

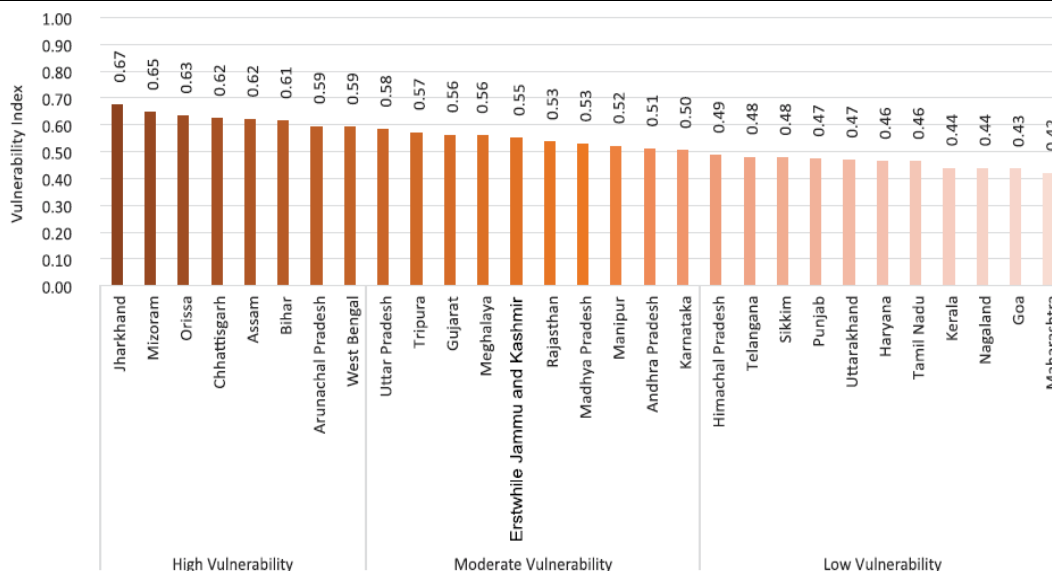


Figure 3.16: Vulnerability Indices of The Indian States, Their Categorization, And Corresponding Ranks

3.8 Air Environment

3.8.1 Site Specific Meteorological Observation

Site specific data has been collected within the Industrial area in order to measure the following parameters- ambient temperature, wind speed, relative humidity and rainfall. The aforesaid metrological parameter was being observed in the filed over a period of 3 month starting from March 2024-May 2024. The metrological data recorded at site is given in Table 3.11.

Table 3-11: Site Specific Meteorological Data

Period	Temperature (°C)		Relative Humidity (%)		Rainfall (mm)		Average Wind speed (m/s)
	Min	Max	Min	Max	Min	Max	
March 2024	13.77	38.52	29	100	0	0	2.41
April-2024	22.15	42.64	18	73	0	0	3.74
May-2024	22.15	44.59	16	92	0	0	3.37

Source: Primary data collected art Site

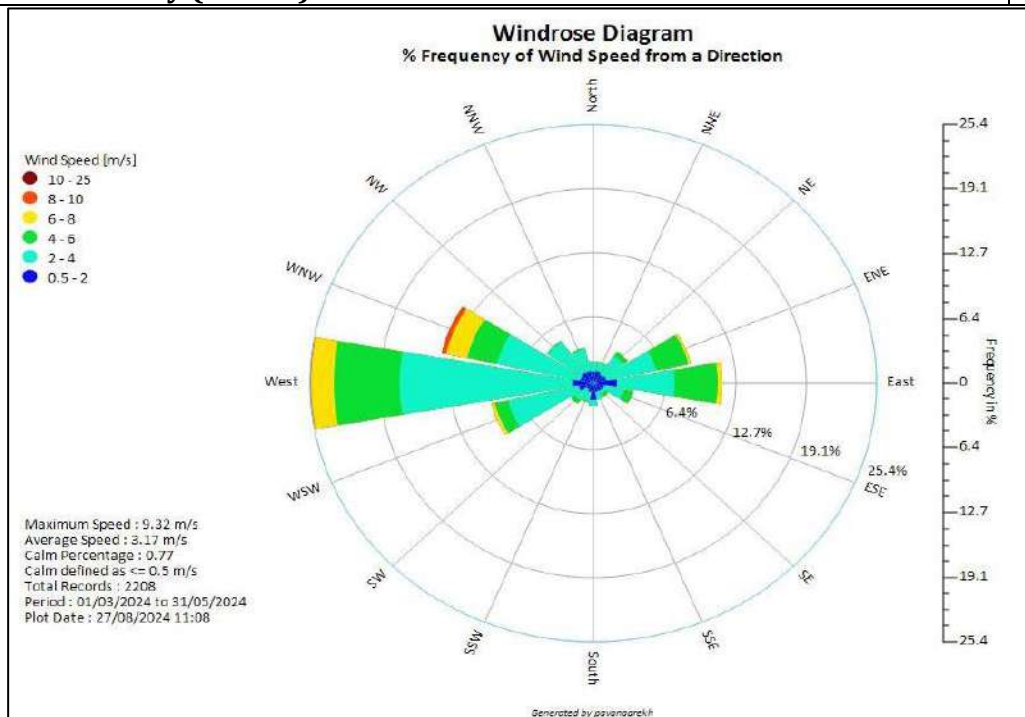


Figure 3.17: Windrose Diagram

3.8.2 Ambient Air Quality

The baseline ambient air quality monitoring has been carried out to establish the present ambient air quality scenario within the project area and its conformity to National Ambient Air Quality Standards. The baseline status of ambient air quality was assessed considering the following:

- Meteorological condition;
- Topography;
- The assumed regional influences on background air quality;
- The areas where impact would most likely be greatest;

The ambient air quality monitoring has been carried out at ten locations in the month of March 2024 to May 2024 with a frequency of twice a week for twelve weeks with respect to Particulate Matter (size less than 10 μ m) or PM₁₀, Particulate Matter (size less than 2.5 μ m) or PM_{2.5}, Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) Carbon Monoxide in accordance with Bureau of Indian Standards (BIS), CPCB guidelines (CPCB Gazette notification dated 18.11.2009 on AAQ) and MoEF&CC guidelines. The Ambient Air Quality Sampling locations are given in Table 3-12 and shown in Figure 3-18. Analytical results of the air monitoring are presented in Table 3-13.

Table 3.12: Ambient Air Quality Monitoring Location

S. No.	Location	Distance (Km)	Direction	Latitude	Longitude
A-1	Within Project Site	--	--	25° 24' 20.60" N	84° 11' 46.19" E
A-2	Atimi Village	1.4	WSW	25° 24' 30.86" N	84° 9' 25.57" E
A-3	Dhapachhuha Village	4	W	25°24'18.32"N	84° 8'36.46"E
A-4	Tetrahar Village	5.3	W	25° 24' 27.04" N	84° 12' 58.96" E
A-5	Kukurbhuka Village	1.2	E	25° 24' 28.76" N	84° 14' 57.86" E
A-6	Mahadeoganj Village	4.4	E	25°26'4.38"N	84°12'59.85"E
A-7	Pawanrpur Village	2	NE	25° 22' 53.26" N	84° 10' 41.26" E
A-8	Bisuwa Village	3	SW	25° 24' 0.86" N	84° 10' 59.18" E
A-9	Nawanagar	1.7	S	25° 23' 11.99" N	84° 12' 26.22" E
A-10	Bhadar Village	2.1	NW	25° 25' 26.72" N	84° 10' 24.73" E

