

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT
&
ENVIRONMENT MANAGEMENT PLAN
(DRAFT)**

[SEPT.' 2023]

For

**INDUSTRIAL AREA, WARSALIGANJ
OF
BIHAR INDUSTRIAL AREA DEVELOPMENT AUTHORITY (BIADA)
(FOR STANDALONE CEMENT GRINDING PROJECT)
AT : MOSMA, WARSALIGANJ
DIST. NAWADA (BIHAR)**

PREPARED BY :



PARAMARSH

(Servicing Environment and Development)

**M.S. – 1/10, Sector A, Sitapur Road Yojna
Near St. Anthony School, Ram Ram Bank Chouraha
Aliganj, Lucknow - 226024 (U.P.)**

NABET-QCI Accredited EIA Consultant Organization

(Certificate No. NABET/EIA/2124/RA 0224 valid upto 01.05.2024)



बिहार औद्योगिक क्षेत्र विकास प्राधिकार

गया क्लस्टर, कार्यालय – औद्योगिक क्षेत्र, गया – 824231

Website-www.biadabihar.in, Email – dgm.gaya@bihar.gov.in

मुख्यालय - प्रथम तल, उद्योग भवन, पूर्वी गाँधी मैदान, पटना-800004

Email- biada-bih@gov.in Phone/Fax: 0612-2675352/2675296/2675002/2675889

Date :03.10.2023

UNDERTAKING

I, Manoj Kumar, DGM – BIADA, Gaya Cluster, hereby undertake that this Environmental Impact Assessment Report (EIA/EMP Report) has been prepared by Paramarsh Servicing Environment and Development, Lucknow, as per TOR granted by SEIAA, Bihar vide F. No. SIA/7(c)/2449/2023 and TOR Correction Letter vide Ref. No. 334 Dt: 27.09.2023, for the Environmental Clearance of IAWarsaliganj Project housing Standalone Cement Grinding Project atWarsaliganj, Block Warsaliganj, Dist. Nawada, State Bihar. I also own full responsibility for correctness of the data and information contained in the present EIA/EMP Report.

MK
3-10-23

Manoj Kumar
DGM-BIADA
Gaya Cluster

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F. No. - SIA/7(c)/2449/2023
STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY,
BIHAR

2nd Floor, Beltron Bhawn
Shastri Nagar
Patna - 800 023
E-mail:- seiaabihar@gmail.com
seiaa.ms.br@gmail.com

Dated:- 24/08/2023

To,

Shri Manoj Kumar,
DGM – Gaya Cluster,
M/s Bihar Industrial Area Development Authority,
Udyog Bhawan, 01st Floor,
Gandhi Maidan,
Patna, Bihar, Pin code:- 800 004,
Email:- dgm.gaya@bihar.gov.in.

Sub: **Proposed Industrial Estate Project “Industrial Area” at Village:- Mosma, Block:- Warsaliganj, District:- Nawada, State:- Bihar; by M/s Bihar Industrial Area Development Authority (BIADA) [Total Plot Area:- 29.77 Ha. (2,97,767 sqm. / 73.58 Acres) – Terms of Reference regarding.**

Ref:

1. Online Application – SIA/BR/INFRA1/433926/2023.
2. Scrutiny fee submission dated 04-07-2023.
3. SEAC meeting held on 05-08-2023.
4. SEIAA meeting held on 17-08-2023.

Sir,

This has reference to the online proposal submitted in the State Level Environment Impact Assessment Authority to prescribe the Terms of Reference (ToR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in

accordance with the provisions of the EIA Notification, 2006. For this purpose, you had submitted online information in the prescribed format (Form - I) along with a Form - I (A). The details of the proposal as described in the application are as follows:

1. **Online Proposal No.** SIA/BR/INFRA1/433926/2023
2. **File No.:** SIA/7(c)/2449/2023
Proposed Industrial Estate
Project "Industrial Area" at
Village:- Mosma, Block:-
Warsaliganj, District:-
Nawada, State:- Bihar;
by M/s Bihar Industrial Area
Development Authority
(BIADA)
Industrial estates / parks /
complexes / areas, export
processing Zones (EPZs),
Special Economic Zones
(SEZs), Biotech Parks, Leather
Complexes.
3. **Name of the Proposal**
4. **Category of the Proposal:**
7(c)
Industrial estates / parks /
complexes / areas, export
processing Zones (EPZs),
Special Economic Zones
(SEZs), Biotech Parks, Leather
Complexes.
5. **Project/Activity applied for**

In this regard, under the provisions of the EIA Notification, 2006 as amended, the ToR for the purpose of preparing Environment Impact Assessment report and Environment Management Plan for obtaining prior Environmental Clearance is prescribed with Public Consultation as follows:-

A. STANDARD TERMS OF REFERENCE

1. Reasons for selecting the site with details of alternate sites examined / rejected / selected on merit with comparative statement and reason / basis for selection. The examination should justify site suitability in terms of environmental damage, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weight-age criteria for short-listing selected site.

2. Submit the details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site. Analysis should be made based on latest satellite imagery for land use with raw images. Check on flood plain of any river.
3. Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities / villages and present status of such activities.
4. Examine the impact of proposed project on the nearest settlements.
5. Examine baseline environmental quality along with projected incremental load due to the project taking into account of the existing developments nearby.
6. Environmental data to be considered in relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health.
7. Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area, and any obstruction of the same by the project.
8. Details regarding project boundary passing through any eco- sensitive area and within 10 km from eco- sensitive area.
9. Green buffer in the form of green belt to a width of 15 meters should be provided all along the periphery of the industrial area. The individual units should keep 33% of the allotted area as a green area.
10. Submit the details of the trees to be felled for the project.
11. Submit the details of the infrastructure to be developed.
12. Submit the present land use and permission required for any conversion such as forest, agriculture etc.
13. Submit details regarding R & R involved in the project.
14. Zoning of the area in terms of 'type of industries' coming-up in the industrial area based on the resource requirement along with likely pollutants with quantity from the various industries.
15. The project boundary area and study area for which the base line data is generated should be indicated through a suitable map. Justification of the parameters, frequency and locations shall be discussed in the EIA.
16. Submit Legal frame work for the implementation of Environmental Clearance conditions to be clearly spelt out in the EIA report.
17. Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.
18. Site justification of the identified industry sectors from environmental angle and the details of the studies conducted if any.

19. Ground water classification as per the Central Ground Water Authority.
20. Submit the source of water, requirement vis-à-vis waste water to be generated along with treatment facilities, use of treated waste water along with water balance chart taking into account all forms of water use and management.
21. Rain water harvesting proposals should be made with due safeguards for ground water quality. Maximize recycling of water and utilization of rain water. Examine details.
22. Examine soil characteristics and depth of ground water table for rainwater harvesting.
23. Examine details of solid waste generation treatment and its disposal.
24. Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.
25. In case DG sets are likely to be used during construction and operational phase of the project, emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.
26. Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project. Present and future traffic and transport facilities for the region should be analyzed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.
27. A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.
28. Examine the details of transport of materials for construction which should include source and availability.
29. Examine the details of National Highways/State Highways/ expressways falling along the corridor and the impact of the development on them.
30. Examine noise levels - present and future with noise abatement measures.
31. Identify, predict and assess the environmental and sociological impacts on account of the project. A detailed description with costs estimates of CSR should be incorporated in the EIA / EMP report.
32. Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.
33. Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.
34. The Public hearing should be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management Plan. The Public Hearing should

be conducted based on the TOR letter issued by the Ministry and not on the basis of Minutes of the Meeting available on the web-site.

35. A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification.
36. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
37. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
38. Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website "<http://moef.nic.in/Manual/Industrial Estate>".

B. Special Condition

1. Collect one Month data during October 2023 to compare the data collected between March to May, 2023.

Sd/-
(Sudhir Kumar)
Member-Secretary,
SEIAA, Bihar

Copy, through email, for information and necessary action to :-

1. Member Secretary, Bihar State Pollution Control Board, Patna.
2. Guard File.

3/ 21/8/2023
(Sudhir Kumar)
Member-Secretary
SEIAA, Bihar
Member Secretary
SEIAA, Bihar

State Environment Impact Assessment Authority, Bihar

2nd floor, Beltron Bhawan, Shastri Nagar, Patna - 800 023.

Ref. No. 334

Patna, Dated:- 27/09/2023.

To,

Shri Manoj Kumar,
DGM – Gaya Cluster,
M/s Bihar Industrial Area Development Authority,
Udyog Bhawan, 01st Floor,
Gandhi Maidan, Patna, Bihar,
Pin code:- 800 004,
Email:- dgm.gaya@bihar.gov.in.

Subject:- Regarding correction in Terms of reference (ToR) Letter F. No. SIA/7(c)/2449/2023, dated 24.08.2023.

Ref:- BIADA Letter Ref. No. 5814, dated 12.09.2023.

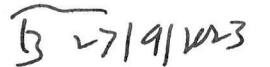
Sir,

In reference Letter No. 5814, dated 12.09.2023 of BIADA, Patna this is informed that while granting ToR, inadvertently the subject has been mentioned as “Proposed Industrial Estate Project “Industrial Area” at Mauza:- Mosama, Tehsil:- Warsaliganj, District:- Nawada, State:- Bihar; by M/s Bihar Industrial Area Development Authority (BIADA) [Total Plot Area:- 29.77 Ha. (2,97,767 m² / 73.58 Acres) – Terms of Reference regarding”

In this regard it is hereby clarified that the same may be read as under:-

“Proposed Industrial Estate Project “Industrial Area” at Mauza:- Mosama, Tehsil:- Warsaliganj, District:- Nawada, State:- Bihar; by M/s Bihar Industrial Area Development Authority (BIADA) [Total Plot Area:- 29.77 Ha. (2,97,767 m² / 73.58 Acres), Standalone Cement Grinding Project – 6.0 Million TPA (2 X 3.0 Million TPA)] – Terms of Reference regarding”.

yours faithfully,



(Sudhir Kumar)
Member Secretary
SEIAA, Bihar

CHAPTER – 1

INTRODUCTION

1.1 Purpose of the report

The present proposal is for environment clearance of Industrial Area, Warsaliganj (IA Warsaliganj), being developed by Bihar Industrial Area Development Authority (BIADA), Industry Deptt., Govt. of Bihar. As per EIA Notification 2006 and amendments thereof, the Project falls under category B of Item 7 (c) of Schedule I, having total land area 29.77 ha., housing one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA (2 * 3 Million TPA).

Project was considered in SEAC Meeting on 05.08.2023, and based on discussions during SEAC meeting and representation made by BIADA, SEAC recommended TOR for preparation of EIA/EMP Report.

Based on recommendation of SEAC, State Environment Impact Assessment Authority (SEIAA) Bihar in its meeting 17.08.2023, discussed the proposal and issued ToR for EIA/EMP Study as per requirement of EIA Notification 2006.

Approved TORs have been issued by SEIAA, Bihar vide F. No. SIA/7(c)/2449/2023 dated 24.08.2023 followed by TOR correction letter vide Ref. No. 334 Dt: 27.09.2023.

The purpose of the EIA report is to address the information on the nature and extent of potential environmental impacts, both negative and positive, during the construction and operative phase of the proposed project and related activities taking place concurrently.

The purpose of the report to integrate different environmental factors into project planning and decision making by studying probable changes in the various

socioeconomic and bio-physical characteristics, which shall result from the proposed project, so as to achieve ecologically sustainable development.

To identify environmental risks, reduce conflicts by promoting community participation, minimize adverse environmental impacts and keep decision makers informed thus laying base for environmentally sound project, such that the benefits shall be observed at all the stages of the project starting from conceptualization to planning, design, construction and operation stage.

This report furnishes the details of location of Site, Description of the project, prevailing baseline status w.r.t Air Environment, Water Environment, Noise Environment, Land Environment, Flora & Fauna and Socio-economic Environment. This report also helps in identification of environmental impacts and suggesting mitigation measures to be followed during Construction and Operation of the proposed expansion project as part of Environmental Management Plan. This report also acts as guidance manual for the proponent for following the Environmental Management Plan (EMP) and for adopting post project Environmental Monitoring Program as per statutory norms.

1.2 Identification of the Project and project Proponent

Industrial Area , Warsaliganj is a project of Bihar Industrial Area Development Authority (BIADA) and is aimed towards offering the industrial entities a fabulous opportunity for establishment of industries. The registered address of project proponent is BIADA, Udyog Bhawan, East Gandhi Maidan, Dist. Patna. Land description of IA Warsaliganj project is Mauza Mosma, Khata No. 759, Khesra No. 30, 1, Samichak, Khata No. 59, Khesra 167, 169, 171, 172, 173, 168/174, Sherpur Khata No. 1099, Khesra No. 4140, 4144, 4239, 4146, 4145, 4148, 4149, 4150, 4151, Mafi, Khesra No. 4800, 4801, 4802, Block Warsaliganj, Dist. Nawada, Bihar.

1.3 Brief Description of Nature, Size, Location of the Project and Its Importance to the Country

1.3.1 Nature for the Project

In exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986, read with clause (d) of

sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 and in supersession of the notification number S.O. 60 (E) dated the 27th January, 1994 the Central Government directs that on and from the date of publication of EIA Notification the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule of EIA notification 2006, entailing capacity addition with change in process and or technology should be undertaken in any part of India only after the prior environmental clearance from the Central Government or as the case may be, by the State Level Environment Impact Assessment Authority, duly constituted by the Central Government under sub-section (3) of section 3 of the said Act, in accordance with the procedure specified in EIA notification 14th Sep. 2006.

The projects or activities listed in Schedule of EIA Notification require prior environmental clearance from the concerned regulatory authority i.e. Ministry of Environment and Forests for matters falling under Category 'A' in the Schedule and at State level the State Environment Impact Assessment Authority (SEIAA) for matters falling under Category 'B' in the said Schedule, before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity OR Expansion and modernization of existing projects or activities listed in the Schedule to this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the Schedule, after expansion or modernization.

To get the Environmental Clearance from the Ministry of Environment & Forests (MoEF&CC), Govt. of India / State Environment Impact Assessment Authority (SEIAA) it is required to carry out an Environment Impact Assessment (EIA) study of the project, deliberating the positive and negative impacts on the environment.

The IA Warsaliganj project falls under, EIA Notification 2006, category B of Item 7 (c), Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes, having total land area <500 ha. housing with one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA. In accordance with the Terms of Reference (ToR) issued by SEIAA, Bihar vide F. No. SIA/7(c)/2449/2023 dated 24.08.2023 followed by TOR

correction letter vide Ref. No. 334 Dt: 27.09.2023, for preparation of EIA study for obtaining Environmental Clearance in accordance with the provisions of the EIA Notification 2006 and amendments thereof, a befitting environment management and monitoring plan (EMP) has been prepared to mitigate or minimize the negative impact vis-à-vis retaining the positive impacts of the project.

Keeping in line with the requirement of EIA Notification 2006 and subsequent amendments and having a high degree of concern, for the environment and in order to assess the likely impacts arising out of the proposed Industrial Area with Stand alone Cement Grinding Project BIADA has involved an EIA Consultant Organization, Paramarsh Servicing Environment and Development, Lucknow, to conduct the Environmental Impact Assessment study for the project as per the structure, given in the EIA Notification 2006 (and subsequent amendment made thereof) and in accordance with the Terms of Reference (ToR) issued by SEIAA, Bihar.

The present EIA cover the baseline data generation, predictions and evaluation of impact on various environmental components and preparation of Environmental Management Plan as per required of TOR issued by SEIAA, Bihar.

1.3.2 Project Specification ;

Project Classification as per EIA Notification 2006 ;

Activity	Sl. No. in Schedule of EIA Notification 2006	Category of Project	Capacity
Industrial estates /Parks/ Complex/ areas, export processing Zone, Special Economic Zones (SEZs), Biotech Parks, Leather complex	7 (C)	B Industrial estates housing at least one Category B industry and area <500 ha.	Total Land Ares 29.77 Ha. (73.58 Acres)
Standalone Cement Grinding Project	3(b)	B	6 Millin TPA (2 * 3 Million TPA)

Proposed Manufacturing & Production Details of IA Warsaliganj ;

Manufacturing Facilities	Production Capacity	
Standalone Cement Grinding Project	Ordinary Portland Cement (OPC) / Portland Pozzolana Cement (PPC) / other cements	6 Million TPA (2 * 3 Million TPA)

1.4 Project Location

Bihar Industrial Area Development Authority (BIADA) has proposed to establish Industrial Area at Warsaliganj, Dist. Nawada which will consist of Standalone cement grinding unit. Geo Co-ordinates of Project Site are Latitude 25°0'26.47"N & Longitude 85°38'35.88"E. Project site is about 16 kms NE from dist. headquarter at Nawada & which is well connected by road and rail with rest of the country. Project site of BIADA is located about 500 m. away from SH-83, which connects BIADA Industrial Area to Dist. Headquarters at Nawada and rest of Country. Nearest railway station is Warsaliganj at 1 Km. distance in North direction on Gaya Kiul Sec, of ECR. The Geo Co-ordinates of the project site are as under:

Plot 1	67.61 Acre	
Location	Latitude	Longitude
NE	25.008438°	85.645659°
NW	25.010387°	85.641248°
SE	25.004050°	85.644960°
SW	25.004647°	85.639589°
Plot 2	5.97 Acre	
Location	Latitude	Longitude
NE	25.008611°	85.640149°
NW	25.008696°	85.638193°
SE	25.007016°	85.639668°
SW	25.007300°	85.638524°

There is no reserved forest, hills / valleys & ecologically sensitive zone within a radius of 10 km. The maximum ambient temperature within the study area goes up to 42 °C during summer and minimum goes down to 5 °C during winter. The annual rainfall received in the project area is about 1006 mm, out of which 90% received during June to September.

The salient features of the project locations are presented in **Table 1.1** and shown in **Figure 1.1, 1.2 & 1.3**. Photographs of the project site are presented in **Figure 1.4**.

Table 1.1: ENVIRONMENTAL SETTING WITHIN 10 KM. RADIUS OF PROJECT AREA

<i>Particulars</i>	<i>Details</i>
• Location	Mauza – Mosma, Samichak, Sherpur, Mafi, Block - Warsaliganj, Dist. Nawada, Bihar
• Elevation above mean sea level	93-98 m.

<i>Particulars</i>	<i>Details</i>
• Nearest Railway Station	Warsaliganj Railway Station : 1 Km. Nawada Railway Station : 16 Km.
• Nearest Highway	SH – 83 (0.5 Km. W)
• Nearest Major City	Warsaliganj (0.5 Km.)
• Nearest River	River Sakri (5.5 Km. W)
• National Park, Reserve Forest	<i>Not exist within 10 km. radius</i>
• Wildlife Sanctuary	
• Biosphere Reserve, Hill & Valleys	

1.5 Importance and Benefits of the Project/ Need for the project and its importance to the country and or region

In order to promote Industrialization in Bihar State, BIADA is allotting land to investors in different Industrial Area within Bihar State. BIADA is providing basic infrastructural facilities, viz. approach roads, boundary walls and water etc. within its industrial area projects. Proposed cement grinding unit for production of different types of cement, target state of Bihar and Jharkhand as potential market. Bihar is lagging behind in the infrastructure and development sector due to lack of capital formation and a sense of uncertainty in the minds of the entrepreneurs for creating big ventures.

However, even the above facts 6.7 million ton consumption is much lower than the 15-17 million ton consumed by larger states as Maharastra and Tamil Nadu which reflects that this growth will increase with real estate development in Bihar.

In the period 2011-12, Bihar was the country's fastest growing state in economic terms, with growth rate of 13.1 % for the year 2011-12. This followed a growth rate of 14.8% in the previous years.

Moreover, consumption of cement will increase further because of increasing demand of rural housing sector in Bihar. Total installed capacity of cement in Bihar is 12 Million Ton (MT) comprising of 4 large units under operation. Consumption of cement in Bihar is more than the amount produced. Therefore, setting up of new cement plants in Bihar are viable option for entrepreneurs.

Cement demand in India is expected to increase due to government's push for large infrastructure projects, leading to 322 million tonnes of cement by 2018 end. India's cement demand is expected to reach 424 million tonnes per annum (MTPA) by 2022.

The housing sector is the biggest demand driver of cement, accounting for about 60-70 per cent of the total consumption in India. The other major consumers of cement include infrastructure at 10-15 per cent, commercial construction at 10-14 per cent and industrial construction at 8-10 per cent. To meet the rise in demand, cement companies are expected to add 127 million tonnes (MT) capacity over the next 3-4 years. The cement capacity in India may register a growth of 6-7 per cent by next year end to 491 MT from the current level of 465 MT. It may increase further to 592 MT by the end of 2022. The demand Indian cement industry is catered by a few companies. The top 20 cement companies meeting almost 70 per cent of the total cement production of the country.

In 2011-12 around 6.17 MT out of the target region demand i.e. 6.74 MT is met by the outside players of Madhya Pradesh, Jharkhand, Chattisgarh, Orissa & West Bengal. The other states supplying cement to Bihar are U.P., Maharashtra, Rajasthan and A.P.

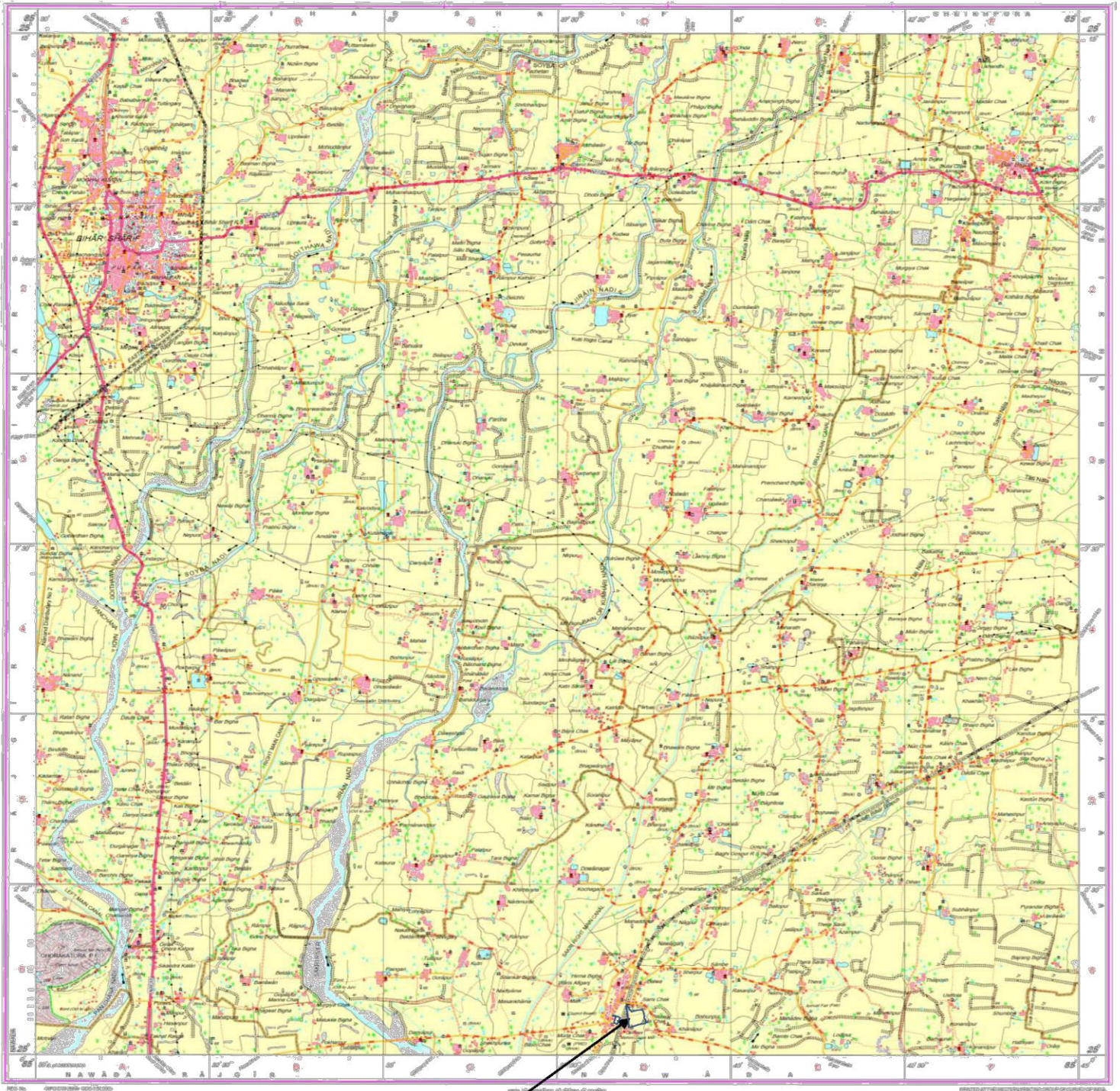
The Government of Bihar endeavors to work towards rapid economic growth with regional balance to bring about prosperity in the state. One of the priority areas of the government is to create a favorable investment environment for increasing industrial production and to create employment opportunities.

