		59.9	57.9	51.7	53.2	53.2	56.9
L <sub>DN</sub>		66.1	63.9	59.4	61.1	60.1	63.9

Note: All Values in dB(A)