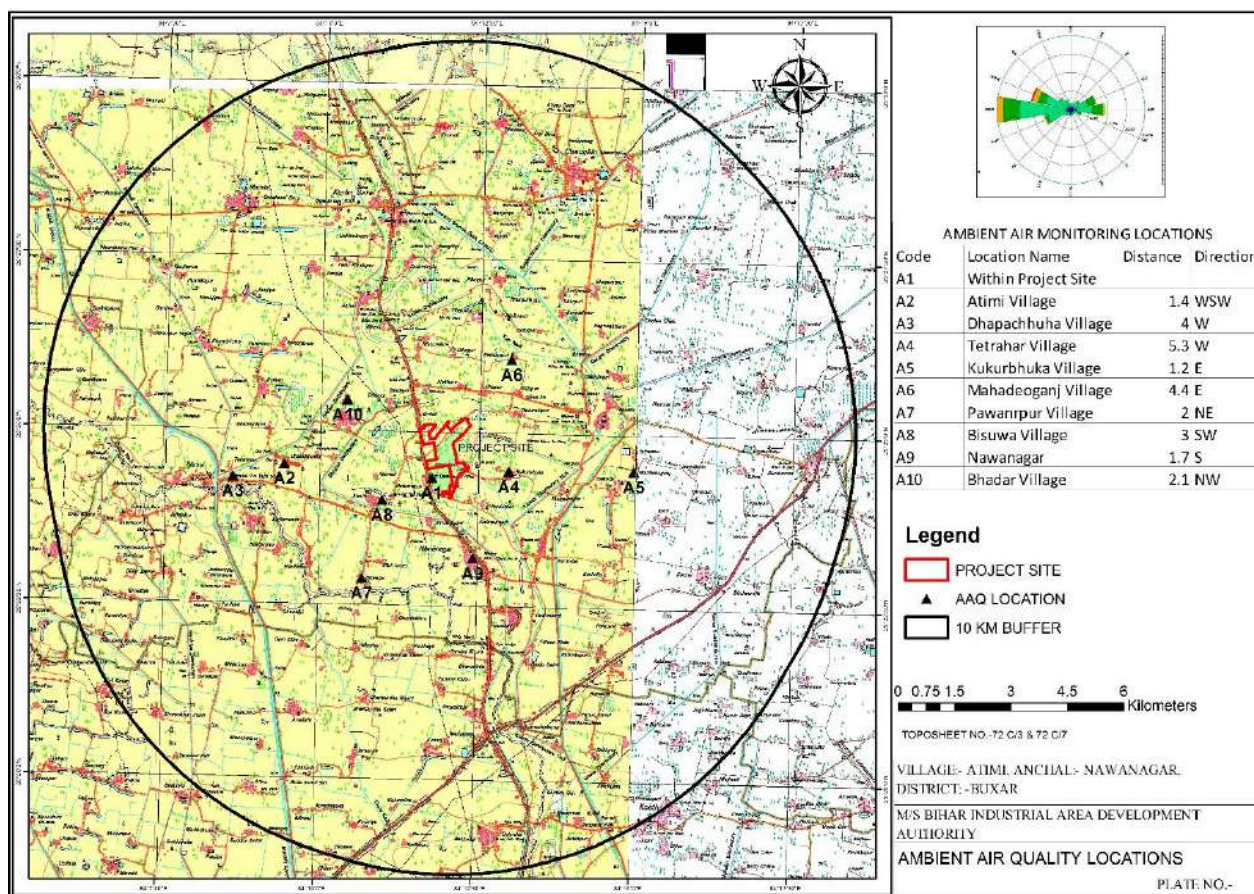


Figure 3-18: Ambient Air Quality Monitoring Sampling Location

Table 3-13: Ambient Air Quality in The Study Area

St. Code	Location	Parameter									
		PM ₁₀ (µg/m ³)		PM _{2.5} (µg/m ³)		SO ₂ (µg/m ³)		NO ₂ (µg/m ³)		CO (mg/m ³)	
		Max	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
A1	Within Project Site	59.2	34.0	40.2	27.0	18.2	10.9	32.2	16.9	0.620	0.280
A2	Atimi Village	61.1	38.4	35.0	24.1	16.9	10.1	27.4	14.7	0.520	0.272
A3	Dhapachhuha Village	54.7	32.1	32.9	21.8	13.7	8.8	23.4	18.6	0.560	0.350
A4	Tetrahar Village	51.0	31.3	30.2	19.8	18.6	11.4	27.6	19.4	0.741	0.382
A5	Kukurbhuka Village	55.1	34.7	34.3	23.0	14.4	8.0	24.4	15.9	0.724	0.256
A6	Mahadeoganj Village	52.4	33.8	26.3	16.4	13.7	7.6	20.5	13.7	0.600	0.400
A7	Pawanrpur Village	54.1	31.7	30.1	23.7	16.4	10.0	23.9	15.3	0.574	0.270
A8	Bisuwa Village	56.1	39.0	32.8	19.9	14.1	7.8	25.4	15.1	0.650	0.340
A9	Nawanagar	60.2	34.9	29.8	19.4	19.7	13.5	29.4	16.2	0.804	0.256
A10	Bhadar Village	51.7	35.0	26.5	17.8	16.3	8.5	24.5	14.1	0.740	0.230
Standard		100		60		80		80		2	

Source: Primary data collected at Site

The test results indicate that 24 hourly mean concentration of PM₁₀ in ambient air varied between 31.3 µg/m³ and 59.2 µg/m³ in the study area, which were within the maximum permissible limit of the National Ambient Air Quality Standards i.e. 100 µg/m³.

The highest concentration of PM_{2.5} in the air samples were reported to 40.2 µg/m³ at Project Site, while lowest recorded as 16.4 µg/m³ at Mahadeoganj Village during the monitoring period. At all the locations the concentration of PM_{2.5} were found within the maximum prescribed limit of 60 µg/m³.

The minimum and maximum concentration of SO₂ were varies between 7.6 µg/m³ to 19.7 µg/m³ and NO₂ ranged between 13.7 to 32.2 µg/m³. Both the parameters were with the prescribed limit of 80 µg/m³ at all the locations. The CO level was measured between 0.2 mg/m³ to 0.8 mg/m³, which was well within the prescribed limit of 2 mg/m³. All the other parameters are well below within the standard. The graphical representation of concentration of PM₁₀, PM_{2.5}, SO₂ and NO_x are shown in Figure 3-19, Figure 3-20, Figure 3-21 and Figure 3-22 respectively.