The New Industrial Policy proposes to add maximum value to the available abundant natural resources in the state. The policy aims to provide necessary infrastructure for investment, reducing the cost of production for the investor and ensuring an investor friendly administration.

Keeping in view the present market trend as well as the present infrastructure requirement for economic growth of the Bihar in particular and the Eastern region as a whole for the proposed Cement Grinding unit at Industrial Area, Block Warsaliganj, Dist.: Nawada, Bihar is a viable project and will not face any problem in marketing its product.

Since the state of Bihar is expected to remain a cement deficit zone and the deficit is likely to be increasing progressively in the coming years, any new company desiring to set up cement manufacturing facilities would have no problem in selling its production in the state. Being a local cement producer the company would get freight advantage.

PROPOSED PROJECT SITE ON TOPOSHEET MAP



**Industrial Area Warsaliganj
A Project of BIADA
(For 6 MTPA Standalone
Cement Grinding Project)**

Source: Survey of India Toposheet No. G45N12 (72 G/12) Scale 1:50,000

EIA Consultant : Paramarsh Servicing Environment and Development, Lucknow

Fig. 1.2 : Key Plan of IA WARSALIGANJ



Fig. No. 1.3 : Google Satellite Imagery Map

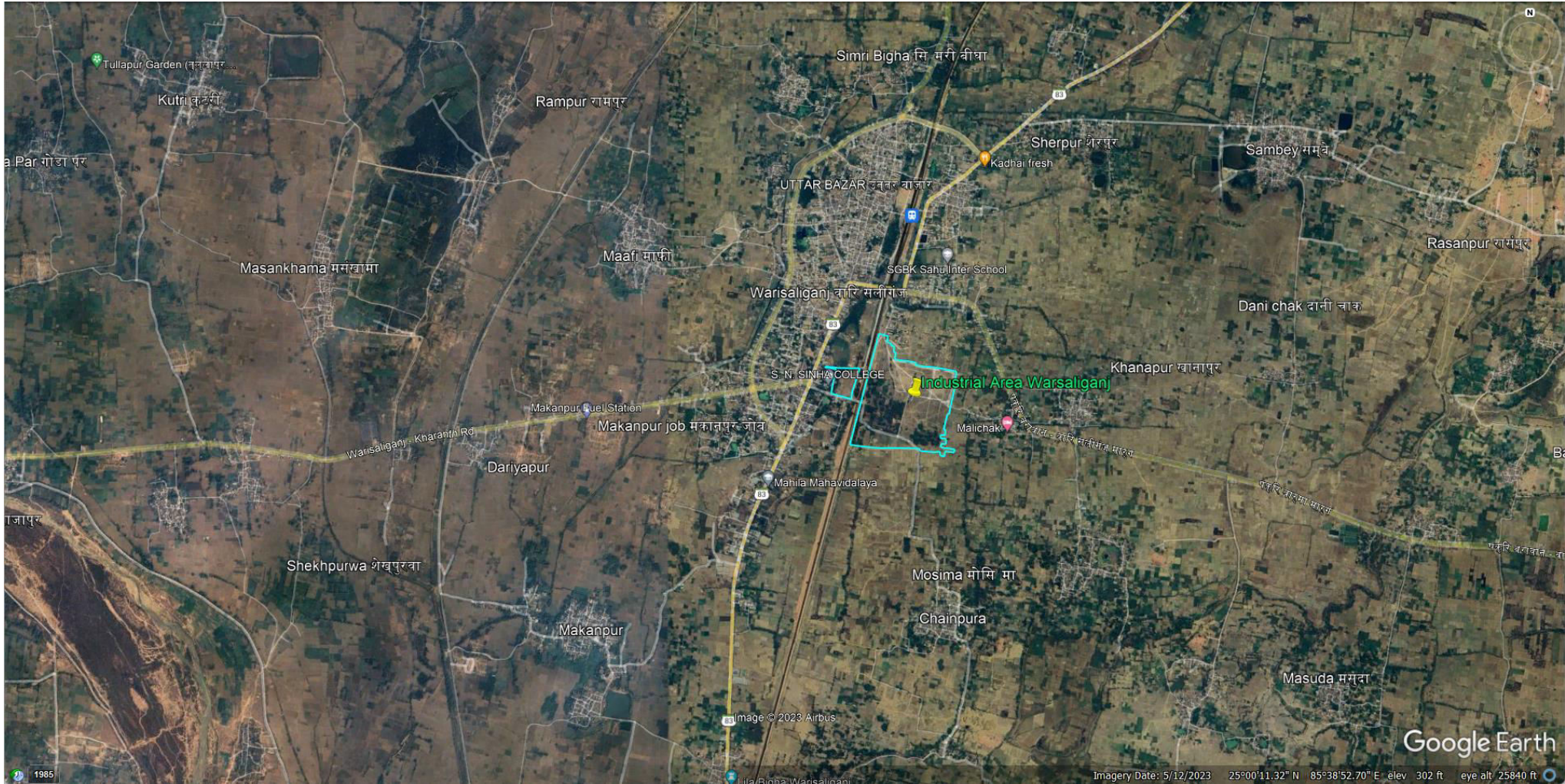


Fig. No. 1.3(A) : **Google Satellite Imagery Map** (2 Km. Radius)



Fig. No. 1.4 : Site Photographs of the Study Area



1.6 Scope of the Study (EIA/EMP) - details of regulatory scoping carried out (As per Terms of Reference)

The study envisages characterization of the existing status of physical environment such as air, water, soil, land use, meteorology, socio-economic and heritage etc. as well as biological environment such as flora and fauna within the study area and quantifying impacts on the environmental parameters. Based on the study, the EIA evaluates the proposed control measures by the project and prepares an environment management plan, outlining additional proposed activities and delineates the requirements of environmental monitoring program. EIA study covers the following aspects:

- ÷ Establishing the baseline environmental aspects in and around the project site
- ÷ To conduct literature review and to collect data relevant to the study area
- ÷ Identifying various existing pollution loads due to various activities
- ÷ Predicting incremental levels of pollutants in the study area due to the proposed Redevelopment.
- ÷ Evaluating the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies.
- ÷ Identifying critical environmental attributes that are required to be monitored in the post-project scenario.
- ÷ Analyze the predicted impact with respect to the regulatory environmental standards.
- ÷ To prepare an Environment Management Plan (EMP), outlining the measures for improving the environmental quality in view of future redevelopment for environmentally sustainable development

1.7 Applicable Environmental Regulatory Framework

The proposed IA project will follow and function under the following Rules, Acts & Regulations that are formulated by the Government of India in order to protect the environment and ensure development takes place in a sustainable way. An outline of important environmental legislations and their applicability is given in the Table 1.2.

TABLE 1.2 - APPLICABLE ENVIRONMENTAL LEGISLATIONS

S. No.	Act	Purpose	Roles and Responsibility
1.	The Environment (Protection) Act, 1986 amended in 1991	New, Expansion, Modernization activities	Providing protection and improvement for the environment and preventing environmental pollution.
2.	The Water (Prevention and Control of Pollution) Act, 1974 amended in 1988	New, Expansion, Modernization activities	For the prevention and control of water pollution. To ensure discharge of waste water is done as per norms.
3.	The Air (Prevention and Control of Pollution) Act, 1981 amended in 1987	New, Expansion, Modernization activities in industries	To control, reduce air pollution.
4.	EIA Notification 2006 and its amendments.	New, Expansion, Modernization activities in industries	Protection of the Environment and ensuring that all environmental impacts are mitigated appropriately.
5.	The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002	New, Expansion, Modernization activities	To protect workers and public in the surrounding from noise pollution
6.	The Ozone Depleting Substances (Regulation and Control) Rules, 2000	New, Expansion, Modernization activities which include ozone depleting substances	Regulation of production and consumption of ozone depleting substances

7.	Hazardous and other wastes Management, Handling and Trans boundary Movement Rules 2016	New, Expansion, Modernization activities which include Management, Handling and Transboundary Movement of Hazardous waste	Prevention, Control and safe handling of hazardous wastes.
8.	The Municipal Solid Wastes (Management and Handling) Rules, 2016	New, Expansion, Modernization activities which include Management, Handling, treatment and disposal of municipal solid wastes.	Prevention, Control and handling of Municipal Solid wastes.
9.	E-Waste (Management) Rules, 2016.	New, Expansion, Modernization activities which include Management, Handling, treatment and disposal of E-Wastes.	Prevention, Control and handling of E-Wastes.
10.	Construction and Demolition Waste Management Rules, 2016.	New, Expansion, Modernization activities which include handling /disposal of Construction and Demolition Wastes.	Disposal / Handling of Construction and Demolition Waste
11.	Plastic Waste Management Rules, 2016.	New, Expansion, Modernization activities which include Management, Handling, treatment and disposal of Plastic Wastes.	Prevention, Control and handling of Plastic Wastes.

Source: CPCB and MoEFCC

1.8 Methodology

A study area of 10 km radius with the project site at the center was considered for the present study. This study will help to determine the present environmental status and likely impacts of the proposed unit's operations, if any in the region. The most predominant wind direction during study period was from west to east. The monitoring/sampling locations have been established in accordance with guidelines issued by CPCB/MoEF&CC.

1.9 Approved TOR

The proposal for grant Terms of Reference (ToR) to the project was considered in SEAC Meeting on 05.08.2023 vide proposal No. SIA/BR/INFRA1/433926/2023, and based on discussions during SEAC meeting and representation made by BIADA, SEAC recommended TOR for preparation of EIA/EMP Report.

Based on recommendation of SEAC, State Environment Impact Assessment Authority (SEIAA) Bihar in its meeting 17.08.2023, discussed the proposal and issued ToR for EIA/EMP Study as per requirement of EIA Notification 2006.

Approved TORs have been issued by SEIAA, Bihar vide F. No. SIA/7(c)/2449/2023 dated 24.08.2023 followed by TOR correction letter vide Ref. No. 334 Dt: 27.09.2023. TOR is attached in the beginning of the present EIA/EMP Report.

1.10 Structure of the EIA Report

Environmental Impact Assessment or EIA is one of several tools available for improving the way in which decisions are made in order to promote sustainable development outcomes. According to the International Association for Impact Assessment, Environmental Impact Assessment can be defined as: 'The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

The objectives of an Environmental Impact Assessment are

- To ensure that environmental considerations are explicitly addressed and incorporated into decision-making processes
- To anticipate and avoid, minimise the significant adverse biophysical, social and other relevant effects of development proposals
- To protect the productivity and capacity of natural systems and the ecological processes that maintain their functions and
- To promote development that is sustainable and optimises resource use and management opportunities.
- This report focus on findings, conclusions and recommendations supported by summaries of the data collected and citations for any references used in interpreting those data. The environmental assessment report will be organized according to the outline given below.

- **Chapter 1** - Introduction
- **Chapter 2** - Project Description
- **Chapter 3** - Description of the Environment
- **Chapter 4** - Anticipated Environmental Impacts and Mitigation Measures
- **Chapter 5** - Analysis of Alternatives (Site and Technology)
- **Chapter 6** - Environmental Monitoring Program
- **Chapter 7** - Additional Studies
- **Chapter 8** - Project Benefits
- **Chapter 9** - Environmental Cost Benefit Analysis
- **Chapter 10** - Environmental Management Plan (EMP)
- **Chapter 11** - Summary & Conclusions (Summary EIA)
- **Chapter 12** - Disclosure of EIA Consultant

1.11 COMPLIANCE OF TOR IN EIA/EMP REPORT

Table 1.3: Pointwise Compliance of Terms of Reference (TOR)

A. Standard Terms of Reference	
1. Reasons for selecting the site with details of alternate sites examined/ rejected/ selected on merit with comparative statement and reason / basis for selection. The examination should justify site suitability in terms of environmental damage, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weight-age criteria for short-listing selected site.	Present site for IA Warsaliganj was earlier under occupancy of Bihar State Sugar Mill Corporation and presently lying vacant and unused which was transferred by Sugarcane Deptt. of Govt. of Bihar, vide letter No. 01/Regu-6-6004/2012-Part-221/Patna Dt: 11.02.2020, to BIADA for notifying as Industrial Area. 73.58 Acres land at Warsaliganj has been declared as IA Warsaliganj vide Gazette Notification No. Patna 316 Dt” 26 th May’2020, of Industry Deptt. of Govt. of Bihar. (Copy of Gazette Notification attached as Annexure – I.
2. Submit the details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site. Analysis should be made based on latest satellite imagery for land use with raw images. Check on flood plain of any river.	Entire land of IA Warsaliganj will be used for establishment of Standalone Cement Grinding Project of 6 Million TPA. 10 Km. radius Satellite Imagery, Land Use Map and Drainage Map incorporated in EIA Report Chapter -3, Fi.g No. 3.1, 3.2 and 3.3 at page Nos. 46,47 & 48 respectively.
3. Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities / villages and present status of such activities.	Details of Environmentally sensitive within 10 Km. radius has been provided in Chapter -1, Table 1.1, Page No. 5 of EIA Report.
4. Examine the impact of proposed project on the nearest settlements.	Impact of proposed project have been assessed and detailed in EIA Report Chapter – 4,
5. Examine baseline environmental quality along with projected incremental load due to the project taking	Baseline environmental status of various environmental components viz., Air, Water, Soil,

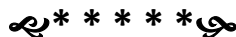
into account of the existing developments nearby.	Noise and socio economics have been examined and details provided in EIA Report, Chapter -3.
6. Environmental data to be considered in relation to the project development should be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health	Environmental Data of (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health have been collected and details provided in EIA Report, Chapter -3.
7. Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area, and any obstruction of the same by the project.	Drainage Pattern of 10 km. radius study area provided in EIA Report Chapter -3, Fig. No. 3.3 at page Nos. 48.
8. Details regarding project boundary passing through any eco-sensitive area and within 10 km from eco-sensitive area.	There is no eco sensitive area within 10 km. radius of study area.
9. Green buffer in the form of green belt to a width of 15 meters should be provided all along the periphery of the industrial area. The individual units should keep 33% of the allotted area as a green area.	Green buffer in the form of green belt will be provided in 33% of total land of IA Warsaliganj with 15 m. width all around the periphery.
10. Submit the details of the trees to be felled for the project.	No trees will be felled for IA Warsaliganj Project with Standalone Cement Grinding Project.
11. Submit the details of the infrastructure to be developed.	BIADA has allotted the IA Warsaliganj to investors for establishment of Standalone Cement Grinding Project. BIADA will only develop basic infrastructure facility for IA Warsaliganj, viz., Boundary Wall, Office, Security room etc. and hand over the site to investors of Standalone Cement Grinding Project for further development.
12. Submit the present land use and permission required for any conversion such as forest, agriculture etc.	Presently land is vacant and not being used for any purposes. Land conversion is not required as

	it has been declared as Industrial Area.
13. Submit the details regarding R & R involved in the project.	As the land belongs to Govt. of Bihar and it is vacant there is no R & R issues.
14. Zoning of the area in terms of 'type of industries' coming up in the industrial area based on the resource requirement along with likely pollutants with quantity from the various industries.	Only Standalone cement grinding project is coming up within IA Warsaliganj. Impacts due to likely pollutants have been assessed and details provided in EIA Report, Chapter -4.
15. The project boundary area and study area for which the base line data is generated should be indicated through a suitable map. Justification of the parameters, frequency and locations shall be discussed in the EIA.	Baseline data has been collected within 10 km. radius of project area and sampling locations have been shown on Google earth imagery maps in Chapter 3, Fig. No. 3.5, 3.6, 3.8 & 3.9 of EIA Report.
16. Submit legal frame work for the implementation of Environmental Clearance conditions to be clearly spelt out in the EIA Report.	Legal frame work for the implementation of Environmental Clearance conditions has been mentioned in EIA Report, Chapter 10, Sec. 10.4
17. Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.	Compliance of environmental regulation under the provision of E(P) Act will be responsibility of investors to whom BIADA allocated IA Warsaliganj for establishment of Standalone Cement Grinding Project.
18. Site Justification of the identified industry sectors from environmental angle and the details of the studies conducted if any.	As per Industrial Promotion Policy, Govt. of Bihar, Industries Deptt. Has allocated land for IA Warsaliganj for establishment of Standalone Cement Grinding Unit.
19. Ground water classification as per the Central Ground Water Authority.	As per GWRE of 2022 by CGWA, study area comes under safe assessment unit.
20. Submit the source of water, requirement vis-à-vis waste water to be generated along with treatment facilities, use of treated water along with water balance chart taking into account all forms of water	Water requirement will be met through borewell after obtaining permission from CGWB. Water requirement provided in Clause 2.3.4 of Chapter 2 of EIA Report.

use and management.	
21. Rain water harvesting proposals should be made with due safeguards for ground water quality. Maximize recycling of water and utilization of rain water. Examine Details.	Rain Water from roof tops and other areas will be recharge to ground water aquifer through recharge wells with filtration system provided within premises. Refer Sec. 10.12 of Chapter 10 of EIA Report.
22. Examine soil characteristics and depth of ground water table for rainwater harvesting.	Soil characteristics mentioned in Table 3.3 of Chapter 3 of EIA Report.
23. Examine details of solid waste generation treatment and its disposal.	Cement dust will be generated as solid waste from proposed standalone cement grinding project within IA Warsaliganj.
24. Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.	Solar panels will be installed for generation of renewable power for captive use, in order to reduce load on govt. grids.
25. In case DG sets are likely to be used during construction and operational phase of the project, emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.	Impact on air environment has been assessed through Air Modelling through AERMOD. All aspects including operation of DG Sets during emergency power failure have been considered. Refer EIA Report Chapter -4, Sec. 4.9.5.
26. Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project. Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.	SH-83 is at a distance from 0.5 Km. from project site and railway line is adjacent to IA Warsaliganj premises which will provided smooth transportation of construction materials and raw materials as well as finished products.
27. A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.	Traffic and transportation study provided in Sec. 4.10 , Chapter – 4 of EIA Report.
28. Examine the details of transport of materials for	SH-83 is at a distance from 0.5 Km. from project

construction which should include source and availability.	site and railway line is adjacent to IA Warsaliganj premises which will provided smooth transportation of construction materials and raw materials as well as finished products.
29. Examine the details of National Highways/ State Highways/ Expressways falling along the corridor and the impact of the development on them.	SH-83 is at a distance from 0.5 Km. from project site and carrying capacity of SH-83 is adequate as per IRC guidelines.
30. Examine noise levels present and future with noise abatement measures.	Noise levels measurements have been done for baseline study. Details provided in Chapter – 3, Sec. 3.7
31. Identify, predict and assess the environmental and sociological impacts on account of the project. A detailed description with cost estimates of CSR should be incorporated in the EIA / EMP report.	Impact of proposed project have been assessed and detailed in EIA Report Chapter – 4. IA Warsaliganj project has allocated CER amount of 2% of total project cost as per requirement of EIA Notification. Details provided in Chapter – 8, Sec. 8.3. CER activities will be detailed on local needs & requirement based on public hearing.
32. Examine separately the details of construction and operation phases both for Environmental Management Plan and Environmental Monitoring with cost and parameters.	Refer EIA Report Chapter 10, Sec. 10.14 and Table 10.2.
33. Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man made-made disaster.	Refer EIA Report Chapter 7, Sec. 7.3.
34. The Public hearing should be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management Plan.	Public Hearing will be conducted as per requirement of EIA Notification 2006 and amendments thereof.

<p>The Public Hearing should be conducted based on the TOR letter issued by the Ministry and not on the basis of Minutes of the Meeting available on the web-site.</p>	
<p>35. A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification.</p>	<p>Draft EIA/EMP report has been prepared as per TOR granted by SEIAA Bihar.</p>
<p>36. Details of litigation pending against the project, if any, with direction / order passed by any Court of Law against the Project should be given.</p>	<p>There is no litigation pending against the IA Warsaliganj Project.</p>
<p>37. The cost of Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.</p>	<p>Refer EIA Report Chapter 10, Sec. 10.14 and Table 10.2.</p>
<p>38. Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website http://moef.nic.in/Manual/IndustrialEstate.</p>	<p>Agreed</p>
<p>B. Special Conditions</p>	
<p>1. Collect one Month data during October 2023 to compare the data collected between March to May, 2023.</p>	<p>One month data during Oct.'2023 is being collected which will be compared with data collected during Mar-May'2023 in final EIA Report.</p>



CHAPTER – 2

PROJECT DESCRIPTION

2.1 Type of the Project

As per EIA Notification '2006 issued by Ministry of Environment & Forests, Govt. of India vide Gazette Notification No. S.O. 1533(E) dt: 14th Sep.'2006 and amendments thereafter, the IA Warsaliganj project falls under category B of Item 7 (c), Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes, having total land area <500 ha. housing with one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA.

In this connection, BIADA submitted an application along with filled up 'Form I' along with Pre-Feasibility Report in the prescribed format vide online proposal No. SIA/BR/INFRA1/433926/2023 dated 24.06.2023, to SEIAA, Bihar for obtaining TOR followed by Environmental Clearance.

The proposal for grant Terms of Reference (ToR) to the project was considered by the SEAC in meeting held on 05.08.2023, for preparation of detailed EIA study for obtaining Environmental Clearance in accordance with the provisions of the EIA Notification 2006 and amendments thereof. Accordingly, SEIAA issued TOR letter vide F. No. SIA/7(c)/2449/2023 dated 24.08.2023 followed by TOR correction letter vide Ref. No. 334 Dt: 27.09.2023, with mentioning the TOR points for preparation of EIA report.

2.2 Need for the project

Proposed cement grinding unit for production of different types of cement, target state of Bihar and Jharkhand as potential market. Bihar is lagging behind in the

infrastructure and development sector due to lack of capital formation and a sense of uncertainty in the minds of the entrepreneurs for creating big ventures.

However, even the above facts 6.7 million ton consumption is much lower than the 15-17 million ton consumed by larger states as Maharastra and Tamil Nadu which reflects that this growth will increase with real estate development in Bihar.