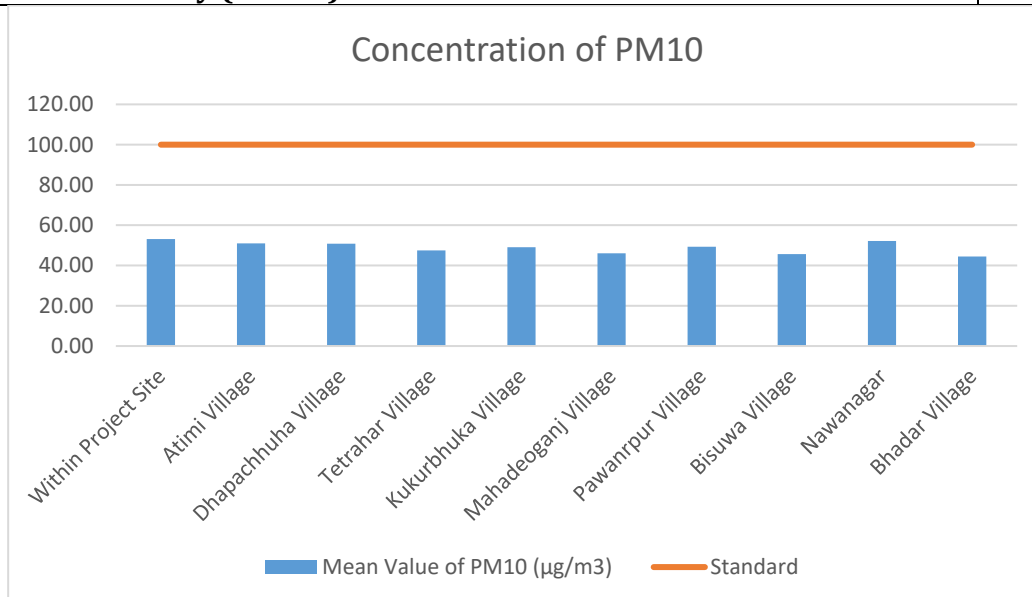


Figure 3-19: Concentration of Pm10 in Ambient Air In Project Area

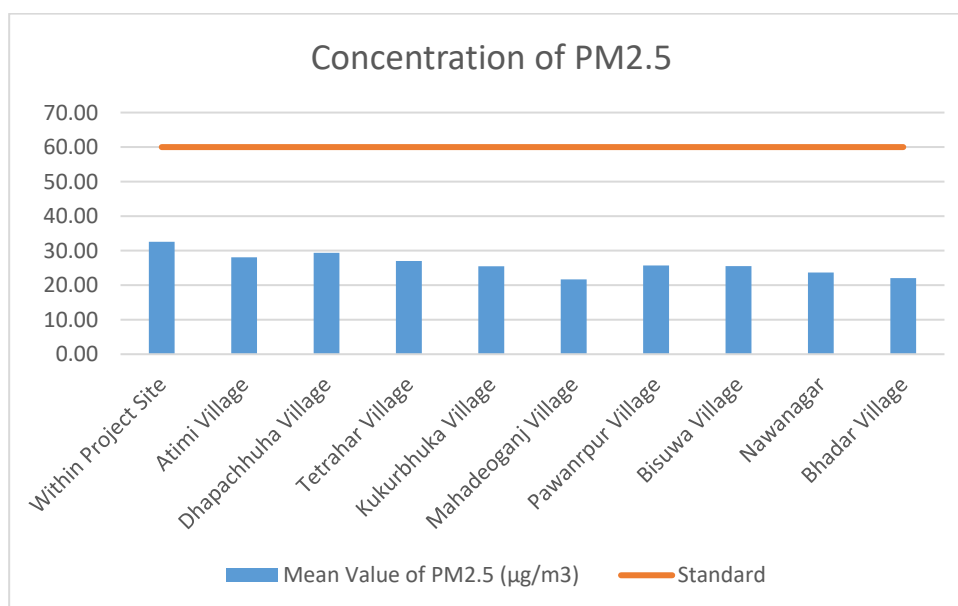


Figure 3-20: Concentration of Pm2.5 in Ambient Air In Project Area

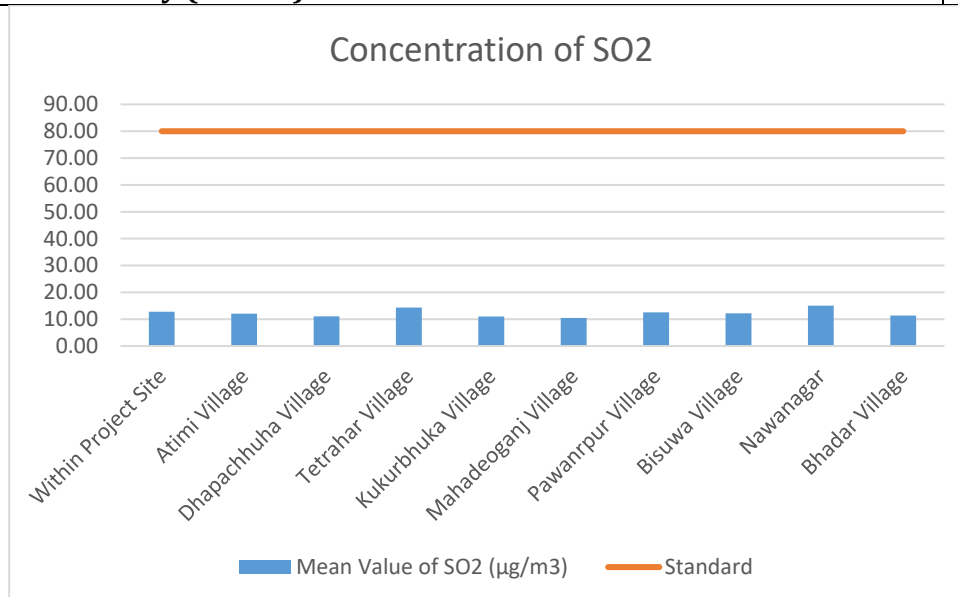


Figure 3-21: Concentration of SO₂ in Ambient Air In Project Area

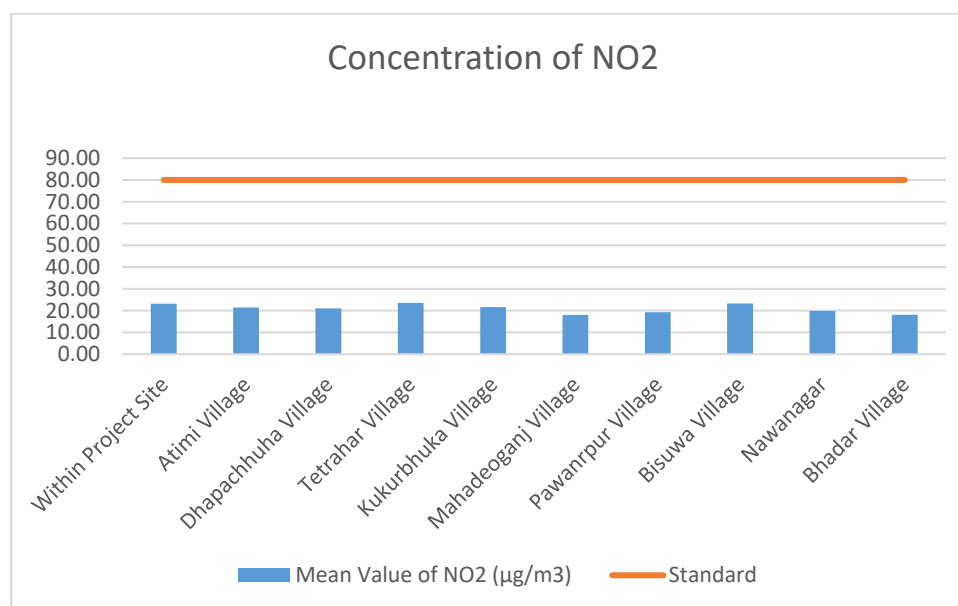


Figure 3-22: Concentration of NO_x in Ambient Air In Project Area

The Ambient Air quality analysis report details are enclosed as **Annexure-5**.

3.9 Noise Environment

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as insidious or harmful as air and water pollutants but it affects human health and well-being and can contribute to deterioration of human well-being in general and can cause neurological disturbances and physiological damage to the hearing mechanism in

particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the site.

Noise monitoring was carried out at different locations in the project study area to understand the present scenario of noise pollution during the month of March 2024-May 2024. Eight (8) numbers of noise monitoring locations has been identified for ambient noise monitoring. The noise levels were monitored continuously for 24 hours with one-hour interval by using Data Logger Noise Meter. The noise monitoring locations are given in Table 3-14.

Table 3-14: Noise Monitoring Location

S. No.	Location	Distance (Km)	Direction	Latitude	Longitude
N-1	Kendriya Vidyalaya	Adjacent	W	25° 24' 39.04" N	84° 11' 40.32" E
N-2	Near High School	Adjacent	S	25° 24' 4.87" N	84° 12' 0.45" E
N-3	Atimi Village	1.4	WSW	25° 23' 56.03" N	84° 10' 53.85" E
N-4	Bhadar Village	1.7	WNW	25° 25' 10.41" N	84° 10' 35.33" E
N-5	Nokhpur Village	0.9	N	25° 25' 40.10" N	84° 12' 11.56" E
N-6	Kukurbhuka Village	1.2	E	25° 24' 24.76" N	84° 13' 3.26" E
N-7	Mahadeoganj	4.4	E	25° 24' 30.00" N	84° 14' 57.46" E
N-8	Tetrahara	5.3	W	25° 24' 18.70" N	84° 8' 38.95" E

Ministry of Environment, Forests & Climate Change (MoEFCC) has notified the noise standards vide gazette notification dated December 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in Table 3-15. The baseline Noise level results are given in Table 3-16. Monitoring Location map of the Noise Level Monitoring is given in Figure 3-23.

Table 3.15: Ambient Noise Quality Standards

Area Code	Category of Area	Noise dB(A) Leq	
		Day time*	Night time*
A	Residential Zone	55	45
B	Silence zone*	50	40
C	Industrial Zone	75	70
D	Commercial Zone	65	55

Note: 1. Daytime is from 6.00am to 10.00 pm and Night time is from 10.00 pm to 6.00 am.
2. Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones.

Development of Nawanagar Industrial Area (Phase-II) at Atimi & Ranbirpur Villages, Nawanagar Block, Buxar District, Bihar by M/s Bihar Industrial Area Development Authority (BIADA) -Industrial Area-102.26 Ha.