In the period 2011-12, Bihar was the country's fastest growing state in economic terms, with growth rate of 13.1 % for the year 2011-12. This followed a growth rate of 14.8% in the previous years.

Moreover, consumption of cement will increase further because of increasing demand of rural housing sector in Bihar. Total installed capacity of cement in Bihar is 12 Million Ton (MT) comprising of 4 large units under operation. Consumption of cement in Bihar is more than the amount produced. Therefore, setting up of new cement plants in Bihar are viable option for entrepreneurs.

Keeping in view the present market trend as well as the present infrastructure requirement for economic growth of the Bihar in particular and the Eastern region as a whole for the proposed Cement Grinding unit at Industrial Area, Block Warsaliganj, Dist.: Nawada, Bihar is a viable project and will not face any problem in marketing its product.

Since the state of Bihar is expected to remain a cement deficit zone and the deficit is likely to be increasing progressively in the coming years, any new company desiring to set up cement manufacturing facilities would have no problem in selling its production in the state. Being a local cement producer the company would get freight advantage.

2.3 Location of the Project

Bihar Industrial Area Development Authority (BIADA) has proposed to establish a cement grinding unit at Industrial Area (IA) Warsaliganj, Dist. Nawada, Bihar. Geo Co-ordinates of Project Site are Latitude 25⁰0'26.47"N & Longitude 85⁰38'35.88"E. Project site is about 16 kms NE from dist. headquarter at Nawada & which is well connected by road and rail with rest of the country. Project site of BIADA is located about 500 m. away from SH-83, which connects BIADA Industrial Area to Dist.

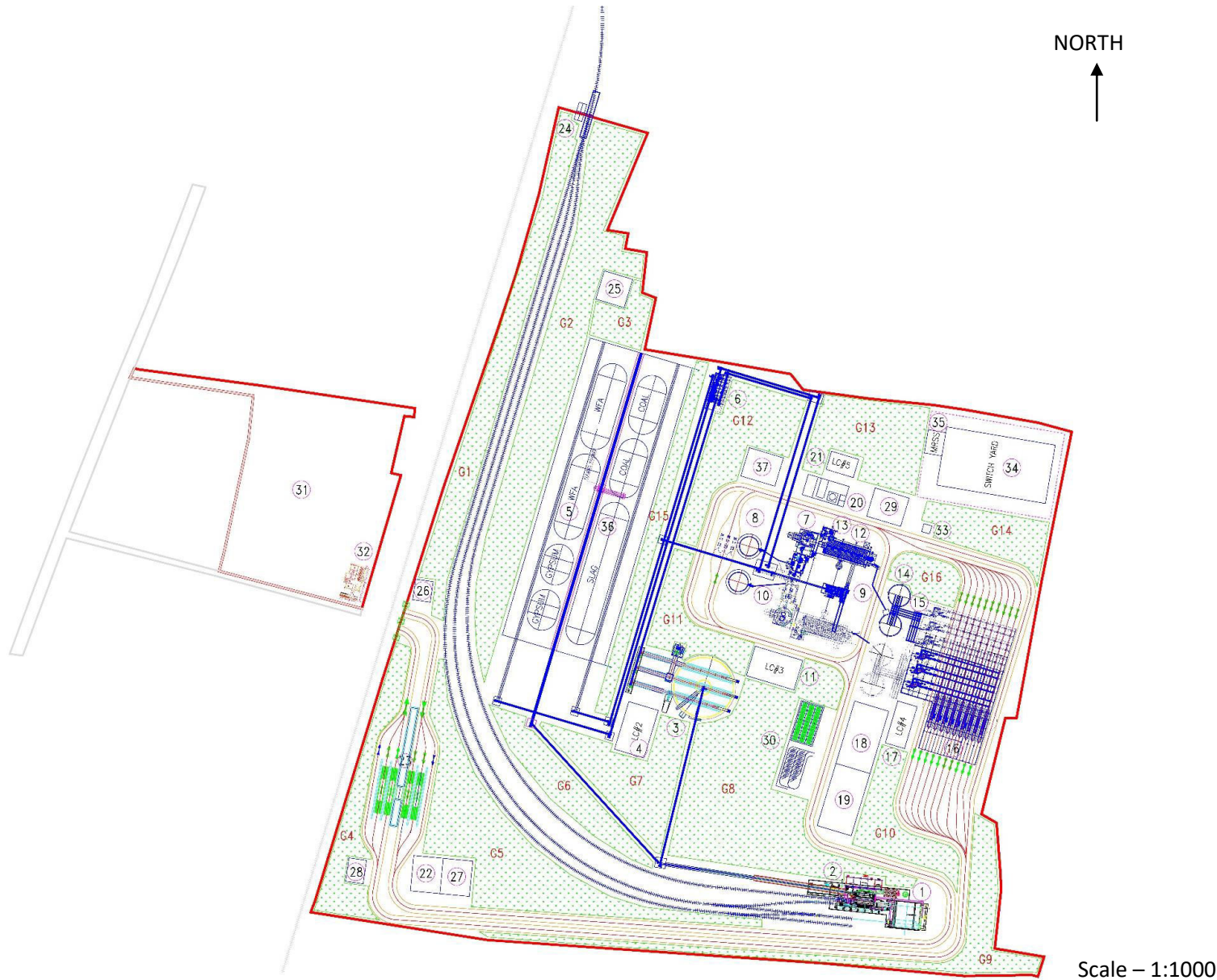
Headquarters at Nawada and rest of Country. Nearest railway station is Warsaliganj at 1 Km. distance in North direction on Gaya Kiul Sec, of ECR. The Geo Co-ordinates of the project site are as under:

Plot 1	67.61 Acre	
Location	Latitude	Longitude
NE	25.008438°	85.645659°
NW	25.010387°	85.641248°
SE	25.004050°	85.644960°
SW	25.004647°	85.639589°
Plot 2	5.97 Acre	
Location	Latitude	Longitude
NE	25.008611°	85.640149°
NW	25.008696°	85.638193°
SE	25.007016°	85.639668°
SW	25.007300°	85.638524°

There is no reserved forest, hills / valleys & ecologically sensitive zone within a radius of 10 km.

Site Layout Plan Map is given in Figure 2.1.

Fig. No.: 2.1: **PROJECT SITE LAYOUT PLAN SHOWING CEMENT GRINDING PROJECT**



Sr. No.	DESCRIPTION	REMARKS
01	WAGON SHED	2300
02	LOD CENTER LCQ1 @ WAGON TRIPPLER	220
03	COAL STORAGE SILO	8150
04	LOD CENTER LCQ2 @ WATER PUMPING	1092
05	CYPSM & MFA STORAGE SHED	11783
06	CEMENT MILL HOPPER BUILDING	418
07	CEMENT MILL BUILDING	3101
08	FLY-ASH SILO	346
09	FLUIDIZED BED FCG FOR CEMENT MILL	270
10	COAL CRUISER OR SCREEN BUILDING	245
11	LOD CENTER LCQ3 @ CEMENT MILL	1092
12	COMPRESSOR HOUSE BELOW CN BAGHOUSE	---
13	LOWER ROOM BELOW CN BAGHOUSE	---
14	CEMENT SILO	2200
15	PACKING PLANT	1740
16	TRUCK LOADING AREA	6400
17	LOD CENTER LCQ4 @ PACKING PLANT	630
18	WORKSHOP BUILDING	1650
19	STORE & STORE YARD	1650
20	WATER TANK & PUMP HOUSE	650
21	LOD CENTER LCQ5 @ WATER TANK	384
22	ADMIN BUILDING	750
23	WEIGH BRIDGE FOR ROAD	1418
24	WEIGH BRIDGE FOR RAIL (IN WORK)	374
25	SEWAGE TREATMENT PLANT	825
26	MAIN GATE, SECURITY & SAFETY OFFICE	763
27	TIME OFFICE & OCCUPATIONAL HEALTH CENTER	750
28	SALUS & DISPATCH OFFICE	300
29	CANTEEN	750
30	CAR & SCOOTER PARKING	1508
31	TRUCK PARKING AREA	23904
32	REST ROOM & LUNCH ROOM	255
33	TOILET	50
34	SWITCH YARD	4880
35	WSSS AT SWITCH YARD	300
36	SLAG & COAL STORAGE SHED	11785
37	WTP	750
AREA IN SQ. MTR		62367
AREA IN ACRE		22.40
AREA IN HECTARE		9.06

GREEN BELT / PLANTATION		
WARSAALIGANJ CEMENT PLANT		
Sr.No.	GREEN BELT	AREA IN SQ. METER
1.	G1	9009
2.	G2	5565
3.	G3	1736
4.	G4	4410
5.	G5	11770
6.	G6	3982
7.	G7	5074
8.	G8	15494
9.	G9	3661
10.	G10	3741
11.	G11	3767
12.	G12	5610
13.	G13	5012
14.	G14	3573
15.	G15	3580
16.	G16	1533
AREA IN SQ. METER		98623
AREA IN ACRE		24.65
AREA IN HECTARE		9.98

PLANT AREA BREAK UP		
S.No.	DESCRIPTION	AREA IN HECTARE
1.	BU-1-100 AREA	9.98
2.	SHRIN BELT	0.50
3.	DRY IN AREA	0.74
TOTAL COP-2 PU AREA		26.78

Scale – 1:1000

2.4 Size or Magnitude of operation:

Project Classification as per EIA Notification 2006 ;

Activity	Sl. No. in Schedule of EIA Notification 2006	Category of Project	Capacity
Industrial estates /Parks/ Complex/ areas, export processing Zone, Special Economic Zones (SEZs), Biotech Parks, Leather complex	7 (C)	B Industrial estates housing at least one Category B industry and area <500 ha.	Total Land Ares 29.77 Ha. (73.58 Acres)
Standalone Cement Grinding Project	3(b)	B	6 Millin TPA (2 * 3 Million TPA)

Proposed Manufacturing & Production Details of IA Warsaliganj ;

Manufacturing Facilities	Production Capacity	
Standalone Cement Grinding Project	Ordinary Portland Cement (OPC) / Portland Pozzolana Cement (PPC) / other cements	6 Million TPA (2 * 3 Million TPA)

2.4.1 Raw Material Requirement & Source ;

Raw Materials	Requirement	Source	Mode of Transportation
Clinker	5.7 Million Ton/Annum	Odisha, Chhattisgarh, M.P.	Road / Rail
Flyash	2.1 Million Ton/Annum	NTPC Barh, Kahalgaon & Barauni	Road / Rail
Gypsum	0.48 Million Ton/Annum	Rajasthan	Road / Rail
Slag	3.9 Million Ton/Annum	West Bengal, Jharkhand	Road / Rail
Coal (for HAG)	0.14 Million Ton/Annum	ECL & CCL, Jharkhand	Road / Rail

2.4.2 Fuel Requirement

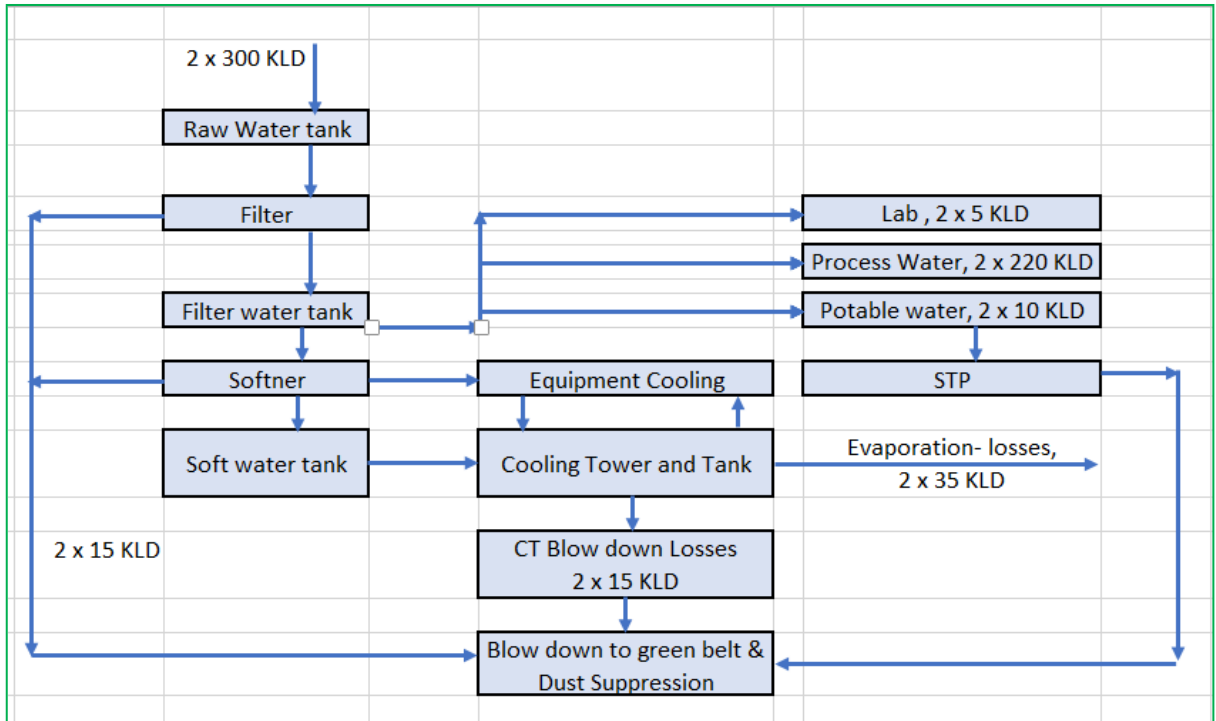
Approx. 80-100 Ltr./Hr. HSD with low sulphur content will be used for operation for DG Sets of Cement Grinding Project within IA Warsaliganj.

2.4.3 Water Requirement

During construction phase of IA Warsaliganj Cement Grinding Project maxm. 20 KLD water will be required, which will be sourced through proposed borewells.

During operation phase of project , approx. 600 KLD water will be required. Water will be used for cooling & domestic purposes. Water will not be used in cement manufacturing process.

Water will be abstracted through borewells after obtaining NOC from CGWA/CGWB. Water Balance flow sheet is shown herewith as under ;



2.4.4 Power Consumption

Estimated power requirement of IA Warsaliganj Cement Grinding Unit will be 36 MW (2 x 18 MW). Power for the proposed project will be supplied by SBPDCL. 2 Nos. DG Set will be installed as power backup during power failure.

2.4.5 Manpower Requirement

Total 250 nos. of manpower is required directly for proposed Cement Grinding Project which includes 26 Nos. qualified & skilled, 8 Nos. semi skilled manpower, 12 Nos. unskilled & 14 nos. administrative & support staffs.

For loading of packed cement in trucks and for house keeping, it is a normal practice to employ contract / casual labour, which is not included in the above mentioned manpower requirements.

2.5 Manufacturing Process

There are basically 4 types of system used for grinding. These are Ball mill, Roller press, Ball mill in combination with roller press and Vertical roller mill. The process of grinding is explained for each system in detail. A techno economic evaluation of these four alternatives is given as under ;

Parameters	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Closed Circuit Ball Mill (CCBM)	Ball Mill & Roller Press (Semi finish grinding) (BMRP)	Closed Circuit Roller Press (CCRP)	Vertical Roller Mill (VRM)
Comminution technique	Impact and attrition with the grinding balls.	<ul style="list-style-type: none"> • Compression in RP. • Attrition in ball mill. 	Compression	Compression
Feed size	90% passing 25 mm sieve.	Upto 2 times the gap width.	Upto 2 times the gap width	Upto 75mm
Moisture drying capacity	Moderate upto 10%	Moderate upto 12%	Low upto 5%	High upto 20%
Air flow requirement	Low	Low	Low	High
No of auxiliary equipment	Less	More	Less	Less
Space requirement	Medium	Large	Small	Small
Maintenance	Low	High	High	High
Particle size distribution (PSD)	Somewhat steep	Steep	Steep	Steeper than CCBM
Expected specific power consumption, kWh/ t cement @ fineness of 360 M ² /kg	32	27	24	25
Hot gas requirement	Low	Low	Low	Medium
Grinding aid	Not necessary	Not necessary	Not necessary	Required

On the basis of various pros and cons of different alternatives, as given in above Table, particularly comparable power consumption and investment & proven system, it is proposed to implement the recommendations of Alternative 4 i.e. VRM.

2.5.1 Vertical Roller Mill (VRM) Manufacturing Process ;

VRM has an inbuilt high efficiency separator for material grinding. The mix of clinker, gypsum and flyash / slag is fed to the grinding table fitted with hydraulically operated rollers, which apply pressure on the material bed for grinding purpose. Fly ash will be fed at the inlet of the mill. The ground material is air swept to the high efficiency separator, where coarse material falls back on grinding table for further grinding. Fines from separator will be collected in a bag filter. Fines collected in bag filter will be transported to cement storage silo by a system of air slides and bucket elevator. Grinding aid may be used, Depending on the customers requirement.

In order to maintain the required gas flow through mill nozzle ring, hot gas may be required during mill startup after long shutdown. Hence, a suitably sized hot air generator (HAG) will also be installed.

Clinker and Gypsum shall be filled into the respective hoppers through suitable material handling system. ACL proposed to install 2x400 TPH Cement Grinding mills for Cement Grinding. Vertical Roller Mill (VRM) / Roller Press technology shall be used for clinker grinding. Arrangement for cement grinding circuit is considered for clinker storage, Gypsum storage, Flyash storage, Cement storage and packing plant. Clinker unloading by rail and bagged cement loading by trucks for road transport is proposed. Process technology of VRM and Roller Press technology are discussed below:

- Vertical roller mill operates under the principle of air swept with impact, Compression & Shear forces.
- Latest Generation VRM is most Robust state of art technology for Cement grinding application.
- VRM performs four major operations inside a single machine; Drying of Raw material, Grinding, Material Transportation and Material Classification
- It comes in 2 Roller / 4 Roller/ 6 Grinding roller segment design, which gives greater flexibility; if one roller is down, production with 70% capacity can be achieved with remaining rollers.
- VRM is most energy efficient equipment, Hence, Less power consumption.
- Water Spray required on table for material bed stabilization.
- External Heat sourced is required for Drying of Material.

Ball Mill+ Roller press circuit

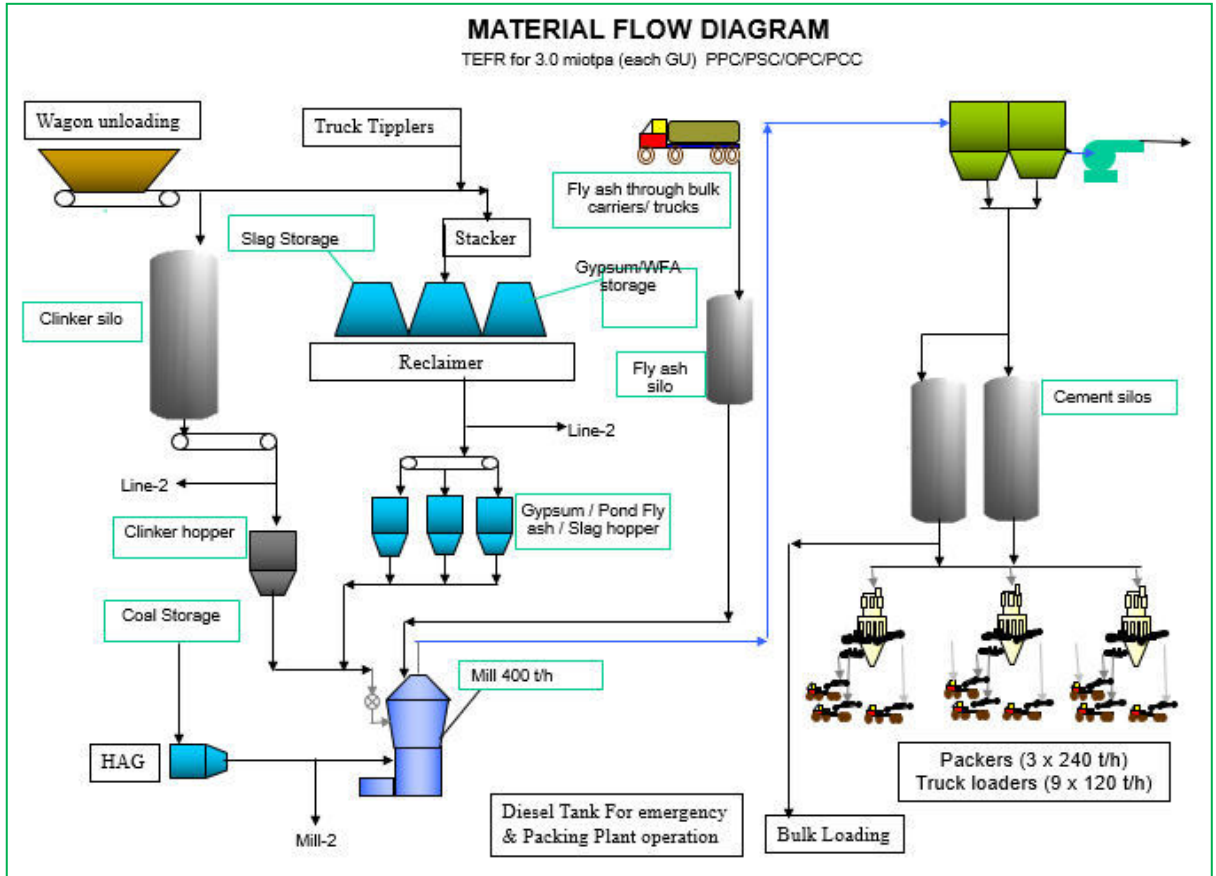
Ball mill mainly works on principle of Impact and attrition forces and in conjunction with roller press its efficiency and output is improved.

- Ball mill consists of Single / Double chamber.
- Each Chamber is filled with grinding media (Steel Ball) of different sizes.
- As the mill get rotated, along with that due to centrifugal forces Grinding media also get lifted and rotated, when centrifugal forces get neutralize by gravitational forces, grinding media fall on material, due to this continuous impact & attrition forces grinding process takes Place.
- A current of air is passed through the mill. This helps keep the mill cooland sweeps out evaporated moisture which would otherwise cause hydration and disrupt material flow. The dusty exhaust air is cleaned, usually with bag filters
- Ball mill shall be used in conjunction with Roller Press
- A high efficiency circulating fan will be operated to collect the ground material in the system. The collected ground material will be taken into the cement silos with the help of series of air slides and Bucket elevators.
- To minimise the pollution, the exhaust of circulating fan is connected with bag filter. Product collected at bag filter shall be transported to the cement silo through a set of air slides and bucket elevator.

- **Cement packing**

The cement from silos will be extracted and fed to the installed 2 x 3 nos. of electronic packers, 16 spout, double discharge with a capacity of 240 TPH each through air slides, bucket elevators and screens. Packer will be connected with 9 nos. truck/trailer loaders for loading packed cement bags. The packed bags from packers will be transported to truck loading bays by suitable flat belts conveyors and diverters. A separate provision will be also available to load bulk cement through closed tankers.

Manufacturing Process Flow Sheet of Cement Manufacturing is shown herewith as under ;



2.6 Proposed Project Schedule for approval and Implementation- Likely date of start of construction & likely date of completion.

All construction activities will be completed within 10-12 months time after grant of EC followed by CTE from Bihar State Pollution Control Board.