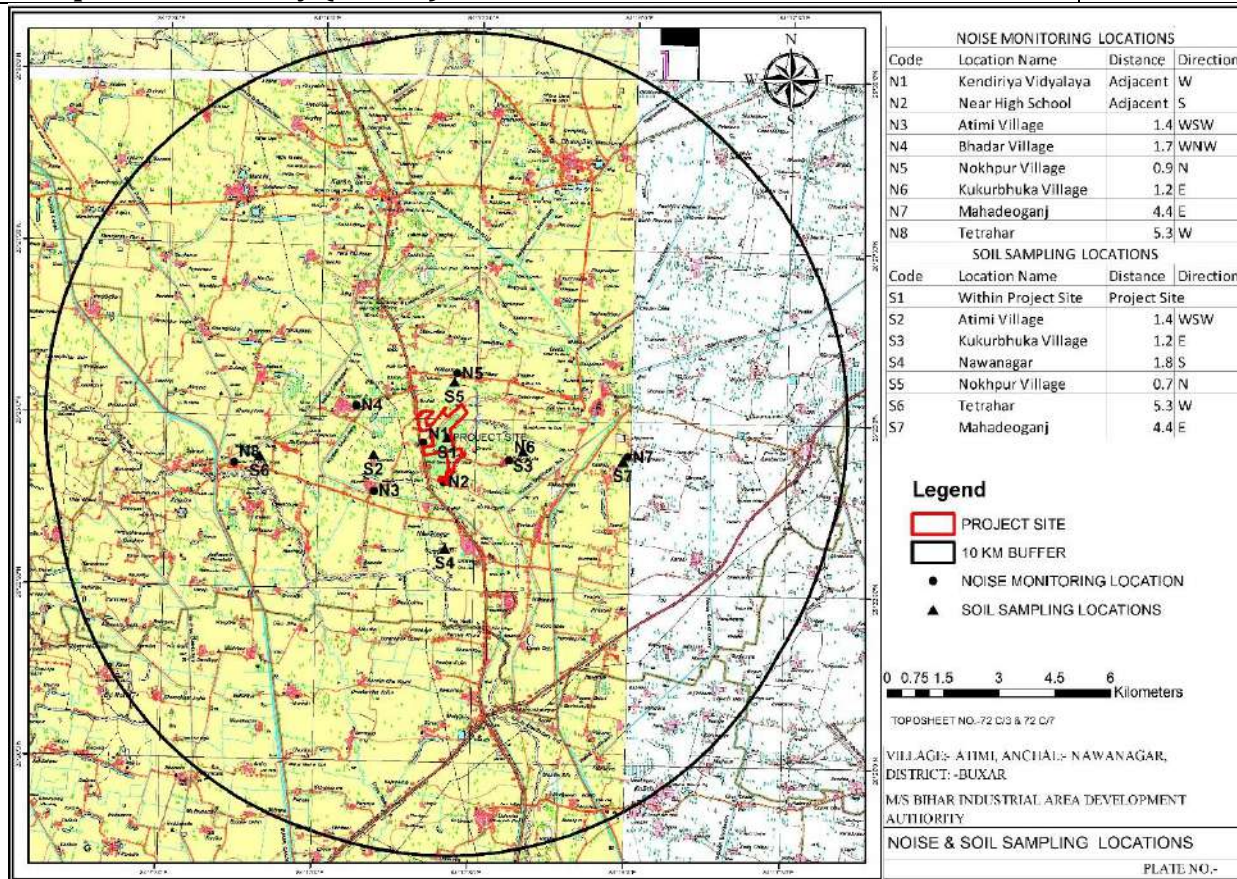


Figure 3.23: Noise Quality Monitoring Sampling Location

Table 3.16: Baseline Noise Quality Monitoring Results

S.No	Location	Area Type	Day (0600-2200 hours)				Night (2200-0600 hours)			
			Norm	Max.	Min.	Day Equivalent	Norm	Max.	Min.	Night Equivalent
N1	Kendiriya Vidyalaya	Silence	50	48.5	39.8	44.9	40	38.2	33.7	36.8
N2	Near High School	Silence	50	45.8	37.8	42.9	40	39.6	35.4	37.3
N3	Atimi Village	Residential	55	51.8	45.6	49.7	45	40.1	36.2	38.9
N4	Bhadar Village	Residential	55	53.8	40.1	46.3	45	42.5	36.4	39.8
N5	Nokhpur Village	Residential	55	51.6	42.3	48.9	45	43.9	38.1	41.6
N6	Kukurbhuka Village	Residential	55	52.8	39.4	52.0	45	42.8	36.8	40.6
N7	Mahadeoganj	Residential	55	53.9	41.8	48.5	45	41.7	37.8	39.9
N8	Tetrahar	Residential	55	51.2	38.6	47.0	45	43.2	37.3	40.6
All values in dB(A); * Logarithmic Averages										

Source: Primary data collected at Site

The average daytime ambient noise level was recorded in the range of 37.8 Leq dB(A) to 53.9 Leq dB(A) whereas the same varied from 33.7 Leq dB(A) to 43.9 Leq dB(A) during night time. At all the locations equivalent noise levels were recorded within the permissible limit

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for the residential & Silence category both during daytime and night time, i.e. 55 Leq dB(A) and 45 Leq dB(A) & 50 Leq dB(A) and 40 Leq dB(A) respectively. The Noise level measurement analysis report details are enclosed as **Annexure-6**.

3.10 Water Environment

It is very much essential to study existing water environment in and around the project area available with respect to their existing quality as well as their supportive capacity to represent the baseline status of water environment.

3.10.1 Drainage Pattern

This district is part of the Lower Ganga sub-basin of the Upper Ganga basin. The Ganga touches the district near Chausa. The river Ganga flows towards east parallel to the district boundary. The other rivers flowing from south to north, through the district, are the Noni and the Thora. Most of these are ephemeral. The river Karmanasa delimits the district in the west and southwest. It debouches in the river Ganga near Chausa. The river Karmanasa is an important for irrigation in the western part of the district. There are many lift irrigation schemes and side channels to carry overflowing river water to the field. The drainage map of buxar district is shown in Figure 3-24. Drainage Classifications 10 Km Radius of Project Site is shown in **Figure 3.25**.

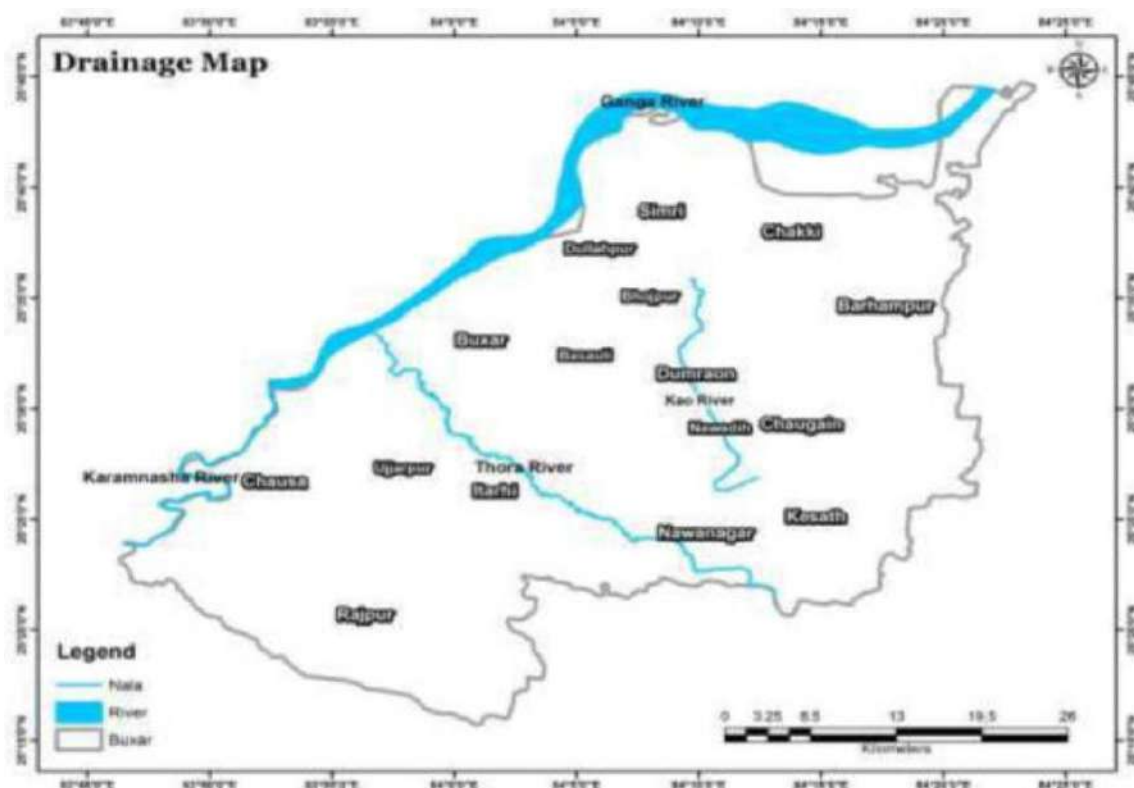


Figure 3.24: Draiange Map of Buxar District

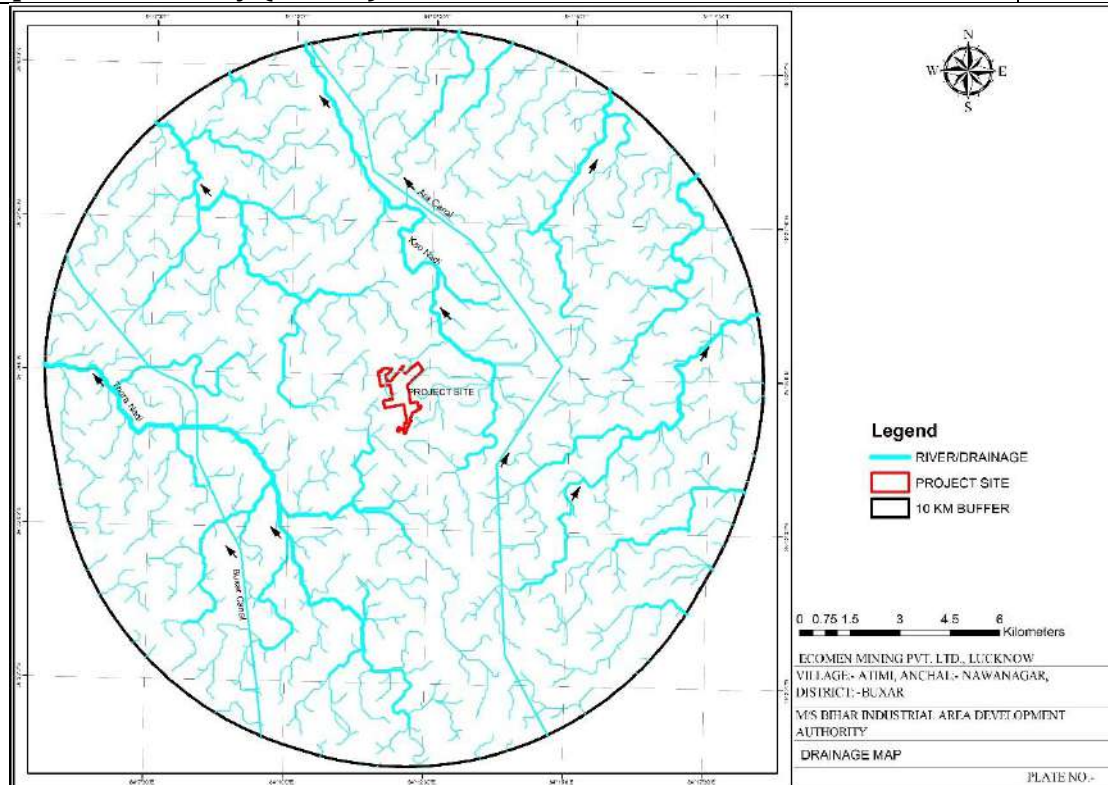


Figure 3.25: Showing The Drainage Classifications 10 Km Raidus of Project Site

Ganga, Thora & Karmanasha are major rivers in Buxar district. Besides the river there are many ephemeral streams. Apart from these sources there are many Tals. During the process of shifting of course these rivers leave behind cut off, meanders, abandoned channels and a number of marshes locally known as chauras. The chauras are also responsible for water logging in the area with the onset of monsoon and contract to become localized during summer. Apart from this drainage system there is a very good network of canal system also in this district. Description of some major rivers of the district is described below.

River Ganga: The Ganges or Ganga, is a trans-boundary river of the Indian subcontinent which flows through the nations of India and Bangladesh. The 2,525 km (1,569 mi) river rises in the western Himalayas in the Indian state of Uttarakhand, and flows south and east through the Gangetic Plain of North India. After entering West Bengal, it divides into two rivers: the Hooghly and the Padma River. The Hooghly, or Adi Ganga, flows through several districts of West Bengal and into the Bay of Bengal near Sagar Island. The other, the Padma, also flows into and through Bangladesh, and joins the Meghna river which ultimately empties into the Bay of Bengal. It has also been important historically, with many former provincial or imperial capitals (such as Kannauj, Kampilya, Kanpur, Kara, Prayag or Allahabad,

Kashi, Pataliputra or Patna, Hajipur, Munger, Bhagalpur, Baranagar, Murshidabad, Baharampur, Nabadwip, Saptagram and Kolkata) located on its banks.

The main stream of Ganga begins at the confluence of the Bhagirathi and Alaknanda rivers in the town of Devprayag in the Garhwal division of the Indian state of Uttarakhand. The Bhagirathi is considered to be the source in Hindu culture and mythology, although the Alaknanda is longer, and, therefore, hydrologically the source stream. The headwaters of the Alaknanda are formed by snowmelt from peaks such as Nanda Devi, Trisul, and Kamet. The Bhagirathi rises at the foot of Gangotri Glacier, at Gomukh, at an elevation of 3,892 m (12,769 ft), being mythologically referred to as, residing in the matted locks of Shiva, symbolically Tapovan, being a meadow of ethereal beauty at the feet of Mount Shivling, just 5 km (3.1 mi) away.

River Thora & Karmanasha:

Thora and Karmanasha rivers are tributaries of Ganga River.

a) Drainage System with description of main rivers

Table No. 3.17: Drainage System With Description of Main Rivers

S.No	Name of the River	Area drained (Sq.m)	Total Length within the District (in m)
1	Ganga River	90768151.35	62,950
2	Thora River	1948096.816	51,294
3	Karmanasha River	2363607.266	29819

Table No. 3.18: Waterbodies Of Study Area

1.	Thoda Nadi	2.4	South
2.	Kao Nadi	2.3	South
3.	Ara Canal	3.7	East
4.	Buxar Canal	5.7	West

3.10.2 Surface Water Quality

Water samples were collected from three Surface water sources to assess the surface water quality in the project study area. The surface water samples were collected for assessing the physico-chemical characteristic and biological characteristics. Grab samples of water were taken during the month of May 2024 by following CPCB guidelines. The details of surface water samples collected from different sources are listed in the Table 3-19 and figure no 3.26. The test results of physico-chemical and bacteriological characteristics of the surface water samples are presented in **Table 3.20**.

Table 3-19: Surface Water Sampling Location

S. No.	Location	Distance (km)	Direction	Latitude	Longitude
SW-1	Kao Nadi	2.7	S	25° 22' 41.27" N	84° 11' 58.61" E
SW-2	Buxar Canal, Near Tetrahar	5.6	W	25° 24' 20.23" N	84° 8' 21.52" E
SW-3	Kesath Distributary Kesath village	4	E	25° 25' 14.95" N	84° 14' 51.11" E