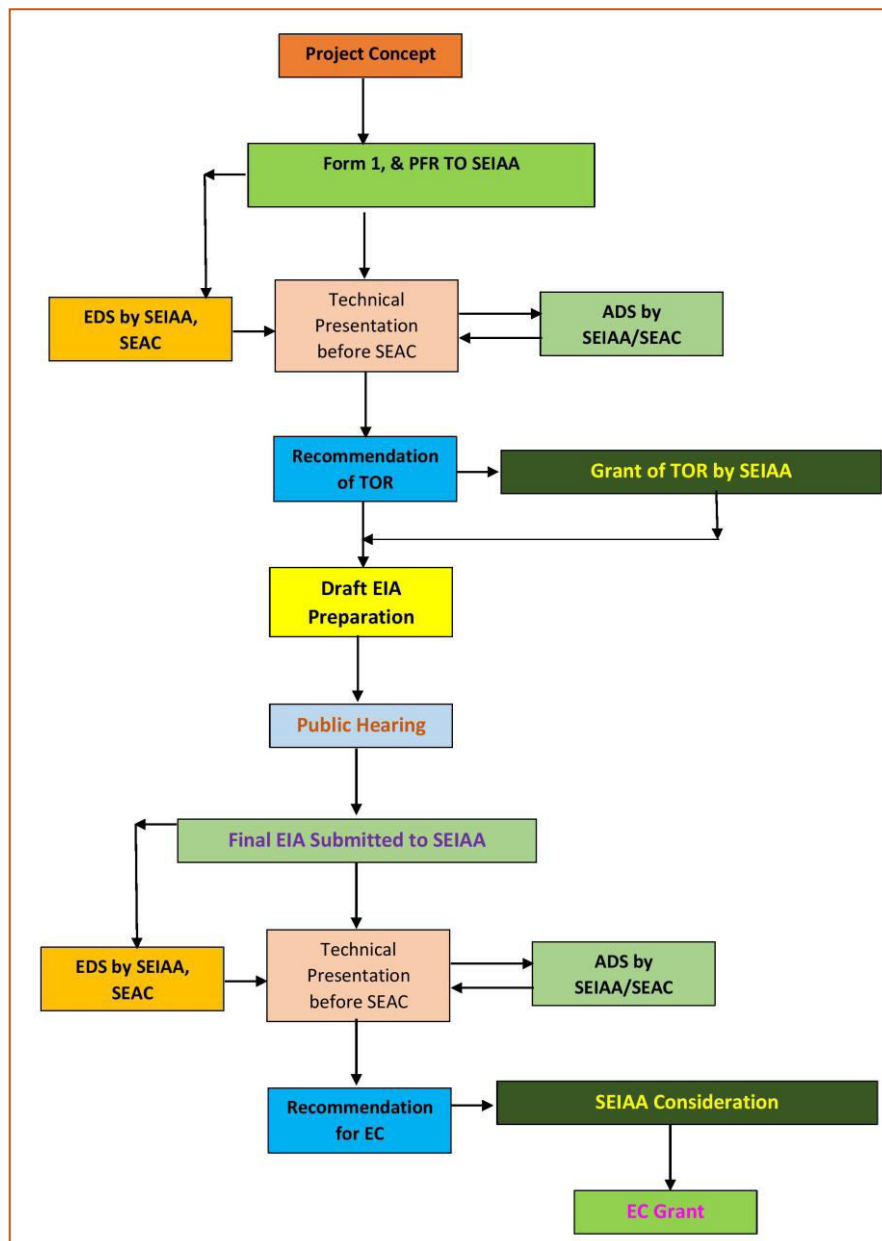
2.7 Total Project Cost

Total cost of the IA Warsaliganj project is approx. Rs. 600 Lakhs i.e. Rs. 6.0 crores which will be spend for development of basic infrastructural facilities within IA Warsaliganj. (This cost does not include project cost of Standalone cement grinding project of 6 Million TPA, as after developing required infrastructure, BIADA will hand over the IA Warsaliganj to investor for establishment of cement grinding project.)

Estimated cost of proposed Standalone Cement Grinding Project within IA Warsaliganj project will be Rs. 1400 Crores. (Investor of proposed Standalone Cement Grinding Project within IA Warsaliganj project will obtain all statutory approvals as per requirement of EIA Notification 2006 and E(P) Act'1986)

2.8 Project description. Including drawings showing project layout, components of project etc. Schematic representations of the feasibility drawings which give information important for EIA purpose.

As per EIA Notification 2006 issued by Ministry of Environment & Forests, Govt. of India vide Gazette Notification No. S.O. 1533(E) dt: 14th Sep.'2006 and amendments thereafter, The IA Warsaliganj project falls under, EIA Notification 2006, category B of Item 7 (c), Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes, having total land area <500 ha. housing with one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA. IA Project site layout has been shown in Fig. No. 1.2 of Chapter 1 and Cement Grinding project layout is shown as Fig. 2.1 of this chapter. Schematic diagram for EIA Purpose is shown herewith as under ;



2.9 Description of mitigation measures incorporated into the project to meet environmental standards, environmental operating conditions, or other EIA requirements (as required by the scope)

2.9.1 Effluent / Sewage Generation, Treatment and its Disposal

In the proposed cement grinding unit water will not be utilize in production process, water will only be used for external cooling & domestic purposes. Therefore no industrial effluent will be generated and discharged. Approx. 15 KLD Domestic Effluent will be generated which will be treated in proposed STP within premises of IA Warsaliganj. The process of treatment is as under;

A 25 KLD Sewage Treatment Plant (STP) based on MBBR (Moving Bed Bio Reactor) Technology will be installed. Operation details of proposed MBBR technology STP are as under;

Preliminary Treatment: The treatment will include the following unit / equipment;

- o Screen Chamber
- o Oil & Grease Trap
- o Raw Sewage Collection Tank
- o Raw Sewage Transfer pumps

Biological Treatment (Secondary Treatment): This will include the following;

- o MBBR Bioreactor
- o Secondary Clarifier
- o Sludge Dewatering System-(Filter press)

Tertiary Treatment: The treatment will include the following unit / equipment;

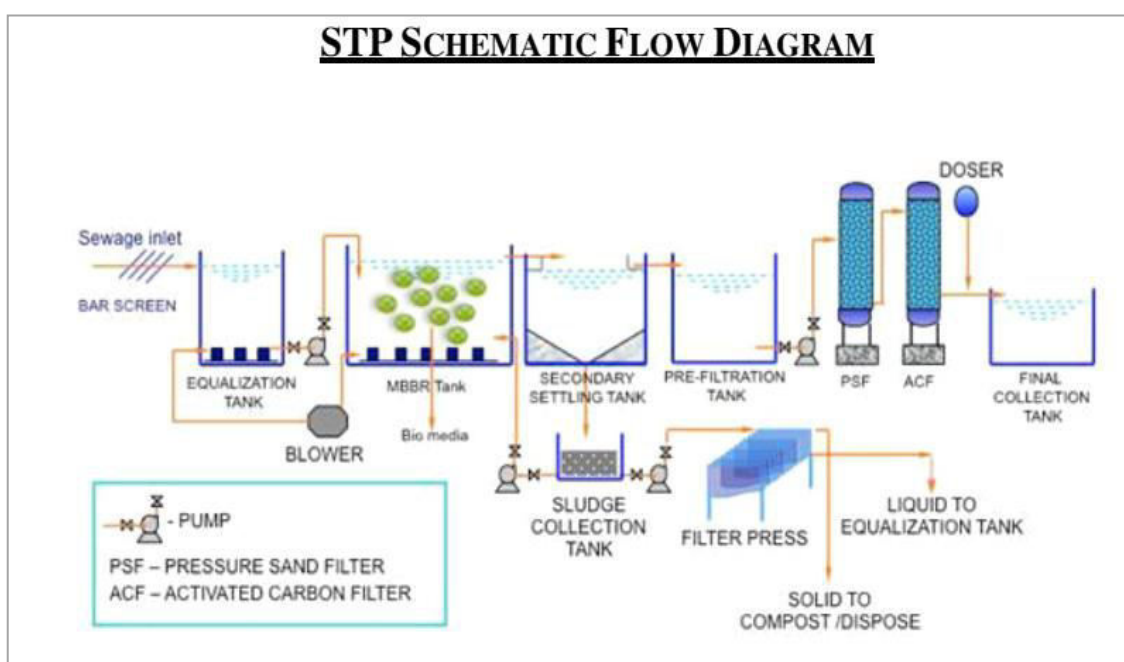
- o Filter feed pumps
- o Pressure Sand Filter (PSF)
- o Activated Carbon Filter (ACF)
- o UV system

The clear supernatant from the Secondary clarifier will be collected in a Filter feed tank this tank will be provided with level switch for unmanned operations. The treated sewage will be pumped to MGF followed by ACF. After ACF treated sewage will be passed through UV filtration for disinfection. After UV filtration treated sewage will be collected in Treated Water Tank.

The treated effluent will be of suitable quality for use as flushing, car washing landscape irrigation & fire water tanks. Treated water Characteristics will be as under;

Parameters	General Standards as per Schedule VI of E(P) Rules for Irrigation of Land	Expected Conc ⁿ (mg/l.)
1. pH	5.5 – 9.0	6.5 – 7.5
2. Suspended Solids mg/l.,	200.0 mg/l.	< 20.0
3. BOD (3 days at 27 ⁰ C), mg/l.	100.0 mg/l.	< 10.0
4. COD, mg/l.	Not Specified	< 30.0
5. Oil & Grease, mg/l.	10.0 mg/l.	< 2.0

Treated sewage will be recycle and reuse within premises for green belt irrigation and dust suppression.



2.9.2 Air Pollution

Construction Phase ;

During construction period major sources of dust & smoke are DG Sets, Vehicular movement & construction activities. To mitigate these effects regular water sprinkling will be done all around the construction area and building materials will be stored in covered area by way of covering them with tarpaulin or keeping them in temporary makeshift sheds.

Operational Phase ;

Environmental control aspects in cement grinding plants are to be given utmost attention. Out of two aspects of pollution of immediate concern, viz. air and water

pollution, the cement grinding plant is virtually free of water pollution as no effluents are involved. Even as regards air pollution, which basically can be caused by both particulates and undesirable gases, the plant operation ensures practically no emission of gaseous substances, where adequate no of dust collectors are installed in order to keep the particulate emission within acceptable limits at all the points of dust generation during the process of cement grinding, packing & dispatch.

Keeping the above philosophy in view, the proposed cement grinding plant will adopt a state-of-art technology, which ensures minimum emission and whatever little dust entertainment takes place, it is almost completely captured by using dust collectors employing most modern technology.

Part of the Project Cost had been earmarked for pollution control devices to not only ensure negligible dust emission but also to make this project a model unit from environmental protection and pollution control point of view.

The air pollution problems related to the production, handling, and transportation of cement in a grinding plant are primarily caused by the very fine particles in the product.

During raw material acquisition the primary air pollutant emitted will be particulate matter. Particulate matter will emitted from the handling, loading, unloading, and transport of raw materials, such as Clinker, Fly Ash& Gypsum purchased from another source. In certain areas, exhaust from portable equipment may also be a consideration.

The following methods will be used to control particulate emissions generated from the handling of purchased raw materials:

- Dust collectors
- Silos (with and without exhaust venting)
- Wind screens fabric filters)

Dust that is collected by these means is restored to the process.

Clinker storage capacity will be 10 days Clinker consumption. Equipment such as conveyors and bucket elevators is used to transfer the clinkers to storage areas and to the finish mill. Gravity drops and transfer points will be vented to dust collectors.

Fly ash will be stored in a covered storage yard. Required dust collectors will be provided for unloading, extraction and transportation system (If required).

Gypsum is stored in a covered storage yard. Required dust collectors will be provided for unloading and extraction system .

Once the production of cement is complete, the finished product is transferred using bucket elevators and conveyors to large, storage silos in the Packing plant. Most of the cement will be transported in bulk by closed trucks in 50kg in HDPE/ paper bags.

The priority in the cement industry is to minimize the increase in ambient particulate levels by reducing the mass load emitted from the stacks, from fugitive emissions, and from other sources.

For control of fugitive particulate emissions, ventilation systems will be used in conjunction with hoods and enclosures covering transfer points and conveyors. Drop distances will be minimized by the use of adjustable conveyors. Dusty areas as roads will be wetted down.

In the proposed cement grinding unit, Cement Mill, Material Storages, Packing plant and various material transfer points, adequate nos. of air pollution control equipments i.e. reverse pulse jet dust collectors based on the most modern technology are proposed to be installed to ensure that the dust emissions are within the prescribed limits and lower than 30 mg/NM³ which is within the norms prescribed by CPCB/MoEF.

Moreover, an area of 9.82 Ha. will be developed as Green Belt within IA Warsaliganj premises. Regular Water Spraying will be done all around the project premises to minimize fugitive emissions.

2.9.3 Noise Pollution

Construction Phase ;

- Equipment generating minimum noise and vibration will be selected for construction phase.

- Vehicles and construction equipment with internal combustion engines will be provided with proper silencers and mufflers in order to reduce noise levels.
- Requisite compliance requirements from contractors for their equipment will be communicated to them before commencing construction.
- To prevent the hearing damage to construction workers, they will be provided with ear plugs and muffs and job rotation will also be practiced.
- Emphasis on carrying out the construction work during day time only.

Operational Phase ;

- During the operational phase, noise will be generated from the DG sets, compressors, pump rooms, vehicular movement & cement grinding equipments..
- The DG set room, compressors and pump room will be isolated from the outside environment and proper acoustic arrangements will be made to control the noise generated.
- Cement Grinding equipment will be installed and operated in acoustically enclosed areas.
- The noise levels outside these rooms will be maintained within the stipulated norms both during the day and night time.
- It shall be ensured that the new DG sets to be installed for the proposed hotel shall comply with all applicable environmental regulations for noise. The DG set shall have an acoustic enclosure and an exhaust muffler that will ensure minimum of 25 dB(A) insertion loss.
- Plantation and landscaping will be designed to ensure that there is a green belt all around the project area so that further noise attenuation is achieved.
- Overall design of facilities, equipment, layout and landscaping is done with a view to maintain pre-project noise level in the post project stage also.
- All efforts will be made to maintain the noise level within the proposed premises around 70-75 dB(A) in day time & 60-65 dB(A) during night time.

- Moreover, 9.82 Ha. Green Belt will be developed & maintained within the proposed Project Premises. Alongside boundary of the proposed building premises trees will be planted which will also act as barrier for outside noise.
- Alongside boundary of the proposed building premises trees will be planted which will also act as barrier for outside noise.

2.9.4 Solid Waste Generation, Collection, Treatment and Its Disposal / Solid and Hazardous Waste Management

Construction Phase:

No flammable / hazardous materials will be handled, stored or used beyond the Threshold Limit of MSIHC Rules at Construction site of proposed Project.

- Wherever possible, hazardous raw materials will be substituted by non-hazardous materials e.g. cleaning solvents can be replaced with biodegradable cleaners, usage of non-chlorinated strippers instead of strippers containing methylene chloride and substitution of water based paints for oil based ones.
- On-site recycling of all waste solvents / thinners and oils and off-site recycling of paint, thinner, solvent wastes and waste oil will be carried out. Segregation and storage of waste paints and thinners, contaminated rags and brushes will be carried out to facilitate recycling and reuse.
- Vehicle maintenance area shall be designed to prevent contamination of ground water by accidental spillage of oil.
- Appropriate inventory control of all hazardous materials will be maintained.
- It will be ensured that concerned contractors follow prescribed directions regarding the above.

Operational Phase ;

Industrial Solid Waste Management ;

Solid Wastes	Generation	Management
Cement Dust from Dust Collection System	0.72 Million TPA (0.12 Ton/Ton of Product)	Collected from Dust Collection Systems and recycle and reuse in cement manufacturing process.

Municipal and Other Solid Waste Management ;

The collection, transportation and disposal of the solid waste generated during the operation phase of the proposed cement grinding project of IA Warsaliganj will be done as per the Municipal Solid Wastes (Management & Handling) Rules, 2016 (MSW Rules).

All biodegradable and non-biodegradable waste will be handled as per Municipal Solid Waste (Management and Handling) Rule, 2016. Waste from biodegradable bins will be reutilized in bio-composting to prepare organic manure. Non bio-degradable waste will be disposed off through govt. waste collection system.

Three-bin system will be adopted. Storage facilities will be created and established by taking into account quantities of waste generation in a given area and the population densities. Different coloured bins for different categories of wastes will be provided.

Three colour of wheeled bins in each building: - Dark grey for non-recyclable waste, Green for kitchen food/ compostable garden waste and Blue for paper.

In addition, boxes will be provided for the collection of other recyclable materials; a green box is used for paper and a black box is used for cans and plastic collections.

Following measures will be adopted for safe disposal and management of solid wastes from the proposed project ;

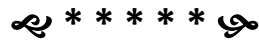
- Waste from biodegradable bins will be reutilized in bio-composting to prepare organic manure.
- The dried STP Sludge will be used as manure for gardening
- Waste oil generated from DG Set / Other machinery overhauling and waste transformer oil will be sold off to CPCB / BSPCB authorized vendors for waste oil.
- Old newspapers & other paper waste and used empty bottles will be sold off to authorized scrap dealers.
- All the non bio-degradable waste disposal will be done through Nagar Nigam waste collection system or other authorized vendors.

The used Spent Oil from DG sets would be carefully stored in HDPE drums in isolated covered facility and disposed off through CPCB/BSPCB authorized recyclers

as per guidelines of Hazardous and Other Wastes (Management and Transboundary Movement) Rules '2016.

2.10 Assessment of New & untested technology for the risk of technological failure

The proposed cement grinding project of IA Warsaliganj will be developed as per latest available technology. No untested technology will be adopted which creates risk of technological failure.



CHAPTER - 3

DESCRIPTION OF THE ENVIRONMENT

3.1 Introduction

This chapter describes the existing environmental status of the study area with reference to the prominent environmental attributes. The study covers the core zone and buffer zone of 10-km radius around the Industrial Area Project Site at Warsaliganj, Block Warsaliganj, Dist. Nawada, State Bihar.

Study Area

Industrial Area project of Bihar Industrial Area Development Authority (BIADA) is being established in land, of old sugar mill of Bihar State Sugar Corporation, acquired by BIADA. Project Site has been declared as Industrial Area by BIADA, Industries Deptt., Govt. of Bihar vide Gazette Notification No. 316 Dt: 26th May'2020.

The relevant information and data (both primary & secondary) were collected in core as well as buffer zone (10 km distance from the proposed project location) during Summer Season (Mar.-May'2023) in accordance with the guidelines for preparation of EIA studies. Studies on various components of environment have been conducted in the "Study Area" covering 10 km radius, centering the proposed project Area. The study area has been divided in two zones, namely, "Core Zone" and "Buffer Zone". The Core Zone is the plot area where manufacturing plant will be located. In order to establish the present environmental scenario, various environmental factors such as topography and drainage, meteorology, air, water, soil, noise, flora, fauna and socio-economics etc. have been studied in the study area.

Details of Study :

M/s Shiva Test House, Patna, a MoEFCC (Ministry of Environment & Forests, Govt. of India) Recognized Environmental Laboratory (vide Gazette Notification No. S.O.

3744 (E), 17th Oct.'2019 & Accredited by National Accreditation Board for Testing & Calibration Laboratories (NABL) has conducted baseline data generation with respect to air, water, soil quality, noise status, meteorology etc. All the field studies for baseline data generation were carried out during Mar. – May'2023.

Components & Methodology

Baseline study is conducted in order to identify the changes to the natural and socioeconomic environments, or any potential impact and to have a thorough understanding of the nature of those existing environments prior to commencement of the proposed Paper Mill activities, it is necessary to study the present scenario of the area by collecting information on the following parameters / components:

1. Land Environment
2. Meteorology
3. Air Environment
4. Noise Environment
5. Water Environment
6. Soil Environment
7. Biological Environment
8. Socio-economic Environment

Land, soil, water, air and noise constitute the physical environment, agricultural crops, flora and fauna constitute the biological environment of the study area and these are discussed in the following sections of this chapter.

3.2 Land Environment

3.2.1 Geological features and Geo-hydrological status of the study are

In the district the main aquifer materials consist of fine to medium sand or fine sand mixed with silts with occasional kankar and gravels. In shallow aquifer zones the ground water is generally under water table condition whereas deeper aquifers are under semi confined to confined condition.

The entire district is occupied by alluvium. In this district there are in general four types of soils. They are grouped as sandy loam, clayey, a clay soil containing an admixture of sand

called as Bangar and lastly the patches of Usar land containing the salt efflorescences that is called as reh in local languages while the sandy loam variety predominate in east of Sakri river. The bangar and clayey soils are found in the north. The Usar land is distributed in patches in the western part. As water logging is also present in some part of the district, the salinisation and alkalinisation increases in the soil of the district.

Precipitation is the main source of ground water recharge in Nawada district. Out of the total rainfall in the district, a part of it directly evaporates from the land surface, a part is absorbed by vegetation and other part reaches the rivers, lakes and ponds etc. as surface run off and remaining part percolates down to the ground water body through sandy soils.

The surface and sub-surface geological condition controls the occurrence and movement and ground water in the area. In order to explain the ground water regime clearly, a hydrogeological map was prepared. The ground water generally occurs under confined to semi confined conditions in deeper aquifers. Sands of varying grades form the prominent aquifers in the area.

The project area (Warsaliganj Block, Dist. Nawada, State Bihar) falls under Safe Category as per GWRE 2022 by CGWA.

3.2.2 Land Use Pattern

The land use pattern indicates the manner in which different parts of land in an area is being utilized. It is an important indicator of environmental health; human activity and a degree of inter play between these two. Within the study region i.e., 10 km radius centering the proposed unit, land use pattern is as under ;

Table No. 3.1: **LAND USE PATTERN OF THE STUDY AREA**

<i>Land Use</i>	<i>Area in Km²</i>	<i>% coverage</i>
Agriculture Crop Land	70.93	22.58
Agriculture Plantation	67.36	21.44
Agriculture Fallow Land	142.08	45.23
Barren/Unculturable/Waste/Scrub Land	11.21	3.57
Built-up Land	19.41	6.18
Water Body	2.04	0.65
Mine/Quarry/Other Land	1.12	0.36

The land use land cover (LULC) map for the study area is given in **Fig. No. 3.2**.

Fig. No. 3.1: **SATELLITE IMAGERY MAP**

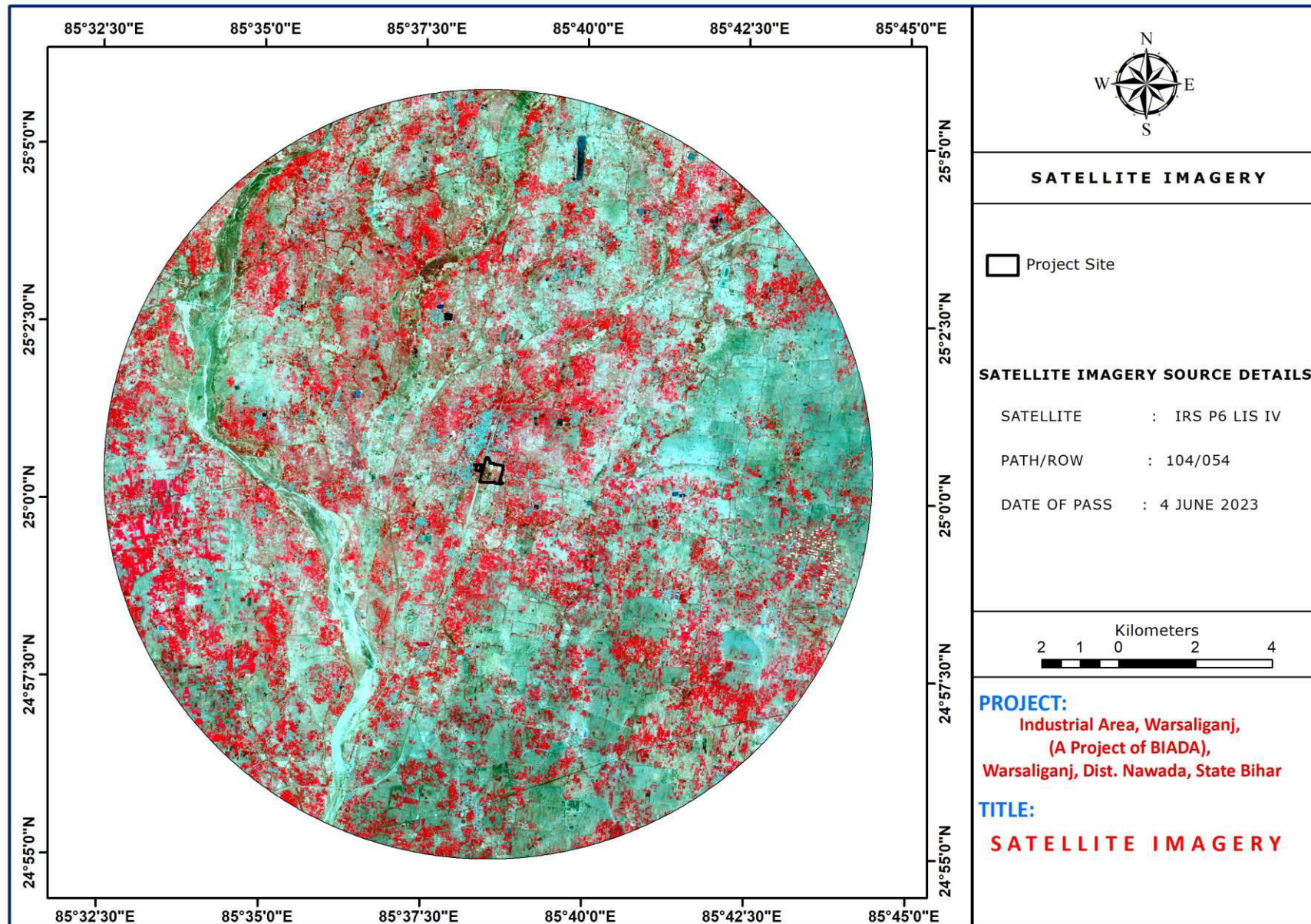


Fig. No. 3.2: LAND USE LAND COVER OF THE STUDY AREA BASED ON SATELLITE IMAGERY

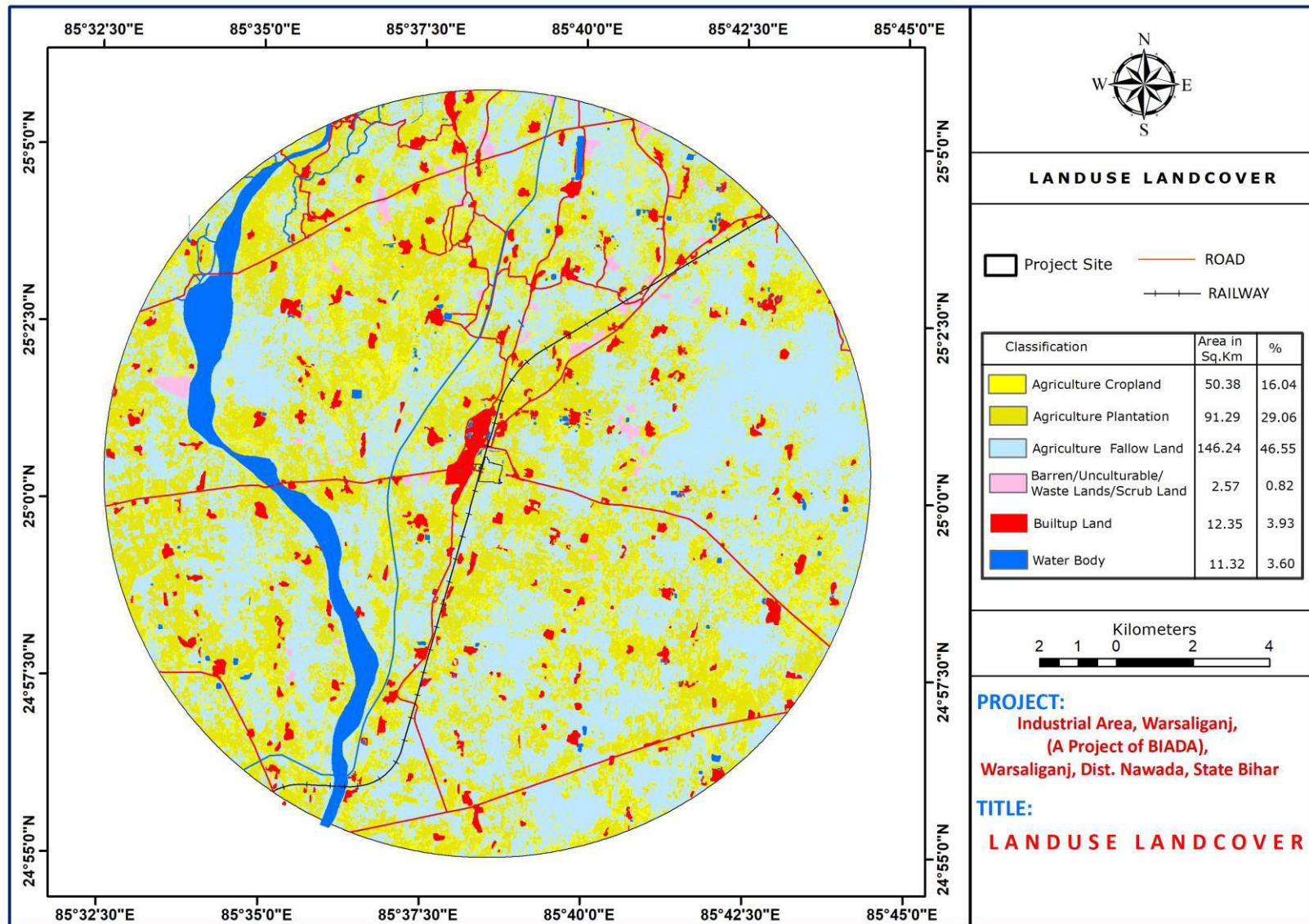


Fig. No. 3.3: DRAINAGE MAP OF THE STUDY AREA BASED ON SATELLITE IMAGERY

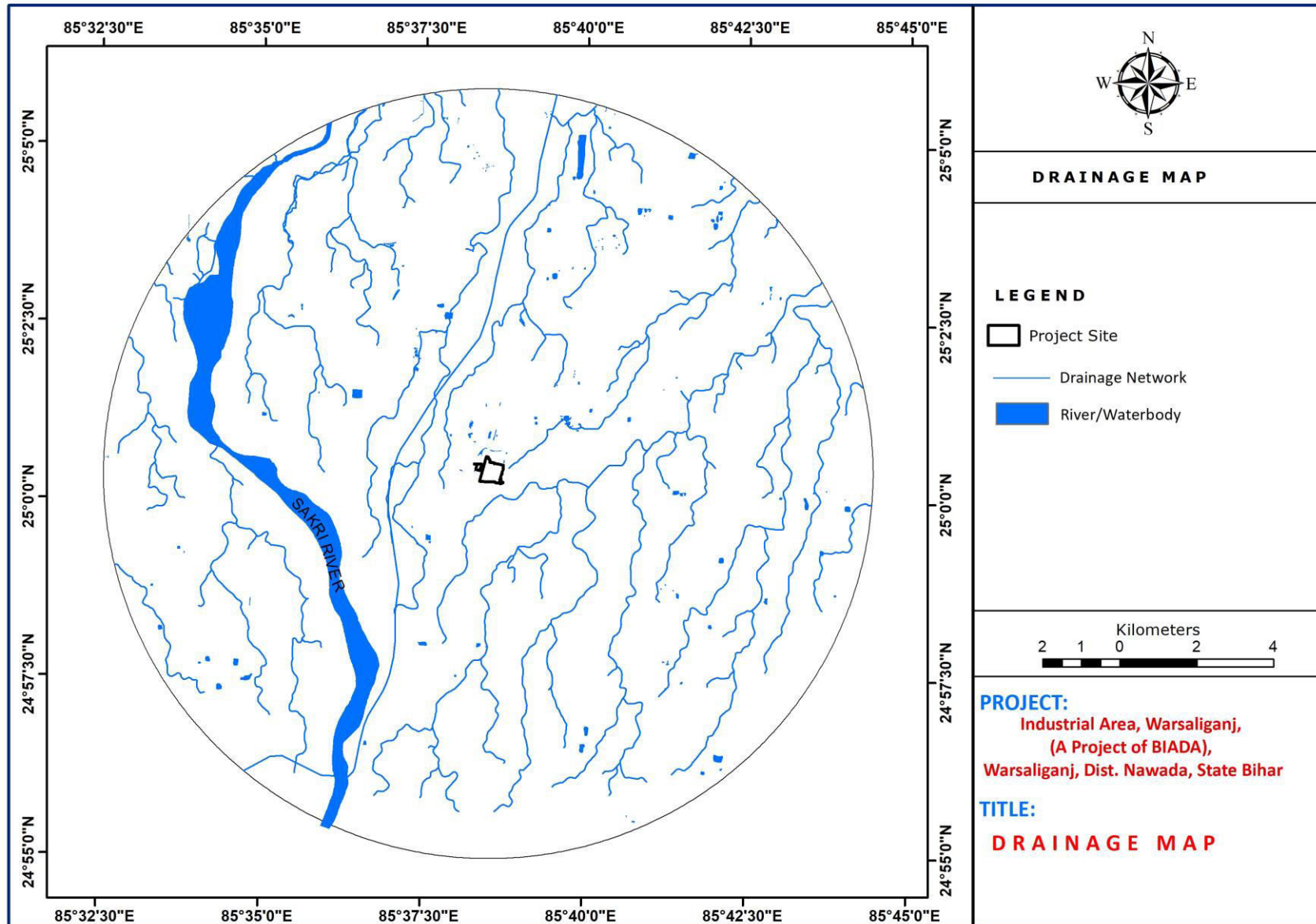
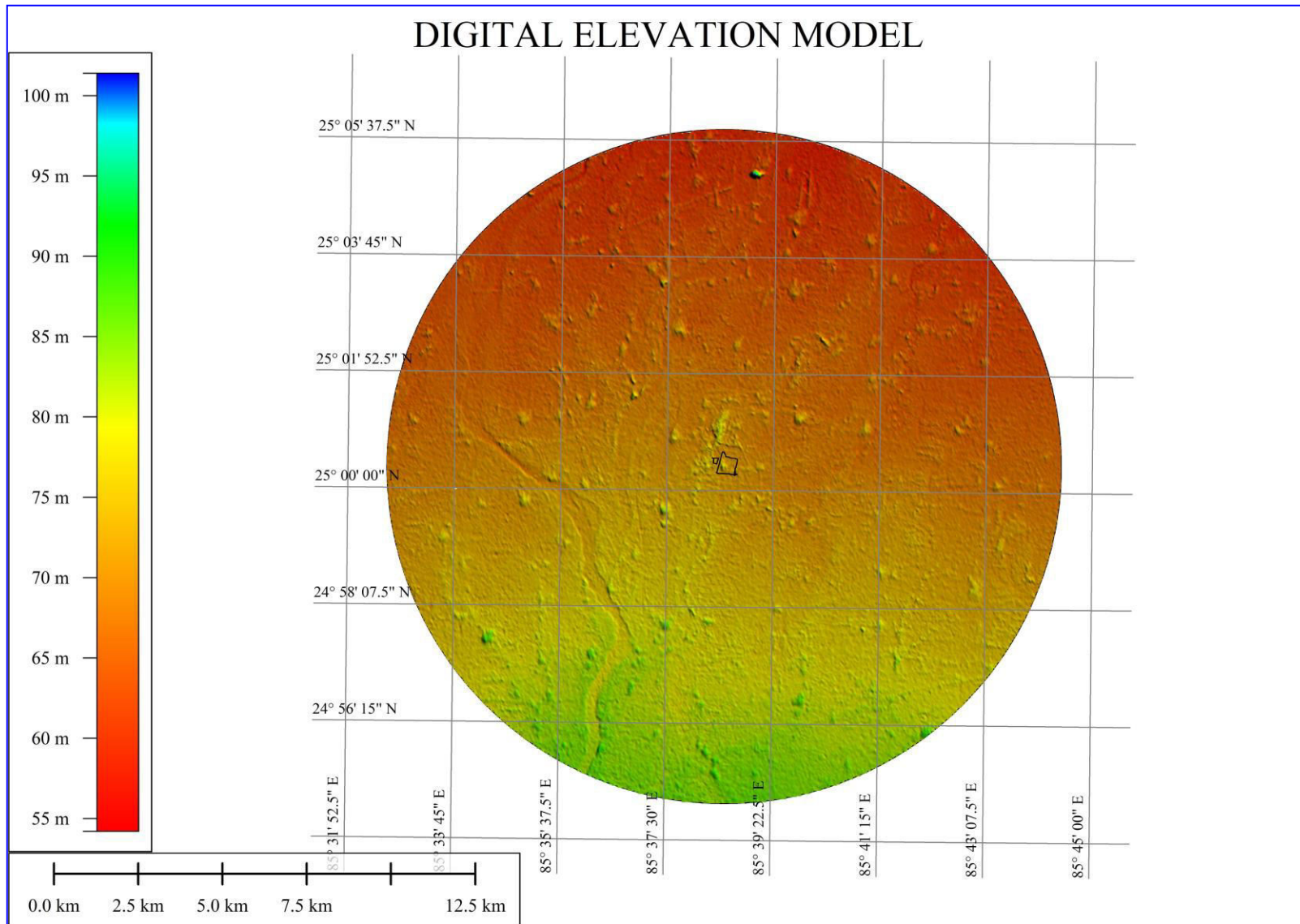


Fig. No. 3.4: DIGITAL ELEVATION MODEL OF THE STUDY AREA BASED ON SATELLITE IMAGERY



3.2.3 Soil

The entire district is occupied by alluvium. In this district there are in general four types of soils. They are grouped as sandy loam, clayey, a clay soil containing an admixture of sand called as Bangar and lastly the patches of Usar land containing the salt efflorescences that is called as reh in local languages while the sandy loam variety predominate in south of Burhi Gandak river. The bangar and clayey soils are found in the north. The Usar land is distributed in patches in the western part. As water logging is also present in some part of the district, the salinisation and alkalisation increases in the soil of the district.

Soil samples from 5 locations covering a radius of 10 km. were collected and analyzed. The study was designed to assess the existing soil quality around the proposed site. The soil sampling locations have been shown in the **Table 3.2** and **Figure 3.5**.

Table 3.2: *Soil Sampling Stations*

Sampling Location	Latitude	Longitude
1. Project Site	25° 0'20.02"N	85°38'34.27"E
2. Bazidpur (6 Km. E)	24°59'50.43"N	85°41'52.90"E
3. Katauna (6 Km. NW)	25° 2'51.87"N	85°35'51.20"E
4. Saur (6 Km. W)	24°59'55.23"N	85°35'6.16"E
5. Sikandra (7 Km. SW)	24°58'1.27"N	85°35'25.12"E

Composite sampling of soil up to root depth (15 cm) was carried out at each location. The value of important physical and chemical parameters has been given in **Table 3.3**.

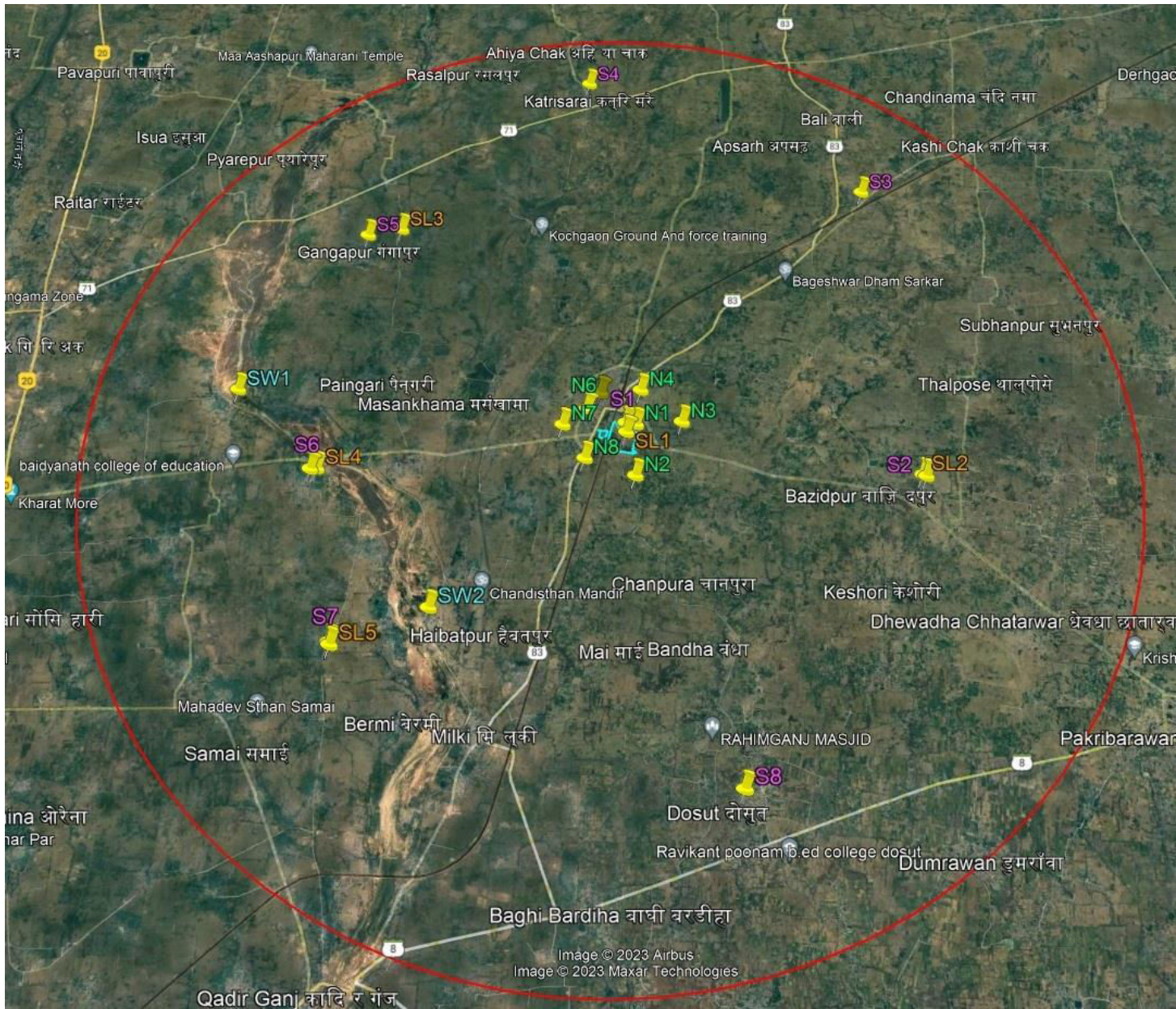


Fig. 3.5 Location of Soil Sampling Stations

Table 3.3

SOIL QUALITY RESULTS (Apr 2023)

Parameter	Unit	Sampling Location				
		Project Site	Bazidpur	Katauna	Saur	Sikandara
Soil Texture	-	Loam	Clay Loam	Loam	Sandy	Sandy loam
Particle Size Distribution						
Gravel	%	0.48	0.52	0.36	0.42	0.55
Sand	%	11.3	16.0	10.0	22.0	15.0
Silt	%	18.0	15.0	20.0	10.0	22.0
Clay	%	15.0	18.0	12.0	16.0	12.0
Conductivity	µmhos/cm.	260.0	264.0	240.0	248.0	256.0
Water Holding Capacity	%	36	64	58	44	72
Porosity	%	8	14	10	8	18
pH	--	7.52	7.88	7.46	7.32	7.57
Available Potassium as K₂O	Kg/Hec.	48.0	70.0	52.0	64.0	66.0
Available P as P₂O₅	Kg/Hec.	5.2	7.4	6.6	10.2	8.0
Available Nitrogen as N	Kg/Hec.	186.0	212.0	196.0	210.0	230.0
Organic Carbon	%	0.24	0.36	0.40	0.28	0.32

3.3 Water Environment

3.3.1 Surface Water Regime

The surface water resources within the study area primarily consist of Sakri Canal (2.25 Km. W) & River Sakri at a distance of 5.5 km. West from the Project Site. A few confined small water bodies viz., lake, ponds etc. also form the part of the surface water resources.

3.3.2 Ground Water Regime

The study area has a very good aquifer source. The entire command area falls on River Sakri command area. Ground water from Hand pumps, Open dug wells and Tube wells is abstracted for both irrigation purposes as well as for meeting various domestic needs. Drinking water requirement is principally met from borewells & Tube wells.

3.3.3 Water Quality

The objective of the baseline water quality program was to determine pre project water quality conditions and the nature and extent of present impacts. Eight ground water samples and two surface water samples were analyzed. Grab samples were collected during the month of Apr.'2023 and brought to the laboratory for testing and analysis. The analysis has been carried out according to the IS standards such as IS: 3025, APHA and IS 10500:2012. The sampling locations have been shown in Table 3.4 and Figure 3.6.