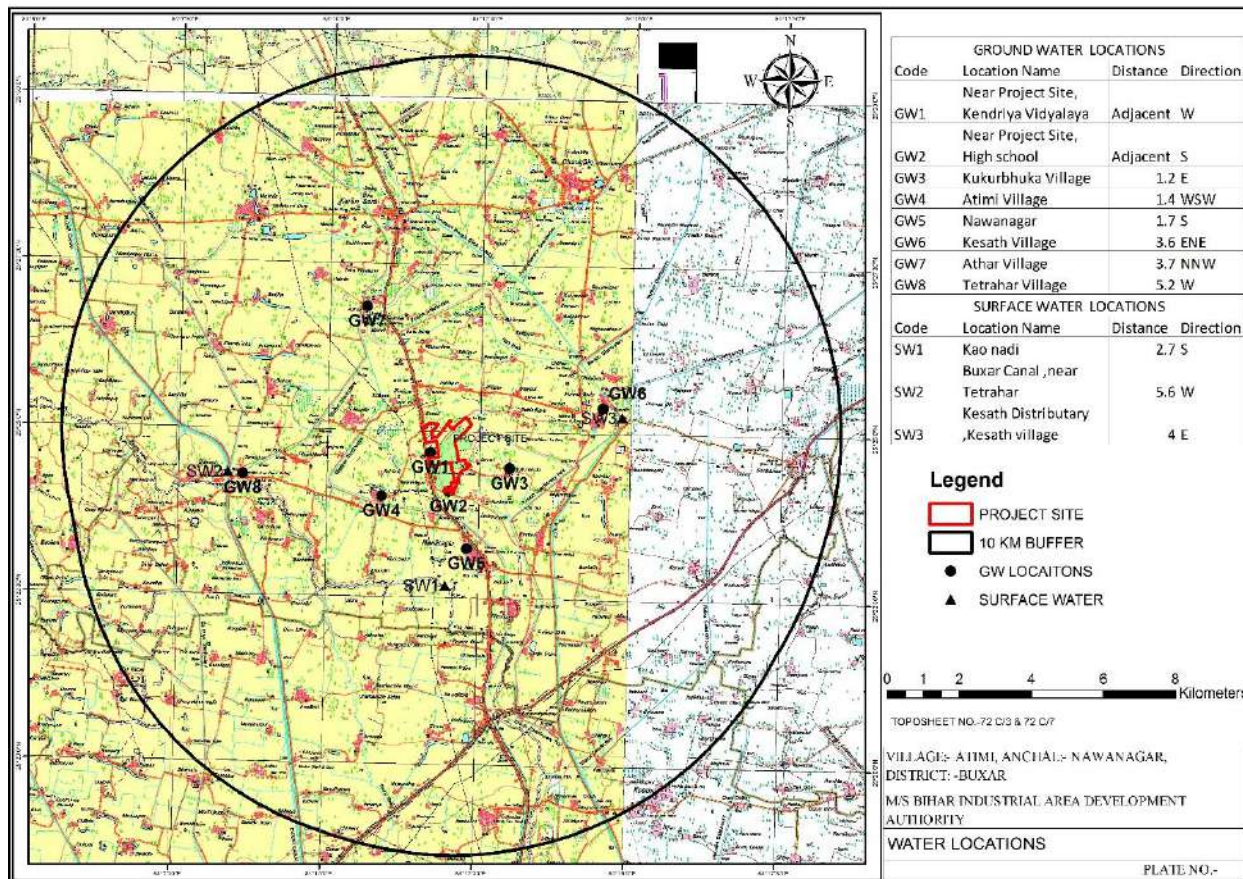


Figure 3.26: Sampling Location of Ground & Surface Water

Table 3-20: Surface Water Quality Of The Project Area

S. No	Parameter	Unit	Results			Method	IS 2296
			Kao Nadi (SW-1)	Buxar Canal, Near Tetrahar (SW-2)	Kesath Distributary Kesath village (SW-3)		Class-C
1	pH	-	7.87	7.68	7.29	APHA, 24th Ed. : 2023, 4500H+A+B	6.0-9.0
2	Colour	Hazen	20	25.00	25.00	APHA, 24th Ed. : 2023, 2120 B	300
3	Electrical Conductivity	Us/cm	549.0	496.0	613.0	APHA, 24th Ed. : 2023, 2510-A + B	-
4	Dissolved Oxygen as DO	mg/l	4.2	4.4	3.9	APHA, 24th Ed. : 2023, 4500 A+C	4.0
5	Biological Oxygen Demand as BOD (mg/l) 5 days at 20 0C	mg/l	4.5	3.5	8.5	APHA, 24th Ed. : 2023, 5210A+ B	3.0
6	Chemical Oxygen Demand as COD	mg/l	16.0	10.0	22.0	APHA, 24th Ed. : 2023, 5220,A+ C	-
7	Total Suspended Solids as TSS	mg/l	13.2	15.30	12.20	APHA, 24th Ed. : 2023, 2540-D	-
8	Total Dissolved Solids as TDS	mg/l	357.0	322.0	398.0	APHA, 24th Ed. : 2023, 2540-C	1500
9	Oil & Grease as O & G	mg/l	<2.5	<2.5	<2.5	APHA, 24th Ed. : 2023, 5520 A+D	-
10	Alkalinity as CaCO3	mg/l	140	112.00	148.00	APHA, 24th Ed. : 2023, 2320 A+ B	-
11	Total Hardness as CaCO3	mg/l	152	132.00	164.00	APHA, 24th Ed. : 2023, 2340 A+C	-
12	Calcium as Ca	mg/l	44.8	38.40	48.00	APHA, 24th Ed. : 2023, 3500 Ca A+B	-
13	Magnesium as Mg	mg/l	9.72	8.75	10.69	APHA, 24th Ed. : 2023, 3500 Mg A+B	-
14	Sodium as Na,	mg/l	10.3	12.20	14.20	APHA, 24th Ed. : 2023, 3500 Na A+B	-
15	Potassium as K,	mg/l	1.09	1.32	1.32	APHA, 24th Ed. : 2023, 3500 K, A+B	-
16	Chloride as Cl	mg/l	16	22.00	26.00	APHA, 24th Ed. : 2023, 4500 Cl A+B	600
17	Sulphate as SO4	mg/l	9.87	12.30	9.54	APHA, 24th Ed. : 2023, 4500-SO42- E	400
18	Nitrate Nitrogen as NO3	mg/l	5.11	5.60	5.60	APHA, 24th Ed. : 2023, 4500-NO32- E	50
19	Total Kjeldahl Nitrogen	mg/l	<0.5	<0.5	<0.5	APHA, 24th Ed. : 2023, 4500 Norg A+C	-
20	Free Ammonia as NH3	mg/l	<0.1	<0.1	<0.1	APHA, 24th Ed. : 2023, 4500 NH3 A+F	-

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21	Fluoride as F	mg/l	0.37	0.34	0.16	APHA, 24th Ed. : 2023, 4500-C	1.5
22	Iron as Fe	mg/l	0.11	0.14	0.18	APHA, 24th Ed. : 2023, 3500 Fe B	0.50
23	Manganese as Mn	mg/l	<0.1	<0.1	<0.1	APHA, 24th Ed. : 2023, 3111 A+B	-
24	Copper as Cu	mg/l	<0.05	<0.05	<0.05	APHA, 24th Ed. : 2023, 3111 A+B	1.5
25	Zinc as Zn	mg/l	0.04	0.07	0.07	APHA, 24th Ed. : 2023, 3111 A+B	15
26	Arsenic as As	mg/l	<0.05	<0.05	<0.05	APHA, 24th Ed. : 2023, 3111 A+B	0.2
27	Total Chromium as T. Cr.	mg/l	<0.05	<0.05	<0.05	APHA, 24th Ed. : 2023, 3111 A+B	-
28	Phosphate as PO4	mg/l	<0.1	<0.1	<0.1	APHA, 24th Ed. : 2023, 4500-P,A+B+D	-
29	Phenolic Compound as C6H5OH	mg/l	<0.005	<0.005	<0.005	APHA, 24th Ed. : 2023, 5530 A+C	0.005
30	Anionic Detergent as MBAS	mg/l	<0.02	<0.02	<0.02	APHA, 24th Ed. : 2023, 5540 A+C	1.0
31	Boron as B	mg/l	<0.5	<0.5	<0.5	APHA, 24th Ed. : 2023, 4500 A+C	-
32	Cadmium as Cd	mg/l	<0.01	<0.01	<0.01	APHA, 24th Ed. : 2023, 3111 A+B	0.01
33	Mercury as Hg	mg/l	<0.01	<0.01	<0.01	APHA, 24th Ed. : 2023, 3112 A+B	-
34	Lead as Pb	mg/l	<0.01	<0.01	<0.01	APHA, 24th Ed. : 2023, 3111 A+B	0.1
35	Total coliform	MPN/100 ml	120.00	160.00	130.00	IS15185:2016;RA:2021	5000

Source: Primary data generated at site

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The analysis results reflect that all the surface water bodies from which the water samples were taken, meet the quality criteria for Class C (Drinking water source after conventional treatment and disinfection) of surface water. The pH is varying from 7.29 to 7.87, Dissolve Oxygen is varying from 3.9 mg/l to 4.4 mg/l and Biological Oxygen Demand (BOD) ranged from 3.5 mg/l to 8.5 mg/l. The total hardness varies between 132 mg/l to 164 mg/l, chloride level recorded between 16 mg/l to 26 mg/l whereas fluoride level ranging from 0.16 mg/l to 0.37 mg/l and Iron between 0.11 mg/l to 0.18 mg/l. All these parameters were well within the prescribed limit for all category of surface water. All the water samples showed biological contamination in the form of Total Coliform. All the other measured parameters were observed well within the prescribed limit of water quality standards. The Ground water and surface water quality analysis report details are enclosed as Annexure-7.

3.11 Geomorphology

The Bihar state can be broadly subdivided into three major unit's i.e., main physical subdivisions is the Northern Mountains, the Gangetic Plains and the Central Highlands. Northern Mountains comprises the Himalayan ranges including their foot hills. The Gangetic plains, situated between the Himalayas and the Deccan plateau constitute the most fertile plains of the sub basin ideally suited for intensive cultivation. The Central highlands lying to the south of the Great Plains consists of mountains, hills and plateaus intersected by valleys and river plains. They are largely covered by forests. Aravali uplands, Bundelkhand upland, Malwa plateau, Vindhyan and Narmada valley lie in the region. Predominant soil types found in the subbasin are sandy, loamy, clay and their combinations such as sandy loam, loam, silty clay loam and loamy sand soils.

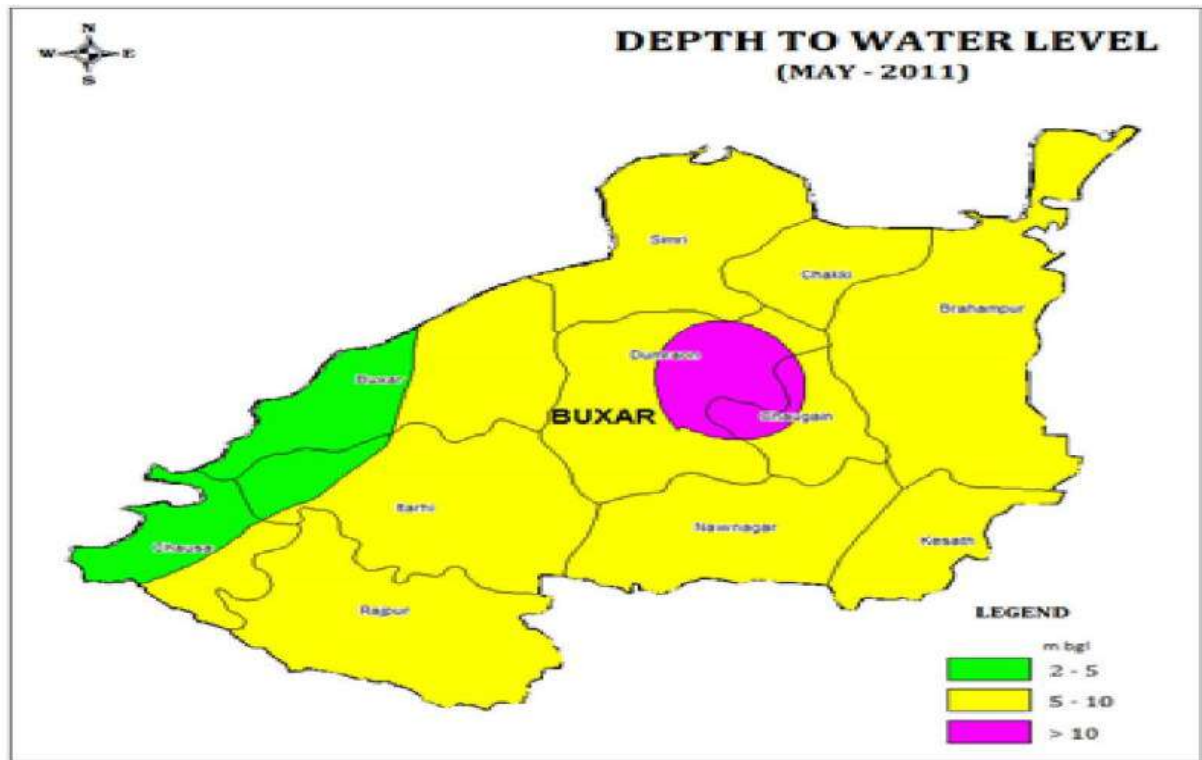
Geomorphologically the area may be divided into (i) Pediplain, (ii) Ridges and Valleys (iii) Flood plain and (iv) Terraced alluvial plain. The elevation of gently sloping pediplain varies from 100 m to 75 m above m.s.l. The Sone and Punpun are the two major rivers flowing through the western part of the district.