Table 3.4: *Water Sampling Stations*

Sampling Location	Latitude	Longitude
1. Project Site	25° 0'26.41"N	85°38'33.82"E
2. Bazidpur (6 Km. E)	24°59'49.43"N	85°41'55.38"E
3. Bojhwan (7 Km. NE)	25° 3'21.56"N	85°41'27.61"E
4. Katrisarai (8 Km. N)	25° 4'54.25"N	85°38'6.67"E
5. Katauna (6.5 Km. NW)	25° 2'47.35"N	85°35'27.31"E
6. Saur (6 Km. W)	24°59'54.90"N	85°35'1.78"E
7. Sikandra (7 Km. SW)	24°58'2.90"N	85°35'24.57"E
8. River Sakri (Murgiachak) 7.5 Km., W	25° 0'50.64"N	85°34'7.01"E
9. River Sakri (Sultanpur) 5.1 Km., SE	24°58'24.08"N	85°36'26.86"E

The findings of the analysis have been reported in **Table 3.4** and **Table 3.5**. Brief description of the findings of water analysis has been given below:

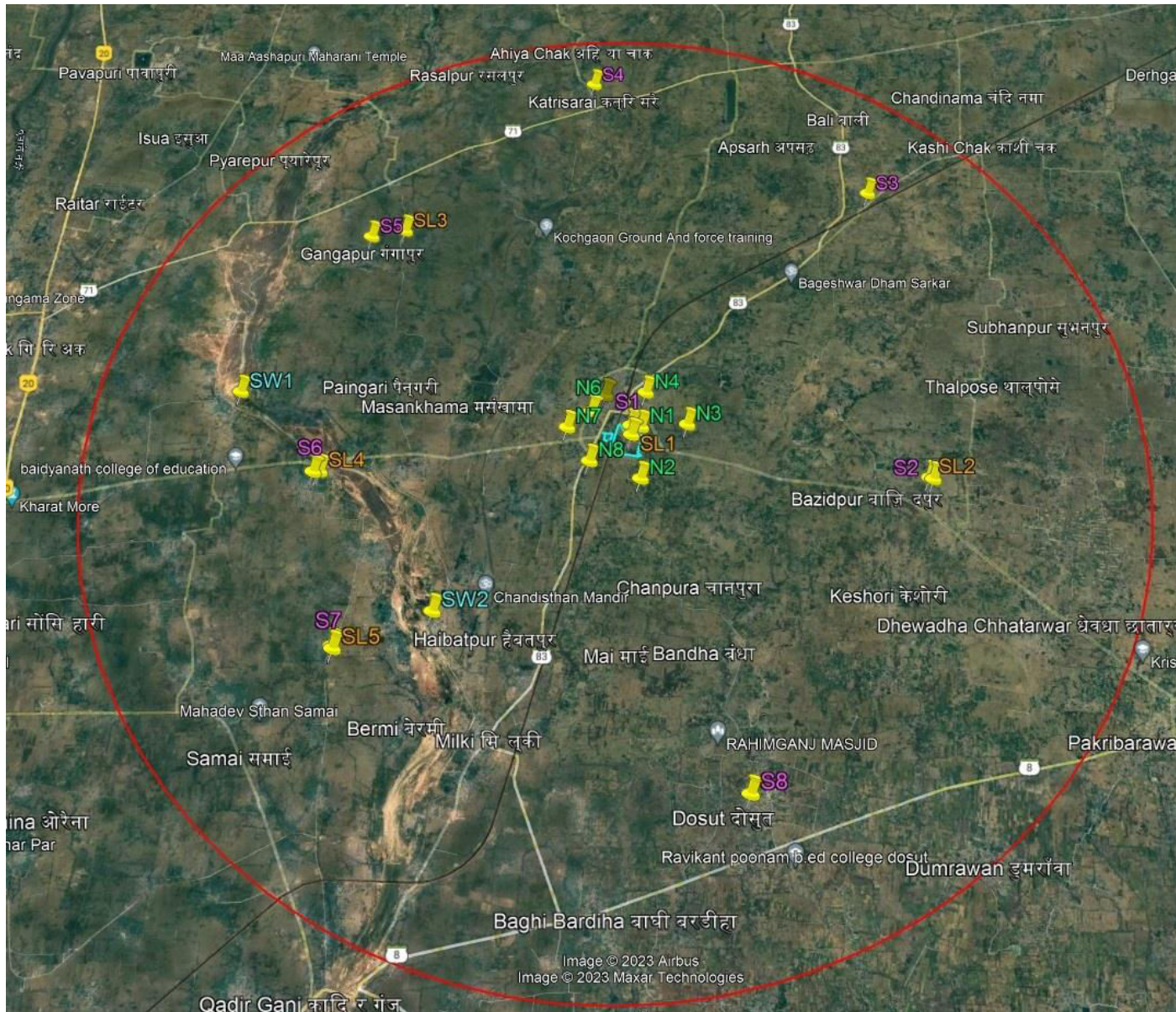


Fig. 3.6 Location of Water Sampling Stations

3.3.3.1 Ground Water Quality

All the water samples were bearing an agreeable taste. The colour of all the water samples was found to be <5 Hazen unit. Odour of all the water was unobjectionable.

The water samples were found to be free from contaminations due to Fluoride & Boron. The dissolved solids level in the water samples were found in the range of 246 - 383 mg/l., which is in the acceptable and permissible limits of IS 10500: 2012. The water sample from Vill. Katauna was having the minimum TDS while maximum dissolved solids were found at Bojhwan.

The chlorides were found to be in the range of 18 - 24 mg/l. The Sulphates were found in the range of 6.4 – 12.2. Total hardness values in the range of 156 - 208 mg/l. It is within the permissible limits of IS 10500:2012. Total Alkalinity values were in the range of 184 - 244 mg/l.

Values of Iron are in range of 0.38 – 0.82 mg/l. & values for Zinc are in range of 0.38 – 0.46 mg/l.

All other parameters have been found to be within the permissible limits prescribed under the IS : 10500 :2012 for drinking water.

The ground water quality report is shown in Table 3.5

3.3.3.2 Surface Water Quality

The surface water quality report is shown in Table 3.6. The surface water can be best used for Irrigation and other domestic purposes except drinking.

Table 3.5
Ground Water Characteristics of Study Area (Study Period : Mar - April-2023)

Parameter	Unit	Limit (Acceptable) as per IS 10500:2012	Project Site	Bazidpur	Bojhwan	Katrisarai	Katauna	Saur	Sikandara	Dosut
1. Colour	Hazen unit	5.0 hazen limit	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00
2. Odour	NS	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3. Taste	NS	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4. Turbidity	NTU	1.0	<1.0	1.12	< 1.0	1.18	<1.0	<1.0	1.34	1.0
5. pH	---	6.5 – 8.5	7.96	7.54	7.87	7.43	7.67	7.26	7.84	7.92
6. Total Dissolved Solids	mg/l.	500	295.0	344.0	383.0	254.0	246.0	264.0	288.0	304.0
7. Total hardness as CaCO ₃	mg/l.	200	170.0	196.0	208.0	180.0	156.0	176.0	192.0	176.0
8. Calcium as Ca	mg/l.	75	30.4	33.6	41.6	35.2	34.4	32.0	28.8	27.2
9. Magnesium as Mg	mg/l.	30	22.4	27.2	25.3	22.4	17.0	23.3	29.2	26.2
10. Total Alkalinity as CaCO ₃	mg/l.	200	218.0	224.0	244.0	212.0	184.0	220.0	226.0	196.0
11. Residual Free Chlorine	mg/l.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
12. Chloride as Cl	mg/l.	250	20.0	22.0	18.0	24.0	20.0	24.0	28.0	22.0
13. Sulphate as SO ₄	mg/l.	200	6.4	8.8	10.2	11.8	7.8	12.2	10.4	8.8
14. Fluoride as F	mg/l.	1	0.16	0.24	0.18	0.12	0.11	0.08	0.28	0.20
15. Nitrate as NO ₃	mg/l.	45.0	5.2	6.4	8.0	10.4	6.4	10.4	6.2	5.8
16. Boron as 'B'	mg/l.	2.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17. Iron as Fe	mg/l.	1	0.38	0.44	0.52	0.82	0.56	0.48	0.74	0.64
18. Copper as Cu	mg/l.	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
19. Zinc as Zn	mg/l.	5.00	0.40	0.44	0.42	0.46	0.43	0.38	0.41	0.44
20. Chromium as Cr	mg/l.	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Parameter	Unit	Limit (Acceptable) as per IS 10500:2012	Project Site	Bazidpur	Bojhwan	Katrisarai	Katauna	Saur	Sikandara	Dosut
21. Arsenic as As	mg/l.	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
22. Manganese as Mn	mg/l.	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
23. Mercury as Hg	mg/l.	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0701	<0.001
24. Cadmium as Cd	mg/l.	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
25. Selenium as Se	mg/l.	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26. Cyanide as CN	mg/l.	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27. Lead as Pb	mg/l.	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
28. Aluminium as Al	mg/l.	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
29. Anionic Detergent	mg/l.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
30. Mineral Oil	mg/l.	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
31. Phenolic Compound as C ₆ H ₅ OH	mg/l.	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32. Total Coliform	CFU/100 ml.	Shall not be detectable in 100 ml.	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
33. E.coli			Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Note: Sampling and Testing Protocol – IS 3025, APHA

Table 3.6

Surface Water Quality Results
(Study Period : Mar. '2023)

Parameter	Unit	River Sakri (Murgiachak)	River Sakri (Sultanpur)
1. pH	---	7.12	7.04
2. Electrical Conductivity	Mmhos./cm.	0.36	0.39
3. Dissolved Oxygen	mg/l.	5.8	5.2
4. Turbidity on NTU	---	4.8	5.4
5. Total Dissolved Solids	mg/l.	192.0	208.0
6. Total hardness as CaCO ₃	mg/l.	148.0	156.0
7. Calcium as Ca	mg/l.	32.8	34.4
8. Magnesium as Mg	mg/l.	16.0	17.0
9. Total Alkalinity as CaCO ₃	mg/l.	124.0	136.0
10. Chloride as Cl	mg/l.	18.0	22.0
11. Sulphate as SO ₄	mg/l.	14.8	16.2
12. Fluoride as F	mg/l.	0.38	0.42
13. Sodium as Na	mg/l.	32.4	35.8
14. Potassium as K	mg/l.	2.8	3.2
15. Boron as B	mg/l.	0.10	0.11
16. Total Phosphate as P	mg/l.	0.32	0.38
17. BOD	mg/l.	2.2	2.8
18. COD	mg/l.	16.0	24.0
19. Ammonical Nitrogen as N	mg/l.	1.1	1.7
20. Total Kjeldahl Nitrogen as N	mg/l.	2.8	3.4
21. Total Coliform (MPN value)	---	1600	2100

Note: Sampling and Testing Protocol – IS: 3025, APHA and IS: 1622

3.4 Biological Environment

The term biological environment would cover the prevalence of all living forms such as plants and animals both in terrestrial and aquatic in the study area. Living forms cover a very wide spectrum of species and even a small area may have thousands of species if all bacteria, protozoa, worms, insects, plants, animals and birds are to be included. In the present study, higher taxa (trees, small trees, shrubs, under shrubs, climbers and grasses) and fauna (mammals, birds and aquatic) are covered. River Sakri is flowing 5.5 km. away from IA Warsaliganj Project Site. The details of most common trees, shrubs and grass species found in the area are as under -

Table 3.7 : List of Flora Found in the Study Area

Family	Scientific Name	Local Name
1. ANACARDIACEAE	<i>Mangifera indica</i> Linn.	Aam
	<i>Spondias pinnata</i> (Linn.) Kurz.	Amra
2. BOMBACACEAE	<i>Salmalia malabarica</i> (D.C.) Scott & Endlicher.	Semal
3. CAPPARACEAE	<i>Cassia fistula</i> Linn.	Amaltas
	<i>Delonix regia</i> (Boj.) Raf.	Gulmohar
	<i>Saraca asoca</i> (Roxb.) de Wilde	Ashoka
	<i>Tamarindus indica</i> Linn.	Imli
4. CARICACEAE	<i>Carica papaya</i> Linn.	Papita
5. MELIACEAE	<i>Azadirachta indica</i> A. Juss.	Neem
	<i>Swietenia mahagoni</i> Jacq.	Mahagoni
6. MORACEAE	<i>Artocarpus heterophyllus</i> Lamk.	Kathal
	<i>Ficus bengalensis</i> Linn.	Bargad
	<i>Ficus religiosa</i> Linn.	Pipal
7. MORINGACEAE	<i>Moringa oleifera</i> Lamk.	Sahizan
8. MYRTACEAE	<i>Psidium guava</i> Linn.	Amrood
	<i>Syzygium cumini</i> (Linn.) Skeels.	Jamun
9. PUNICACEAE	<i>Punica granatum</i> Linn.	Anar
10. RUBIACEAE	<i>Anthocephalus chinensis</i> (Lamk.) A. Rich.	Kadam
	<i>Ixora coccinea</i> Linn.	Jungle flame
11. SAPINDACEAE	<i>Litchi chinensis</i> Sonner. Voy.	Litchi
12. VERBENACEAE	<i>Tectona grandis</i> Linn.	Sagvan
13. MUSACEAE	<i>Musa paradisiaca</i> Linn.	Kela
14. PALMAE	<i>Cocos nucifera</i> Linn.	Nariuyal
	<i>Phoenix dactylifera</i> Linn.	Khajur
	<i>Rostonia regia</i> Linn.	Bottle palm

Table 3.8 : List of Terrestrial Fauna Found in the Study Area

Sr. No.	Scientific Name	Common Name
1.	<i>Funambulus pennant</i>	Squirrel
2.	<i>Calotes versicolor</i>	Garden lizard
3.	<i>Hemidactylus frenatus</i>	House gecko
4.	<i>Duttaphrynus melanostictus</i>	Toad frog
5.	<i>Bos Taurus</i>	Cow
6.	<i>Canis Familiaris</i>	Dog
7.	<i>Bubalus Bubalis</i>	Buffalo
8.	<i>Felis Catus</i>	Cat
9.	<i>Rattus Rattus</i>	Black Rat
10.	<i>Herpestidae</i>	Mongoose
11.	<i>Capra hircus</i>	Goat
12.	<i>Apis Mellifera</i>	Honey Bee
13.	<i>Tribolium castaneum</i>	Red flour beetle
14.	<i>Musca domestica</i>	House Fly
15.	<i>Culicidae</i>	Mosquito
16.	<i>Blaberus discoidalis</i>	Indian Leaf Cockroach
17.	<i>Cryptotermes brevis</i>	Indian drywood Termite
18.	<i>Danaus chrysippus</i>	Butterfly
19.	<i>Lasius niger</i>	Black Garden Ant
20.	<i>Pheidologeton diversus</i>	East Indian harvesting ant

Table 3.9 : List of Avi-Fauna Found in the Study Area

Scientific Name	Common Name
1. <i>Acridotheres tristis</i>	Common myna
2. <i>Apus affinis</i>	House swift
3. <i>Athena brama</i>	Ullu
4. <i>Centropus sinensis</i>	Mahoka
5. <i>Columba livia</i>	Rock Pigeon

6. <i>Coracias benghalensis</i>	Neelkanth
7. <i>Corvus macrorhynchos</i>	Jungle crow
8. <i>Corvus splendens</i>	House crow
9. <i>Dicrurus macrocercus</i>	Black drongo
10. <i>Milvus migrans</i>	Pariah kite
11. <i>Passer domesticus</i>	House sparrow
12. <i>Picoides nanus</i>	Katkhoddi
13. <i>Psittacula kramera</i>	Tota
14. <i>Pycnonotus cafer</i>	Bulbul
15. <i>Streptopelia chinensis</i>	Spotted dove
16. <i>Turdoides striatus</i>	Kachbachiya
17. <i>Upupa epops</i>	Hudhud
18. <i>Eudynamys scolopacea</i>	Koyal

3.4.1 Natural Fauna

The study area does not host any natural wild life because there is no forest area in the study area. There is no zoo, wildlife sanctuary, national parks or any bird sanctuary in the study area within 10 km. radius of the project. No avifaunal species was found under IUCN Threat Category. There was no endemic aquatic species recorded during study.

3.5 Climatology and Meteorology

Meteorological parameters play a vital role in dispersion of the pollutants, once it is discharged in to the atmosphere. The micro-meteorological data monitoring was carried out at a centralized location of the study area. The meteorological data were collected continuously for 24-hours during the entire study period during Mar-May 2023. All the parameters such as: wind speed, wind direction, ambient temperature and relative humidity have been recorded on hourly basis.

The objective of installation of the continuous weather station was to record the prevailing site specific micro-meteorological conditions with respect to wind direction and speed in the impact zone. The instrument used for the data recording was automatic weather station, an indigenously built wind monitoring unit by M/s

Virtual Electronics Company, which not only records the data on hourly basis but also exhibit wind rose plotted on the basis of the observations recorded. The data were compared with the IMD Data (Source : IMD Report Series No. 18, Climate of Bihar)

3.5.1 IMD Data

The climate of this district is characterized by mild cold winter, hot dry summer, hot and humid monsoon season. The year may be divided into four seasons. The cold season starts from late November and lasts till end of February. March to first the week of June is the summer or hot weather season. The period from second week of June to about the first week of October constitutes the southwest monsoon season. The succeeding period lasting till late November is the post monsoon or transitional period from monsoon to the winter season.

RAINFALL

Records of rainfall in the district are available for 10 raingauge stations for the period ranging from 18 to 47 years. The details of rainfall at these stations and for the district as a whole are given in Tables 1 and 2. The average annual rainfall in the district is 1004.3 mm. The rainfall is largely confined to the southwest monsoon season when 86% of the annual normal rainfall is received. July is the rainiest month with an average rainfall of 277.4 mm. The variation in the annual rainfall from year to year is not large. In the fifty year period 1951 to 2000, the highest annual rainfall was in 1961 when it amounted to 166% of the normal. 1966 was the year with the lowest rainfall amounting to 60 % of the normal. In this fifty year period there were 6 years when the rainfall was less than 80 % of the normal, out of which two were consecutive. It is seen from Table 2 that the annual rainfall was between 801 mm and 1300 mm in 35 years out of 46.

On an average there are 48 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. This number varies from 44 at Pakribarwan to 51 at Hisuaa and Kowakol.

The heaviest rainfall recorded in 24 hours at any station in the district was 450.0 mm at Rajauli on 04 July 1981.

TEMPERATURE

There is no meteorological observatory in the district at Nawada. The temperature and other meteorological condition as indicated by the data at Gaya and Jamui observatories in the neighbouring districts may be taken as representative of the climatic conditions in the district in general. The summer season starts from March with steady rise in day temperature and lasts till first week of June. May is generally the hottest month with the mean maximum temperature at about 40°C and the mean minimum temperature at about 26°C. The day temperature may go above 45°C on individual days before the onset of the monsoon. The scorching northwesterly winds which blow during the hot summer season are quite uncomfortable. There is fall in day temperature from second week of June with the onset of monsoon, but night temperatures continue to remain high making the weather uncomfortable. The day and night temperatures fall rapidly from about the middle of November. January is generally the coldest month with the mean maximum temperature at about 24°C and the mean minimum temperature at about 10°C. In association with passage of western disturbances, cold wave conditions hit the district and minimum temperature drops down to about 2°C during this period.

HUMIDITY

The relative humidity remains generally high about 75% during the southwest monsoon season and in the morning of post monsoon and winter season. The driest part of the year is the summer season when humidity remains between 25% to 30% especially in the afternoon. The relative humidity remains between 45% to 65% in the afternoon during rest of the year.

CLOUDINESS

The sky is generally heavily clouded or overcast during the monsoon period. Thereafter the cloudiness decreases and sky remains generally clear or lightly clouded during winter and summer months. During the passage of western disturbances across the state during winter season, the sky remains covered with clouds.

WINDS

Winds are generally light to moderate in the post monsoon and winter season with some strengthening in force during the summer and monsoon season. During the post monsoon and winter season winds are generally calm or blow from south/southwest direction in the morning and in the afternoon winds are generally northwesterly. In the summer season

winds are mostly southwesterly in the morning and northwesterly in the afternoon. Easterly winds appear from late summer season and remain predominant during the southwest monsoon season.

SPECIAL WEATHER PHENOMENA

Storms and depressions originating in the Bay of Bengal in pre-monsoon and monsoon season move in northwesterly to northerly direction after crossing the coast and affect the district and its neighbourhood causing heavy thunderstorms and rainfall accompanied with squalls at times. Thunderstorms occur throughout the year, however their frequency are more during monsoon period. Dust storms accompanied with squall affect the district during summer and early part of monsoon season occasionally. Fog affects the district occasionally during winter season in association with passage of western disturbance across the state.

3.5.2 Site Specific Data

Site Specific data has been collected within the IA Warsaliganj Project Site in order to measure the following parameters: - ambient temperature, wind speed and direction. The aforesaid meteorological parameters were being observed in the field over a period of about 3-months starting from Mar-May 2023. The meteorological data recorded at site is given in **Table 3.10**.

Table 3.10: *Meteorological Data*

Month	Temperature, °C			Wind Speed, m/sec.			Humidity %		
	Min ^m .	Max ^m .	Mean	Min ^m .	Max ^m .	Mean	Min ^m .	Max ^m .	Mean
Mar.'2023	18.1	37.6	28.1	0.54	2.7	1.9	21	68	46.2
Apr.'2023	20.8	44.3	33.2	0.32	3.6	2.1	18	58	40.2
May'2023	21.6	42.8	32.8	0.48	5.4	3.2	20	62	38.4

3.5.2.1 Temperature

The daily average temperature was recorded to be in the range of 18.1 – 44.3 °C during the study period. The maximum reading was found to be 44.3 °C during Apr.'23 and the minimum was found to be 18.1 °C during Mar.'23. The average value of temperature was computed to be 31.36 °C.

3.5.2.2 Relative Humidity

During the study the average relative humidity was found to be in the range of 18 – 68%. The minimum values was found during Apr.'23 and maximum value was found during Mar.'2023. The average value of Relative Humidity was computed to be 41.6%.

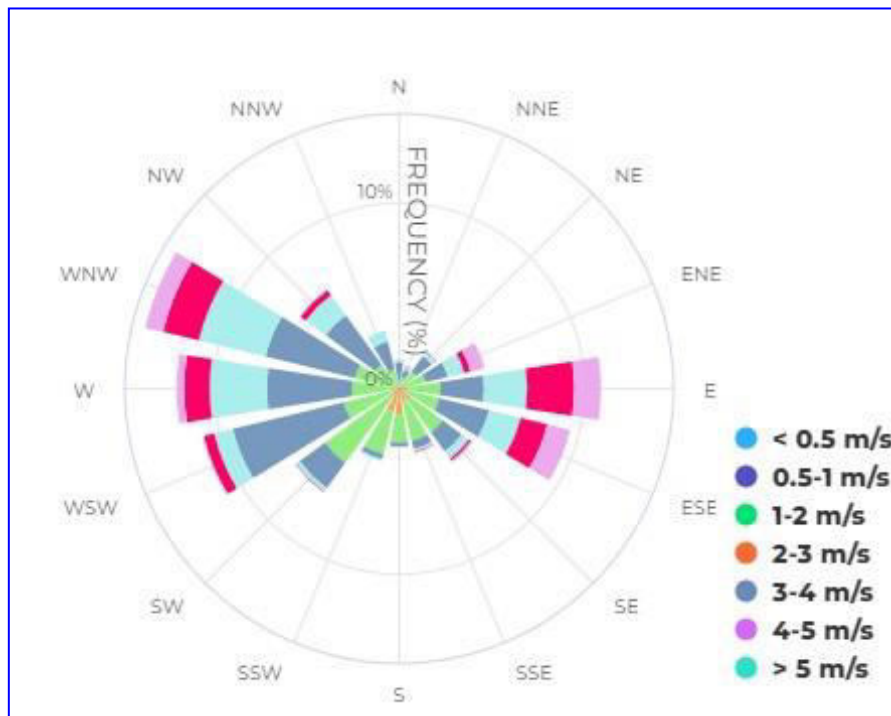
3.5.2.3 Rainfall

During the study period no rainfall was observed.

3.5.2.4 Wind Direction and Speed

The wind is predominantly blowing from WNW to SE. The wind speeds are of the range of 0.32 – 5.4 m/sec. and the calm condition is 5.2 %. The periodic wind rose diagrams have been provided in Figure 3.7

Fig. 3.7 : Windrose Diagram



3.6 Ambient Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed project on air quality conditions. Ambient background measurements were done during the period

Mar.– May.'2023 at 5 locations spread over, in the 10 km radius centering the proposed unit. The locations have been shown in Figure 3.8 and also outlined in Table 3.11.

Table 3.11: Ambient Air Quality Monitoring Stations

Sampling Location	Latitude	Longitude
1. Project Site	25° 0'26.41"N	85°38'33.82"E
2. Bazidpur (6 Km. E)	24°59'49.43"N	85°41'55.38"E
3. Bojhwan (7 Km. NE)	25° 3'21.56"N	85°41'27.61"E
4. Katrisarai (8 Km. N)	25° 4'54.25"N	85°38'6.67"E
5. Katauna (6.5 Km. NW)	25° 2'47.35"N	85°35'27.31"E
6. Saur (6 Km. W)	24°59'54.90"N	85°35'1.78"E
7. Sikandra (7 Km. SW)	24°58'2.90"N	85°35'24.57"E
8. Dosut (7 Km. SE)	24°56'36.22"N	85°39'46.22"E

The air quality assessment involved the determination of ambient levels of Respirable Particulates, PM₁₀ (<10µm), PM_{2.5}, Sulphur dioxide gas, oxides of Nitrogen gas & Carbon Monoxide.

Ambient air samples were collected by Respirable Dust Samplers (RDS) fitted with Low Volume Sampling (LVS) attachments for gaseous sampling. Composite samples were collected on 24-hourly basis and brought to the laboratory for analysis. Sample collection and analysis have been strictly carried out according to the Bureau of Indian Standards guidelines; IS: 5182 series.

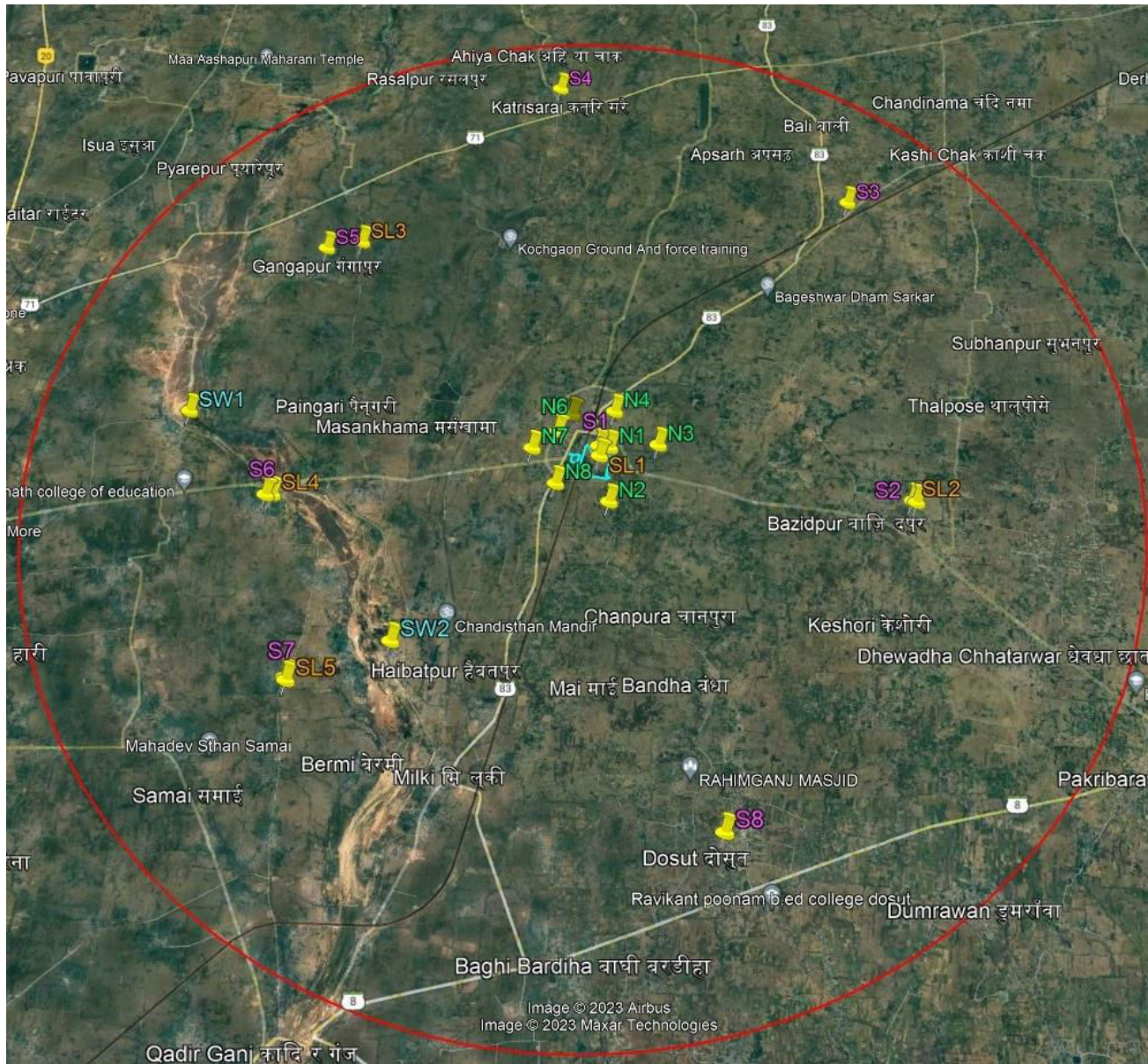


Fig. 3.8 Location of Ambient Air Monitoring Stations

3.6.1 Methods of Monitoring

Sampling and analysis of Ambient Air samples were carried out with reference to the Standards developed by Bureau of Indian Standards IS: 5182 series. Brief methods of monitoring have been outlined in Table 3.12.

Table 3.12: Ambient Air Quality Monitoring Methodology

Ambient Air Quality Monitoring Methodology

Parameters	Methodology
PM ₁₀	Gravimetric method by use of Respirable Dust Sampler as per IS: 5182 (Part – 23), 2006
PM _{2.5}	Gravimetric method by use of Fine Particulate Sampler as per CPCB Guidelines & USEPA, 2006
SO ₂	Chemical analysis by absorption of gases in <i>Sodium Tetra-Chloro Mercurate</i> followed by colorimetric estimation using p-Rosaniline hydrochloride and Formaldehyde as per IS: 5182 (Part – 2), 1969
NO ₂	Chemical analysis by absorption of gases in dilute sodium hydroxide and then estimated colorimetrically with <i>sulphanilamide</i> and <i>N (1-Nephthyle) Ethylene diamine Dihydrochloride</i> and <i>Hydrogen Peroxide</i> as per IS: 5182 (Part – 6), 1975

3.6.1.1 Particulate Matter

A. PM₁₀

Air is drawn through a size-selective inlet and through a 20.3 X 25.4 cm (8 X 10 in) filter at a flow rate, which is typically 1.13 m³/min. Particles with aerodynamic diameter less than the cut-point of the inlet are collected, by the filter. The mass of these particles is determined by the difference in filter weights prior to and after sampling. The concentration of PM10 in the designated size range is calculated by dividing the weight gain of the filter by the volume of air sampled.

B. PM_{2.5}

Air is drawn through a size-selective inlet and through a specially designed WINS (Well Impact Ninty-Six) impactor at a flow rate, which is typically 1.0 m³/hr. Particles with aerodynamic diameter less than 10 micro grams but greater than 2.5 microns are trapped in WINS Impactor and particles having size less than 2.5 microns bounce and collected at 46 mm Teflon filter paper at the base. The mass of these particles is determined by the difference in filter weights prior to and after sampling. The concentration of PM2.5 in the designated size range is calculated by dividing the weight gain of the filter by the volume of air sampled.

3.6.1.2 Sulphur Dioxide

Sulphur dioxide gas in ambient air was monitored in accordance to IS: 5182 Part – II. The gas was bubbled in *sodium tetra-chloromercurate* solution at the rate of about 1.0 lpm till 24 hours. The sample was taken to the laboratory and analyzed colorimetrically by addition of *p-Rosaniline hydrochloride* and *Formaldehyde* solution.

3.6.1.3 Nitrogen Dioxides

Nitrogen dioxides in the ambient air were monitored in accordance to IS 5182 Part – VI. The air sample was bubbled to dissolve in dilute sodium hydroxide solution at the rate of 1.0 lpm for about 24 hours. Then the sample was taken to the laboratory and estimated colorimetrically with addition of *sulphanilamide, N (1-Nephthyle) Ethylene diamine Dihydrochloride* and *Hydrogen Peroxide*.

3.6.2 Results and Discussions

The summary of the monitoring results have been presented in Table 3.13 and the detail monitoring results are enclosed at Annexure I.

Table 3.13: *Summary of Ambient Air Quality Monitoring Results*
(Study Period : Mar—May 2023)

Stn. No.	Location Name	24-hourly average concentration ($\mu\text{g}/\text{m}^3$)									
		PM ₁₀		PM _{2.5}		SO ₂		NO ₂		CO (mg/m^3)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
S1	Project Site	34.4	54.4	21.3	35.5	6.0	13.9	10.7	24.7	0.10	0.27
S2	Bazidpur	43.5	59.0	27.8	36.5	6.4	10.2	12.7	31.1	0.11	0.44
S3	Bojhwan	39.5	53.7	23.7	31.8	5.2	9.5	11.4	28.9	0.05	0.23
S4	Katrisarai	42.4	58.2	25.1	34.9	8.4	14.0	14.5	25.6	0.08	0.36
S5	Katauna	41.9	59.7	24.9	34.9	6.9	16.9	12.4	23.7	0.06	0.19
S6	Saur	36.5	65.5	21.0	35.4	6.0	10.9	13.4	32.2	0.07	0.35
S7	Sikandra	37.1	61.2	22.3	35.8	5.6	13.0	11.3	30.4	0.08	0.46
S8	Dosut	43.0	54.7	25.8	35.4	6.1	14.9	12.6	28.0	0.08	0.40

3.6.2.1 Particulate Matters

(i) Respirable Suspended Particulate Matters (PM₁₀)

The maximum 24 hourly concentration of PM₁₀ was found to be 65.5 µg/m³ at Saur while the minimum concentration was recorded to be 34.4 µg/m³ at Project Site. The 98 percentile values were found in the range of 53.0 – 63.1 µg/m³.

The average 49.0 µg/m³ concentration of PM₁₀ in the study area is found to be within the prescribed norms of National Ambient Air Quality Standards of 100 µg/m³ for Industrial and Residential, Rural and Other areas respectively.

(ii) Fine Particulate Matters (PM_{2.5})

The maximum 24 hourly concentration of PM_{2.5} was found to be 36.5 µg/m³ at Bazidpur while the minimum concentration was recorded to be 21.0 µg/m³ at Saur. The 98 percentile values were found in the range of 31.5 – 36.3 µg/m³.

The average 29.5 µg/m³ concentration of PM_{2.5} in the study area is found to be within the prescribed norms of National Ambient Air Quality Standards of 60 µg/m³ for Industrial and Residential, Rural and Other areas respectively.

3.6.2.2 Sulphur Dioxide (SO₂)

The 24 hour maximum concentration of SO₂ was found to be 16.9 µg/m³ at Katauna while the minimum concentration was recorded to be 5.2 µg/m³ at Bhojwan. The 98 percentile values were found in the range of 9.4 – 16.9 µg/m³.

Thus, all the values have been found to be below the prescribed norms of 80 µg/m³ for Residential, Rural and Other areas.

3.6.2.3 Nitrogen Dioxide (NO₂)

The maximum concentration of NO₂ was found to be 32.2 µg/m³ at Saur, while the minimum concentration was recorded to be 10.7 µg/m³ at Project Site. The 98 percentile values were found in the range of 23.4 – 31.4 µg/m³.

Thus, all the values have been found to be below the prescribed norms of 80 µg/m³ for Residential, Rural and Other areas.

3.6.2.4 Carbon Monoxide (CO)

The maximum concentration of CO was found to be 0.46 mg/m³ at Sikandara, while the minimum concentration was recorded to be 0.05 mg/m³ at Bhojwan. The 98 percentile values were found in the range of 0.19 – 0.44 mg/m³.

Thus, all the values have been found to be far below the prescribed norms prescribed in the National Ambient Air Quality Standards of 4 mg/m³ for Industrial, Residential, Rural and Other areas.

3.7 Noise

Noise level readings were recorded in five locations spread over in study area centering the proposed unit. The monitoring locations have been shown in Figure 3.8 and outlined in Table 3.14.

Table 3.14: Noise Monitoring Stations

Monitoring Location	Latitude	Longitude
1. Project Site	25° 0'25.49"N	85°38'40.88"E
2. Mosima, (1 Km., SE)	24°59'50.02"N	85°38'40.35"E
3. Khanpur, (1Km., E)	25° 0'27.18"N	85°39'12.24"E
4. Patel Nagar, (0.8 Km., N)	25° 0'49.72"N	85°38'44.29"E
5. Krishnapur Road, (0.8 Km., NNW)	25° 0'47.77"N	85°38'16.67"E
6. Jawahar Park, (0.8 Km., NW)	25° 0'36.52"N	85°38'7.29"E
7. Near Chandani Chowk, (1.2 Km., W)	25° 0'25.25"N	85°37'50.92"E
8. Near PWD Office Warsaliganj, (1 Km. SW)	25° 0'1.88"N	85°38'6.15"E

Noise levels were recorded by the use of a digital noise level meter. The instrument was calibrated before and after each set of readings.

4

The monitoring was carried out on 24-hourly basis and the hourly L_{eq} values were derived and reported.

The maximum daytime L_{eq} was found at Krishnapur Road i.e 65.2 dB(A) and maximum nighttime L_{eq} was also found at Krishnapur Road i.e. 47.0 dB(A). The maximum values may be attributed towards the heavy traffic movement. The

minimum value for daytime and night time was found at Project Site 45.8 dB(A) and 35.0 dB(A) respectively. The monitoring data have been presented in Table 3.15.

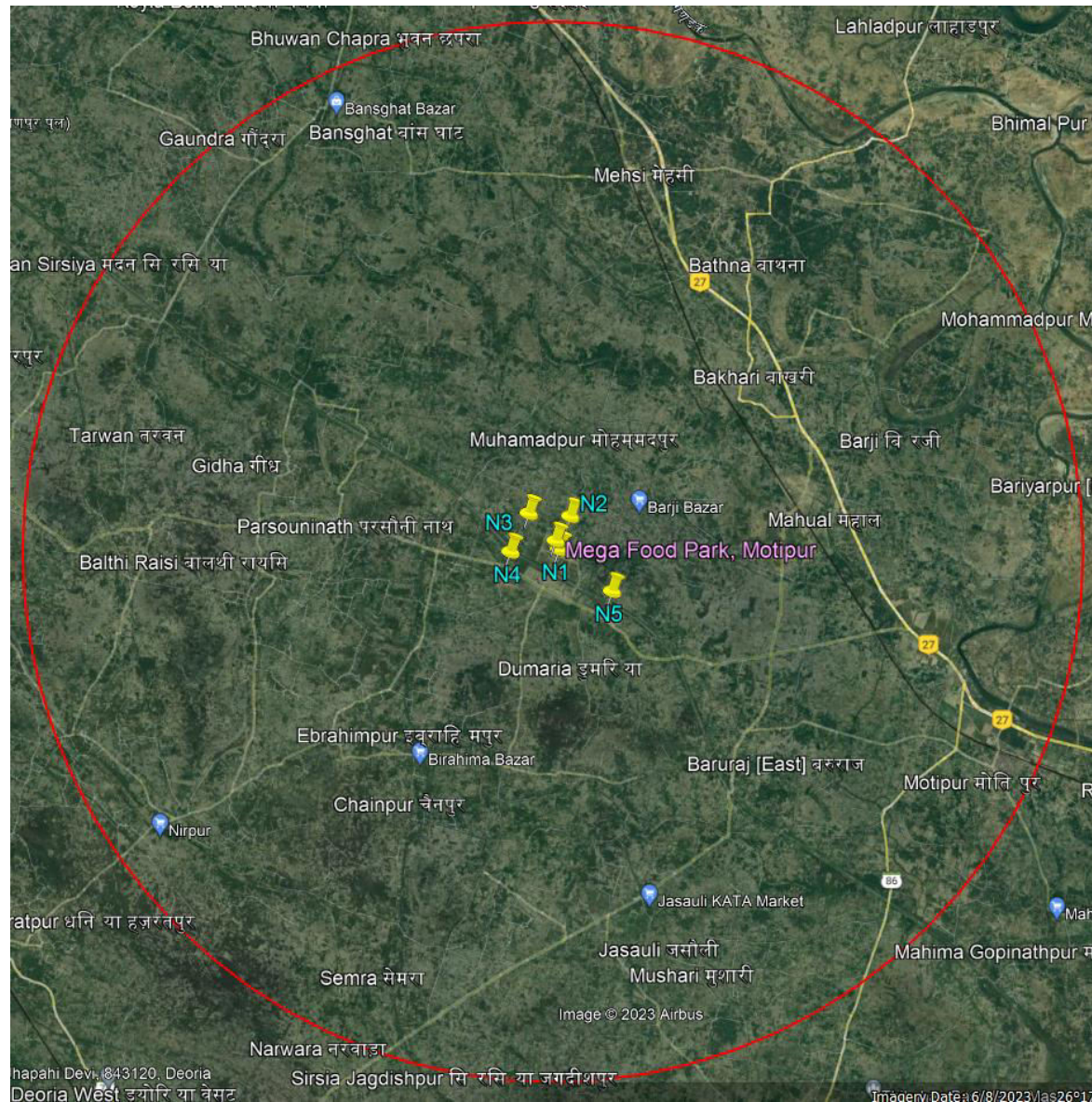


Fig. 3.9 Location of Noise Monitoring Stations

Table 3.15
Noise Level Monitoring Data [dB(A)]

Hours		Project site	Mosima	Khanpur	Patel Nagar	Krishnapur Road	Jawahar Park	Near Chandani Chowk	Near PWD Office
Daytime	7:00	39.4	50.8	48.8	45.0	53.2	45.3	46.8	44.6
	8:00	40.2	52.4	55.6	49.1	62.7	47.8	54.6	51.5
	9:00	41.7	55.8	45.9	51.0	66.4	49.8	51.5	51.8
	10:00	43.2	57.3	44.4	54.4	70.4	53.9	55.7	52.6
	11:00	41.8	62.1	52.6	57.6	74.2	55.8	57.6	53.3
	12:00	42.7	65.4	43.7	50.8	75.3	52.5	54.1	55.6
	13:00	45.5	60.1	46.9	59.0	75.4	58.8	60.7	53.6
	14:00	54.3	66.3	58.8	57.5	76.6	53.0	54.7	54.5
	15:00	57.5	64.1	44.3	55.6	72.4	49.1	50.7	56.8
	16:00	59.0	63.0	43.6	54.3	68.5	55.0	56.7	55.0
	17:00	52.4	60.9	56.6	51.6	66.2	51.2	52.8	57.5
	18:00	46.9	56.3	54.8	50.6	61.2	49.4	51.0	53.0
	19:00	44.4	52.1	41.7	47.2	54.1	48.0	49.5	51.1
	20:00	42.3	51.0	40.9	46.4	51.4	46.7	48.2	45.3
21:00	36.0	48.4	41.2	45.2	49.8	44.5	46.0	40.6	
Nighttime	22:00	34.9	46.6	37.1	40.3	48.6	40.1	39.6	40.2
	23:00	33.8	45.3	35.3	39.1	47.2	36.4	44.5	42.2
	0:00	32.3	41.2	36.0	37.1	45.8	42.2	36.8	37.7
	1:00	34.6	44.8	36.6	36.5	44.3	34.4	35.5	34.7
	2:00	32.8	42.7	38.8	38.8	46.2	37.2	38.4	34.1
	3:00	35.9	41.9	34.3	35.6	42.8	34.1	35.2	31.1
	4:00	37.0	43.2	32.5	36.0	45.9	36.2	37.3	36.2
	5:00	36.1	45.4	34.5	38.9	50.6	35.3	36.4	38.2
6:00	37.4	48.6	35.9	40.5	51.8	36.0	37.1	38.9	
L_d		45.8	57.7	48.0	51.7	65.2	50.7	52.7	51.8
L_n		35.0	44.4	35.7	38.1	47.0	36.9	37.9	37.0
Permissible L_d		55	65	65	55	65	55	65	55
Permissible L_n		45	55	55	45	55	45	55	45

3.8 Demography & Socio Economic Profile

Socio-economic study of an area enables to assess the socio-economic conditions and living standards of that area and it also helps in predicting the impact on the future of the economic conditions of the study area, due to progressive growth of industrialization. The socio-economy of the study area is influenced by commercial and industrial activities in the surrounding. Growth of socio-economic condition of the area has been identified in the last decade.

3.8.1 Methodology

Data have been collected on demographic pattern, literacy rate, livelihood, prevailing infrastructure and education facilities etc of the Warsaliganj Block. The prime source of such data collection was the Census Data, 2011.

3.8.2 Population

According to 2011 census of India, Warsaliganj population is 153,067 people are living in this Block, of which 79,533 are male and 73,534 are female. Warsaliganj population estimated to be 195,926 in 2022. Literate people are 74,342 out of 45,467 are male and 28,875 are female. Total workers are 59,646 depends on multi skills out of which 38,942 are men and 20,704 are women. Total 13,720 Cultivators are depended on agriculture farming out of 10,921 are cultivated by men and 2,799 are women. 17,402 people works in agricultural land as a labour in Warsaliganj, men are 11,905 and 5,497 are women.

The prevailing sex ratio in the study area is 921 females per 1000 males.

3.8.3 Literacy

The average literacy rate in Warsaliganj Block is 69.7 %. Male literacy is around 77.43% while female literacy is 61.12%.

3.8.4 Livelihood

Agriculture is the one of the main sources of income in the study area. About 23.05 % of the total population are cultivators. 54.58 % of the total population has been found to be working as agricultural labourers. 3.87 % are household industrial workers and about 18 % of the total population has been in to other occupations.

3.8.5 Infrastructure

The entire study region has been very well connected with roads to the main town and district head quarter. The entire study area has been very well connected to the district head quarter and block. Most of the villages have access to telephone systems. Almost all the villages have been provided with facilities of mobile telephones. Post offices are available in almost all the villages of the study area.

3.8.6 Drinking Water

The entire study area has access to drinking water facilities. Hand pumps, tube wells, dug wells are commonly used for drinking water. The drinking water quality has been found to be satisfactory in the study area.

3.8.7 Power Supply

As far as conditions of power supply are concerned, it is fairly satisfactory. Many villages have power supply for domestic as well as agricultural purposes in Warsaliganj block. However, some villages also have power connections for operating mechanism such as tube wells, thresher machines and saw cutting machines etc.

3.8.8 Education Facilities

A reasonably good educational facility exists in the study area. About 99.06 % of the villages are served with educational amenities, even though it is confirmed that there are 16 nos. of pre-primary schools, 110 Nos. primary school, 56 nos. Middle Schools, 10 nos. Secondary School, 3 nos. Senior Secondary School & 3 nos. Degree Colleges are present in Warsaliganj Block.

3.8.9 Medical Facilities

Medical amenities are available in 78.18% villages of the study area. Rest of the villages has such facilities available within a distance of about 2 – 5 km.