Source: District Survey Report, Buxar District, 2022; Issued by Ministry of Environment, Forest and Climate Change (MoEF & CC)

3.11.1 Mode of Occurrence of Ground Water

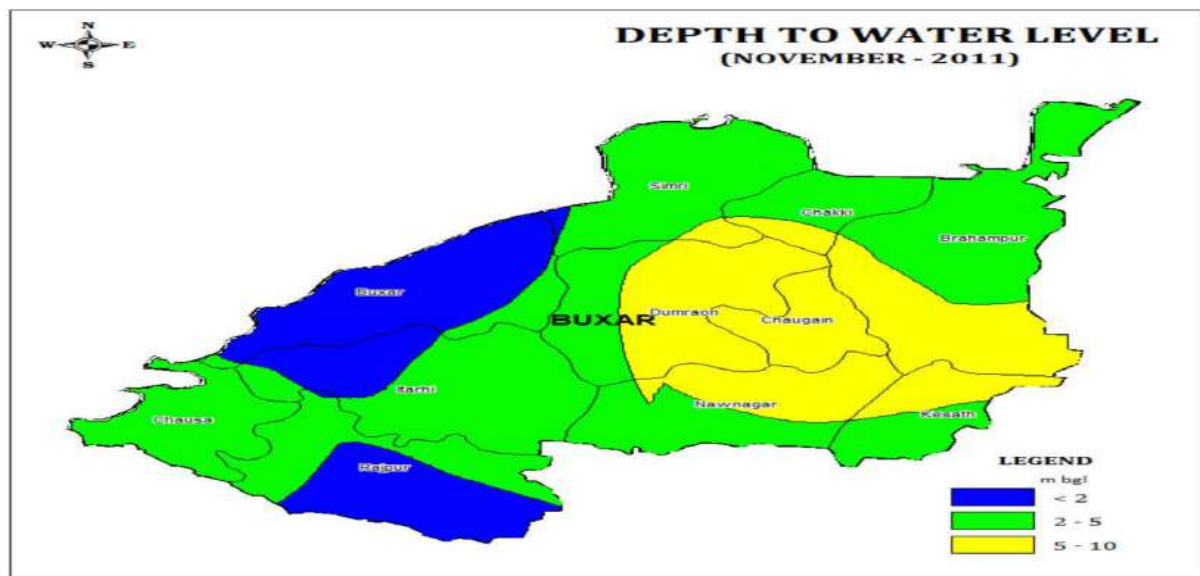
The ground water occurs under water table condition in aquifer disposed at shallow depth. This aquifer is commonly tapped by dug-wells of depth ranges from 5 to 10 m bgl. The shallow tube-wells tap unconfined aquifer and disposed at a depth between 20 to 60 m. The ground water in the phreatic aquifer occurs under water table conditions. The deep tube-wells have been constructed tapping aquifers disposed at deeper levels. These aquifers are in semiconfined to confined condition. The arsenic free deep tube wells constructed by CGWB is upto depth of 208m at Brahampur, 204 m in Arjunpur village of Simri block and 223, in Churamanpur village of Buxar block

3.11.2 Ground Water Level



Source: CGWB, Ground Water Brochure, Buxar District, 2013

Figure 3-27: Depth To Water Level During Pre-Monsoon (May 2011), Buxar District



Source: CGWB, Ground Water Brochure, Buxar District, 2013

Figure 3.28: Depth To Water Level During Post-Monsoon (Nov 2011), Buxar District

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3.11.3 Ground Water Resources

The net annual replenishable ground water resource as on 31st March'09 works out to be 59153 ha m. The gross annual draft for all uses works out to be 21093 ha m. Allocation of ground water for domestic and industrial use for 25 years works out to be 5288 ha m. The stage of ground water development is 40.2%. The stage of ground water development is highest in Chakki 81.0% and lowest in the Nawanagar 20%. Except the Chakki block, all the blocks are under safe category Blockwise Stage of Ground Water of Buxar District is depicted in Fig.3.29. The block wise resource is given in **Table 3.21**

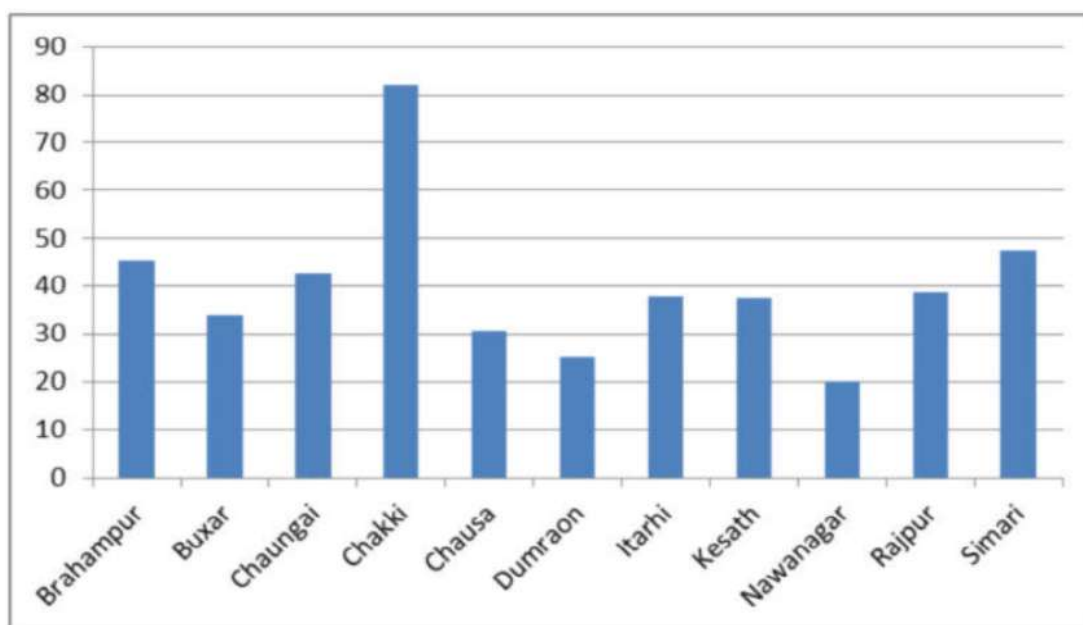


Figure 3.29: Block Wise Stage of Ground Water Development of Buxar District

Table 3-21: Block-Wise Dynamic Ground Water Resource of Buxar District (as on 31st March 2009, in Ha M)

Sl.No	Assessment Unit/ District	Net Annual Ground water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground water Draft for Domestic and Industrial Water Supply	Existing Gross Ground Water Draft For all Uses (10+11)	Allocation for Domestic and Industrial Requirement supply upto next 25 years	Net Ground Water Availability for future irrigation development (9-10-13)	Stage of Ground Water Development (12/9)*100 (%)
1	2	9	10	11	12	13	14	15
1	Brahampur	5649	2274	290	2564	462	2913	45.4
2	Buxar	7188	2009	423	2432	741	4438	33.8
3	Chaungai	2003	782	75	857	120	1102	42.8
4	Chakki	342	220	60	280	96	26	81.9
5	Chausa	4509	1245	145	1390	232	3033	30.8
6	Dumraon	6857	1371	361	1732	613	4874	25.3
7	Itarhi	8035	2809	243	3052	387	4839	38.0
8	Kesath	1370	462	51	513	82	827	37.5
9	Nawanagar	9101	1581	243	1824	388	7133	20.0
10	Rajpur	9421	3351	295	3645	470	5600	38.7
11	Simari	4677	1891	320	2212	510	2275	47.3
	Total	59153	17994	3099	21093	5288	37059	40.1

Source: CGWB, Ground Water Brochure, Buxar District, 2013

3.11.4 Ground water Quality

As per the CGWB Report of Buxar district, Chemical analysis of ground water phreatic aquifer is suitable for drinking and irrigation purposes. The ground water is mildly alkaline in nature with pH varying from 8.1 to 8.3. Electrical conductivity (Ec) ranges from 370 micro seimens/cm at Buxar to 880 micro seimens/cm at Rajpur. All major parameters are within the permissible limit. However, ground water analyses, in Brahampur, Simri, Chakki and Buxar blocks, reveals presence of arsenic concentration above permissible limit of 50 ppb. The highest value arsenic is 1220 ppb at Ekdar village and 1100 ppb at Chakni village. The arsenic contaminated water above regulatory limit of 50 ppb is hazardous for human health. Fluoride and Iron slightly above permissible limit is also reported from Rajpur (1.82 mg/l) of Rajpur block and Neazipur (1.17mg/l) of the Simri block respectively.

Ground Water Quality in the Study Area

Ground water were collected from Six (8) locations in order to assess the ground water quality of the study area. Grab sampling were carried out in the month of May 2024. The

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details of monitoring locations for assessing the groundwater quality is indicated in Table 3-22. Table 3.23 depicts the physico-chemical and biological characteristics of the ground water samples collected from different locations which falls under the study area and compared with the standard (IS 10500: Indian Standards/Specifications for Drinking Water) reference values. Monitoring Location map for the Ground water is given in **Figure 3-30**.

Table 3.22: Ground Water Sampling Locations

S. No.	Location	Distance	Direction	Latitude	Longitude
GW1	Near Project Site, Kendriya Vidyalaya	Adjacent	W	25° 24' 40.68" N	84° 11' 41.86" E
GW2	Near Project Site, High school	Adjacent	S	25° 24' 5.94" N	84° 12' 0.72" E
GW3	Kukurbhuka Village	1.2	E	25° 24' 27.43" N	84° 13' 0.52" E
GW4	Atimi Village	1.4	WSW	25° 24' 0.78" N	84° 10' 54.24" E
GW5	Nawanagar	1.7	S	25° 23' 14.97" N	84° 12' 19.60" E
GW6	Kesath Village	3.6	ENE	25° 25' 22.78" N	84° 14' 31.81" E
GW7	Athar Village	3.7	NNW	25° 26' 51.09" N	84° 10' 36.46" E
GW8	Tetrahar Village	5.2	W	25° 24' 18.98" N	84° 8' 36.16" E

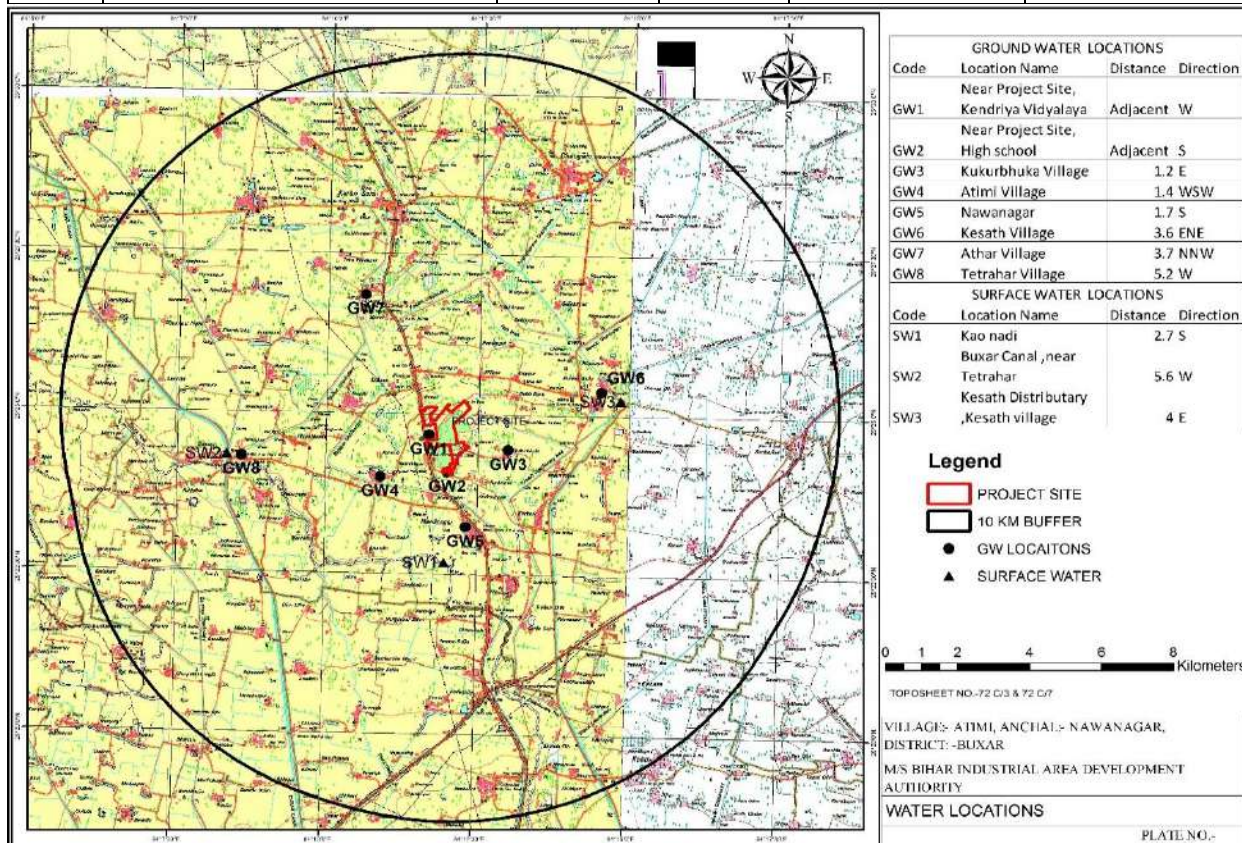


Figure 3-30: Sampling Location of Ground Water

Table 3.23: Ground Water Quality In The Study Area

S.No	Parameter	Unit	INDIAN STANDARDS as per IS 10500:2012 (Reaff:2018)		Results							
			Desirable	Permissible	Near Project Site, Kendriya Vidyalaya (GW-1)	Near Project Site, High school (GW-2)	Kukurbhuka Village (GW-3)	Atimi Village (GW-4)	Nawanagar (GW-5)	Kesath Village (GW-6)	Athar Village (GW-7)	Tetrahar Village (GW-8)
1.	Temperature	OC	-	-	26.5	26.1	26.2	25.5	25.6	25.8	26.3	25.5
2.	Colour	Hazen	5	15	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
3.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Turbidity	NTU	1	5	1.10	1.32	1.13	1.28	1.24	1.42	1.17	1.20
6.	Electrical Conductivity	Us/cm	-	-	923.0	778.0	851.0	735.0	887.0	901.0	819.0	667.0
7.	PH	-	6.5-8.5	No Relax	7.56	7.61	6.65	7.77	7.53	7.78	7.32	7.71
8.	Total Dissolved Solids as TDS	mg/l	500	2000	563.0	475.0	519.0	448.0	541.0	549.0	499.0	406.0
9.	Alkalinity as CaCO ₃	mg/l	200	600	212.00	172.00	180.00	172.00	212.00	208.00	204.00	156.00
10.	Total Hardness as CaCO ₃	mg/l	200	600	232.00	192.00	192.00	192.00	240.00	228.00	208.00	164.00

Development of Nawanagar Industrial Area (Phase-II) at Atimi & Ranbirpur Villages, Nawanagar Block, Buxar District, Bihar by M/s Bihar Industrial Area Development Authority (BIADA) -Industrial Area-102.26 Ha.



11.	Calcium as Ca	mg/l	75	200	62.40	48.00	54.40	46.40	60.80	52.80	49.60	46.40
12.	Magnesium as Mg	mg/l	30	100	18.47	17.50	13.61	18.47	21.38	23.33	20.41	11.66
13.	Sodium as Na	mg/l	-	-	23.50	21.20	32.40	16.50	15.30	22.40	21.20	18.90
14.	Potassium as K	mg/l	-	-	1.44	2.21	1.52	1.24	2.30	1.65	1.11	2.34
15.	Chloride as Cl	mg/l	250	1000	32.00	32.00	34.00	22.00	30.00	30.00	20.00	20.00
16.	Sulphate as SO ₄	mg/l	200	400	26.40	21.20	32.20	21.30	17.40	24.30	18.50	19.30
17.	Nitrate Nitrogen as NO ₃	mg/l	45	No Relax	5.23	5.64	6.31	6.21	7.21	8.40	6.45	5.32
18.	Fluoride as F	mg/l	1	1.5	0.38	0.42	0.39	0.36	0.31	0.41	0.39	0.45
19.	Iron as Fe	mg/l	0.3	No Relax	0.16	0.17	0.15	0.21	0.34	0.42	0.47	0.28
20.	Copper as Cu	mg/l	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21.	Manganese as Mn	mg/l	0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
22.	Zinc as Zn	mg/l	5	15	0.09	0.05	0.13	0.12	0.06	0.13	0.12	0.18
23.	Arsenic as As	mg/l	0.01	No Relax	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
24.	Total Chromium as T. Cr.	mg/l	0.05	No Relax	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25.	Phenolic Compound as C ₆ H ₅ OH	mg/l	0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

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Development of Nawanagar Industrial Area (Phase-II) at Atimi & Ranbirpur Villages, Nawanagar Block, Buxar District, Bihar by M/s Bihar Industrial Area Development Authority (BIADA) -Industrial Area-102.26 Ha.



26.	Free Residual Chlorine as FRC	mg/l	0.2	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27.	Boron as B	mg/l	0.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
28.	Anionic Detergent as MBAS	mg/l	0.2	1.0	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
29.	Mercury as Hg	mg/l	0.001	No Relax	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30.	Cadmium as Cd	mg/l	0.003	No Relax	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
31.	Lead as Pb	mg/l	0.01	No Relax	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
32.	Total coliform	Per 100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
33.	E.coli	Per 100 ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Source: Primary data generated at site

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