Table No. 3.16 : *Demographic Status of Warsaliganj Block*

Name of Village	No. of Household	Total Population	Total Male Population	Total Female Population	Schedule Caste Population	Schedule Caste Male Population	Schedule Caste Female Population	Schedule Tribe Population	Schedule Tribe Male Population	Schedule Tribe Female Population
Kumbhi	477	2988	1544	1444	794	389	405	1	1	0
Mohiuddinpur	144	1024	536	488	452	239	213	1	1	0
Haibatpur	258	1816	933	883	907	460	447	3	2	1
Sawaiya	82	578	299	279	137	66	71	0	0	0
Hemda	215	1262	626	636	208	105	103	0	0	0
Pachwara	130	672	364	308	335	194	141	1	1	0
Rajapur	91	654	329	325	101	51	50	0	0	0
Saur	504	3103	1566	1537	425	218	207	4	2	2
Daulatpur	242	1239	652	587	403	212	191	2	0	2
Milki	80	346	180	166	304	159	145	6	0	6
Murgia Chak	172	1198	669	529	200	115	85	0	0	0
Barrawan	950	6333	3247	3086	1799	906	893	10	4	6
Paingari	687	4281	2244	2037	783	413	370	7	3	4
Dariapur	649	4230	2183	2047	720	363	357	4	2	2
Chandipur	198	1233	640	593	339	185	154	0	0	0
Sultanpur	195	1423	735	688	562	284	278	10	6	4
Manjaur	655	4000	2071	1929	963	488	475	7	4	3
Makanpur	1021	6082	3188	2894	901	458	443	1	1	0
Shekhpurwa	52	311	161	150	301	156	145	0	0	0
Baso chak	186	1087	562	525	265	142	123	1	0	1
Rampur	34	195	103	92	193	102	91	0	0	0
Kutri	842	5445	2800	2645	1327	661	666	0	0	0
Naromurar	290	2035	1047	988	122	59	63	0	0	0
Khirbhojana	51	324	176	148	0	0	0	0	0	0

*"EIA/EMP Studies for Industrial Area, at Warsaliganj, Block Warsaliganj, Dist. Nawada,
State Bihar, of Bihar Industrial Area Development Authority (BIADA)"*

Kochgawan	1206	7553	3989	3564	1025	532	493	3	3	0
Sorahipur	146	919	467	452	217	107	110	0	0	0
Kandha	204	1180	605	575	397	203	194	0	0	0
Bheria	108	692	372	320	135	71	64	0	0	0
Fataha	167	870	456	414	30	14	16	0	0	0
Chakwae	1578	9444	4936	4508	1437	733	704	4	3	1
Gamhirpur Sonbarsa	331	2141	1165	976	686	373	313	0	0	0
Mohiuddinpur	378	2225	1156	1069	755	395	360	1	0	1
Khanapur	230	1575	832	743	62	32	30	1	1	0
Rasanpur	77	458	255	203	263	156	107	152	76	76
Chiraia	117	803	394	409	47	22	25	0	0	0
Bala Chak	99	670	338	332	592	298	294	0	0	0
Ballopur	244	1567	796	771	183	94	89	0	0	0
Chalisa Chak	91	567	292	275	389	205	184	0	0	0
Chanpur	186	1230	654	576	198	105	93	0	0	0
Jamuawan	556	3254	1726	1528	748	392	356	0	0	0
Apsand	991	5667	3025	2642	1159	618	541	0	0	0
Bali	374	2628	1365	1263	288	142	146	0	0	0
Azampur	93	647	348	299	0	0	0	0	0	0
Thera	950	5927	3056	2871	2219	1139	1080	83	35	48
Bahroi Chak	67	393	216	177	2	2	0	0	0	0
Mosima	1103	7148	3703	3445	1666	838	828	4	1	3
Chanpura	358	2197	1140	1057	363	182	181	1	0	1
Masuda	704	4752	2458	2294	1355	694	661	0	0	0
Begrajpur	60	382	195	187	94	45	49	0	0	0
Garua	163	966	515	451	279	146	133	0	0	0
Raikar	46	267	136	131	95	50	45	0	0	0
Kathokari	109	881	451	430	35	16	19	0	0	0
Bandha	337	2260	1204	1056	576	293	283	0	0	0

*"EIA/EMP Studies for Industrial Area, at Warsaliganj, Block Warsaliganj, Dist. Nawada,
State Bihar, of Bihar Industrial Area Development Authority (BIADA)"*

Mai	495	3433	1753	1680	892	449	443	0	0	0
Khaira	130	825	425	400	207	112	95	0	0	0
Motalib Chak	80	553	298	255	190	109	81	0	0	0
Abdalpur	299	1924	995	929	438	228	210	0	0	0
Milki	179	1074	521	553	279	141	138	1	1	0
Hajipur	546	3234	1699	1535	840	445	395	2	1	1
Bhalua	118	698	360	338	163	77	86	1	0	1
Gangta	27	197	89	108	184	84	100	0	0	0
Khajpura	134	801	408	393	344	172	172	0	0	0
Baghi Bardiha	980	5875	2951	2924	1311	658	653	0	0	0
Dosut	723	4448	2307	2141	1384	718	666	8	5	3
Bahera Bhelwa	415	2542	1308	1234	529	275	254	0	0	0
Bojhwan	344	2299	1215	1084	599	305	294	0	0	0
Shahpur	452	2908	1537	1371	919	489	430	0	0	0
Sagaman	162	1134	567	567	6	4	2	0	0	0
Warisaliganj (NP)	5292	34056	17874	16182	4071	2082	1989	68	39	29
Warisaliganj (NP) WARD NO.-0001	146	811	433	378	180	85	95	0	0	0
Warisaliganj (NP) WARD NO.-0002	245	1722	881	841	72	37	35	0	0	0
Warisaliganj (NP) WARD NO.-0003	219	1476	738	738	17	9	8	0	0	0
Warisaliganj (NP) WARD NO.-0004	261	1554	824	730	771	398	373	0	0	0
Warisaliganj (NP) WARD NO.-0005	233	1681	916	765	145	75	70	0	0	0
Warisaliganj (NP) WARD NO.-0006	372	2415	1248	1167	123	67	56	41	25	16
Warisaliganj (NP) WARD NO.-0007	315	1982	1044	938	262	128	134	0	0	0
Warisaliganj (NP) WARD NO.-0008	183	1177	622	555	73	39	34	22	11	11
Warisaliganj (NP) WARD NO.-0009	299	1834	978	856	286	156	130	4	2	2
Warisaliganj (NP) WARD NO.-0010	295	2016	1085	931	0	0	0	0	0	0
Warisaliganj (NP) WARD NO.-0011	258	1616	850	766	0	0	0	0	0	0
Warisaliganj (NP) WARD NO.-0012	234	1479	798	681	13	7	6	0	0	0
Warisaliganj (NP) WARD NO.-0013	235	1510	785	725	66	31	35	0	0	0

*"EIA/EMP Studies for Industrial Area, at Warsaliganj, Block Warsaliganj, Dist. Nawada,
State Bihar, of Bihar Industrial Area Development Authority (BIADA)"*

Warsaliganj (NP) WARD NO.-0014	200	1459	779	680	367	199	168	1	1	0
Warsaliganj (NP) WARD NO.-0015	331	2022	1060	962	116	61	55	0	0	0
Warsaliganj (NP) WARD NO.-0016	287	1943	1009	934	386	202	184	0	0	0
Warsaliganj (NP) WARD NO.-0017	197	1488	770	718	54	27	27	0	0	0
Warsaliganj (NP) WARD NO.-0018	438	2558	1314	1244	620	311	309	0	0	0
Warsaliganj (NP) WARD NO.-0019	300	2034	1076	958	6	3	3	0	0	0
Warsaliganj (NP) WARD NO.-0020	244	1279	664	615	514	247	267	0	0	0

CHAPTER - 4

ENVIRONMENTAL IMPACT ASSESSMENT & MITIGATION MEASURES

4.1 Details of Investigated Environmental impacts

(Details of Investigated Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project)

Impact prediction is a very important phenomenon in evaluating the environmentally potential adverse impacts for any proposed new or expansion industrial project. The impact prediction is always carried out under worst possible conditions so as to mitigate or to eliminate the environmental hazards. These predictions thus calculated are superimposed over the baseline data to calculate the net impact on the environment after the proposed plant comes into production. The impact of the proposed project has been considered and discussed in this chapter.

Both beneficial (positive) and adverse (negative) impacts on various components of environment due to proposed expansion are identified, based on the nature of the various activities associated with the proposed project operations. Environment impact analysis gives an indication of ways to consider modeling the project to mitigate adverse impacts through best practicable environmental option or alternate processes.

Any developmental activity in its wake will bring about some impacts associated with its origin, which can be broadly classified as reversible, irreversible, long and short-term impacts. In this chapter, an endeavor has been made to identify various Environmental Impacts associated with the plant operation and other activities wherein, there may be a chance of pollution.

Impacts due to any project activity have been divided according to the temporal scale into 'Impacts during Construction Phase' & 'Impacts during Operation Phase'. The impacts on different environmental parameters, due to the proposed IA Warsaliganj for Cement Grinding Project, will be due to various activities carried out during construction phase & operation phase; Construction activity spreads over pre-construction, machinery installation and commissioning stages and ends with the induction of manpower and start-up. During operation phase of the proposed project, the impacts will be mostly permanent and irreversible in nature.

Based on the possible worst case emissions and waste generation from the proposed IA Warsaliganj Cement Grinding Project and also taking into consideration the baseline Environmental status at the proposed project location, the environmental factors that are likely to be affected (Impacts) are assessed identified. Both instrumental (positive) and detrimental (negative) impacts are accounted for this purpose. The prediction of impacts helps in the preparation of a sound Environmental Management Plan which has to be executed during the on-going activities for the proposed project to minimize the adverse impacts on the environmental quality. The mathematical models were used to quantitatively describe the cause-effect relationships between the sources of pollution and different components of environment. In case if the mathematical models are not available or it is not possible to identify/validate a model for particular situation, predictions would be made through available scientific knowledge.

(Measures for minimizing and / or offsetting adverse impacts identified / Irreversible and Irretrievable commitments of environmental components / Assessment of significance of impacts (Criteria for determining significance, Assigning significance) / Mitigation measures)

A. Methodology

The potential impacts on the environment from the proposed project are identified based on the nature of the various activities associated not only with the project implementation and operation, but also on the current status of the environmental quality at the project site.

4.2 Impact on Land Use Pattern

There would be no impact of the proposed project on the land use pattern because this is notified Industrial Area Project.

Most of the work force will be from nearby areas therefore no camp would be required. Since the present site is exclusively in possession of project authorities, rehabilitation & resettlement problem does not occurs.

4.2.1 Impact during Construction Stage

No forest land is involved in the project area. The entire land belongs to the project proponent BIADA. Preparatory activities like construction of access roads, storage yard etc. will be spread around the project site and would not generally exercise any significant impact.

Due to proposed Cement Grinding Unit 50 nos. of persons will get employed in direct mode in different capacities and approx. 200 nos. of persons will be benefitted indirectly in the form of stockiest, dealers and suppliers. An estimated work force would flock to the project area during the construction stage. A sizeable portion of this workforce will be local people and only experienced trained people will be from outside.

4.2.2 Impact during Operation Stage

Total land area for IA Warsaliganj is 29.77 Ha., Village- Mosma, Samichak, Sherpur, Mafi, Block-Warsaliganj, Dist-Gaya, Bihar. IA Warsaliganj will consists Standalone Cement Grinding Project equipped with VRM (Vertical Roller Mill). Cement mill, Material Storages, Packing plant and various material transfer points, are the major sources of air pollution in the proposed cement grinding unit. Adequate air pollution control equipment i.e Reverse Pulse Jet bag filters based on the most modern technology are proposed to be installed to ensure that the emissions are within the prescribed limits i.e $< 30 \text{ mg/Nm}^3$ as prescribed by CPCB/ MoEFCC. Adequate stack height i.e 30 m will be provided in cement grinding mill for wider dispersion of pollutants. The improved economy of the area is expected to cause increased outputs to agriculture, trade and commerce.

4.3 Impact on Land Environment / Soil

Any construction activity could tend to create changes in the soils of the area. Excavation work tends to denude the soil and make it loose. The excavated soil and construction materials, such as sand etc. could tend to infiltrate and clog the inter-granular spaces, leading to decreased permeability.

The proposed cement grinding unit of IA Warsaliganj will be designated plant boundary the impacts would be confined principally within the plant site and thus would be of localized nature.

4.3.1 Impact during Construction Stage

During the construction stage, the following steps will be taken to check the adverse effect:

- All earth work will be completed before the monsoon so that the soil erosion and carryover of the materials in other areas are protected.
- The packaging materials which may consist of wooden boxes and jute wrappers will be stored at suitable place and disposed off suitably.
- Proper drainage system will be constructed for the waste water, if generated during construction period which will be discharged into low land areas and accumulation of water will be avoided.

4.3.2 Impact during Operation

During operation phase the soil will not be affected due to any operation. However, any percolation of any contaminates into ground water will be prevented by constructing suitable storage facilities as per guidelines of CPCB and MoEFCC.

Another manner in which the soils within the impact zone might undergo changes is due to deposition of air pollutants. Stack Emission results will be well within the limits of BSPCB and E(P) Rules. Proposed Cement Grinding Mills will be equipped with VRM (Vertical Roller Mill). Cement mill, Material Storages, Packing plant and various material transfer points, are the major sources of air pollution in the proposed cement grinding unit. Adequate air pollution control equipment i.e Reverse Pulse Jet bag filters based on the most modern technology are proposed to

be installed to ensure that the emissions are within the prescribed limits i.e < 30 mg/Nm³ as prescribed by CPCB/ MoEFCC. Stack of adequate Height will be provided as 30 mtr as per CPCB Norms. Meanwhile, the 2-5 m wide green belt would largely offset the change to the existing landscape and would provide visual comfort. Stack Emission results are well within the limits of BSPCB & E (P) Rules.

4.4 Solid Waste Management

- Ash will be generated from the combustion of coal used in HAG and the entire quantity of ash will be used in PPC manufacturing. Proper ash handling system will be provided to ensure no dust generation during handling, filling and transportation.
- Dust collected by the bag filters will be automatically recycled in the system
- Other solid waste will be in the form of rejected conveyor belts, torn/ damaged cement bags, paper/ wooden/ plastic waste etc. which are not hazardous in nature and will be sold to recyclers on regular basis.

4.5 Impact on Surface Water Hydrology

The unit will use only ground water during construction and operational stage of plant. There is no use of surface water in the project. Therefore, there would not be any anticipated impact on surface water hydrology.

4.6 Impact on Ground Water Hydrology :-

The proposed project will not discharge any waste water to the land, the adverse impact on ground water is therefore unlikely.

4.7 Impact on Water Use

4.7.1 Impact during Construction Stage

The civil structures of the proposed cement grinding Unit will be constructed by using cement, sand, concrete and RCC. Compared to the total availability of ground water, the impact will be intangible even during dry season.

4.7.2 Impact during Operation

The fresh water requirement for proposed project will be 600 KLD. This water requirement will be met by proposed bore-well with IA Warsaliganj.

The area falls under medium category where on average 1006 mm. of rain is recorded annually. The small quantity of withdrawal of ground water during the operation of plant will not affect the large quantity of ground water available in the area.

4.8 Impact on Water Quality

4.8.1 Impact during Construction Stage

Nominal quantity of water will be used during construction period. The peak hourly demand during the construction period may be considered as 20 m³ per day. Adequate arrangements would be made to ensure proper drainage of wastewater from the construction sites, so that such waters do not form stagnant pools nor aggravate soil erosion.

The waste water during construction will contain only suspended impurities. The waste water will be drained into spared own land which will dry up within a month or so. In no case, this waste water will be allowed to join canal or river.

4.8.2 Impact on Surface Water during Operation

No waste water will be discharged into surface water

4.8.3 Impact on Ground Water Quality

There will not be any direct impact on ground water quality due to the project operation, as the unit will not generate or discharge any Industrial waste water.

Thus, there would neither be any significant impact on surface water bodies nor on ground water due to the proposed project.

4.9 Impact on Air Environment

4.9.1 Impact During Construction

Particulate Matter would be the predominant pollutant affecting the air quality during the construction period. The soil of the project area, being generally clay loam is likely to generate dust, especially during dry seasons. Dust will be generated mainly during excavation, back filling and hauling operation along with transportation activities. However, wind blown dust is not expected to have tangible effects on the air quality of the area. The vehicular exhausts and other related

activities will result in rise of pollutants in the air. Incremental values are expected to be negligible compared to total permissible limit for ambient air quality.

4.9.2 Impact on Air Quality During Operation

Proposed Cement Grinding Mills will be equipped with VRM (Vertical Roller Mill). Cement mill, Coal Mill, Material Storages, Packing plant and various material transfer points, are the major sources of air pollution in the proposed cement grinding unit. Adequate air pollution control equipment i.e Reverse Pulse Jet bag filters based on the most modern technology are proposed to be installed to ensure that the emissions are within the prescribed limits i.e $< 30 \text{ mg/Nm}^3$ as prescribed by CPCB/ MoEFCC. Stack of adequate Height will be provided as 30 mtr as per CPCB Norms. Meanwhile, the wide green belt and plantation would largely offset the change to the existing landscape and would provide visual comfort. Stack Emission results are well within the limits of BSPCB & E (P) Rules.

Further measures to minimize the pollution have been envisaged as:

- ❖ Providing adequate stack height as per norms of CPCB for wider dispersion of pollutants, resulting in lower ground level concentration.
- ❖ The exhausts of DG set will be provided with adequate height as per norms prescribed by Central Pollution Control Board.
- ❖ Transport vehicles will be maintained properly.
- ❖ Dust control will be done by water spraying on the exposed area, time to time.

Source of Air pollution and control measures

Section	Source of Air Pollution	Pollutants	Air Pollution control Measures
Cement Mill	Grinding of raw materials in VRM	PM	Reverse Pulse Jet bag filters system, Stack Height will be 30 mtr as per CPCB Norms
Raw Material Handling & Dispatch Section	Conveyor Belt	Dust and Particulate Matter	Dust Catcher and Bag Filter
Overall Plant Area	Open Space	Fugitive Dust Emission	Pucca roads within the premises, water sprinkling in dusty areas and green belt

The concerning emission will be only from Point Source i.e. from Stack, which will be released through the stacks of 30 m height. The emissions from other point

source i.e. exhausts of Diesel Generator set and the vehicular emissions will be of insignificant value.

4.9.3 Impact Assessment

The impact on air quality has been assessed considering the following:

- a) The air quality impacts have been predicted for the release of emissions from Stacks.
- b) Plume Rise and Effective Stack Height
Brigg's modified equation as suggested by Central Pollution Control Board has been used for calculation of effective Stack Height.
- c) Dispersion Coefficient: Brigg's dispersion coefficients have been used to determine σ_y and σ_z for rural conditions.
- d) Particulate Matter (PM) has been considered taking maximum limit of 30 mg/Nm³ for Stack as prescribed by Central Pollution Control Board.

4.9.4 Air Quality Modeling

The main air pollutant from the operations would be Particulate Matter and for the same short term 24-hourly GLC's has been computed. The GLC's are estimated using the site-specific meteorological data and various input parameters using AERMOD Air Quality Modeling Software based on USEPA Guidelines.

4.9.5 AERMOD

Air pollution modeling is a numerical tool used to describe the causal relationship between emissions, meteorology, atmospheric concentrations, deposition, and other factors. Air pollution measurements give important, quantitative information about ambient concentrations and deposition, but they can only describe air quality at specific locations and times, without giving clear guidance on the identification of the causes of the air quality problem. Air pollution modeling, instead, can give a more complete deterministic description of the air quality problem, including an analysis of factors and causes (emission sources, meteorological processes, and physical and chemical changes), and some guidance on the implementation of mitigation measures. Air pollution models

play an important role in science, because of their capability to assess the relative importance of the relevant processes. Air pollution models are the only method that quantifies the deterministic relationship between emissions and concentrations/depositions, including the consequences of past and future scenarios and the determination of the effectiveness of abatement strategies. This makes air pollution models indispensable in regulatory, research, and forensic applications.

AERMOD is a steady-state Gaussian plume model. It uses a single wind field to transport emitted species. The wind field is derived from surface, upper-air, and onsite meteorological observations. AERMOD also combines geophysical data such as terrain elevations and land use with the meteorological data to derive boundary layer parameters such as length, mixing height, stability class, turbulence, etc.

A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) was formed to introduce state-of-the-art modeling concepts into the EPA's air quality models. Through AERMIC, a modeling system, AERMOD, was introduced that incorporated air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

The AERMOD modeling system consists of two pre-processors and the dispersion model. The AERMIC meteorological preprocessor (AERMET) provides AERMOD with the meteorological information it needs to characterize the PBL. The AERMIC terrain preprocessor (AERMAP) both characterizes the terrain, and generates receptor grids for the dispersion model (AERMOD).

AERMET uses meteorological data and surface characteristics to calculate boundary layer parameters (e.g. mixing height, friction velocity, etc.) needed by AERMOD. This data, whether measured off-site or on-site, must be representative of the meteorology in the modeling domain. AERMAP uses gridded terrain data for the modeling area to calculate a representative terrain-influence height associated with each receptor location. The gridded data is supplied to AERMAP in the format of the Digital Elevation Model (DEM) data (USGS 1994). The terrain preprocessor can also be used to compute elevations for both discrete receptors and receptor grids.

AERMOD is a steady-state plume model. In the stable boundary layer (SBL), it assumes the concentration distribution to be Gaussian in both the vertical and horizontal. In the convective boundary layer (CBL), the horizontal distribution is also assumed to be Gaussian, but the vertical distribution is described with a bi-Gaussian probability density function (pdf). This behavior of the concentration distributions in the CBL was demonstrated by Willis and Deardorff (1981) and Briggs (1993). Additionally, in the CBL, AERMOD treats "plume lofting," whereby a portion of plume mass, released from a buoyant source, rises to and remains near the top of the boundary layer before becoming mixed into the CBL. AERMOD also tracks any plume mass that penetrates into the elevated stable layer, and then allows it to re-enter the boundary layer when and if appropriate. For sources in both the CBL and the SBL AERMOD treats the enhancement of lateral dispersion resulting from plume meander.

Using a relatively simple approach, AERMOD incorporates current concepts about flow and dispersion in complex terrain. Where appropriate the plume is modeled as either impacting and/or following the terrain. This approach has been designed to be physically realistic and simple to implement while avoiding the need to distinguish among simple, intermediate and complex terrain, as required by other regulatory models. As a result, AERMOD removes the need for defining complex terrain regimes. All terrain is handled in a consistent and continuous manner while considering the dividing streamline concept (Snyder et al. 1985) in stably stratified conditions.

In urban areas, AERMOD accounts for the dispersive nature of the "convective-like" boundary layer that forms during nighttime conditions by enhancing the turbulence over that which is expected in the adjacent rural, stable boundary layer. The enhanced turbulence is the result of the urban heat flux and associated mixed layer which are estimated from the urbanrural temperature difference

AERMOD simulates five different plume types depending on the atmospheric stability and on the location in and above the boundary layer: 1) direct, 2) indirect, 3) penetrated, 4) injected and 5) stable. All of these plumes will be discussed, in detail, throughout the remainder of this document. During stable conditions, plumes are modeled with the familiar horizontal and vertical Gaussian formulations. During convective conditions ($L < 0$) the horizontal distribution is still Gaussian; the vertical concentration distribution results from a combination of three plume types: 1) the direct plume material within the mixed layer that initially does not interact with the mixed layer lid; 2) the indirect plume material within the mixed layer that rises up and tends to initially loft near the mixed layer

top; and 3) the penetrated plume material that is released in the mixed layer but, due to its buoyancy, penetrates into the elevated stable layer.

During convective conditions, AERMOD also handles a special case referred to as an injected source where the stack top (or release height) is greater than the mixing height. Injected sources are modeled as plumes in stable conditions, however the influence of the turbulence and the winds within the mixed layer are considered in the inhomogeneity calculations as the plume material passes through the mixed layer to reach receptors.

4.9.6 Input Parameters

For modeling purpose, only Particulate Matter (PM) have been considered as this is only grinding process and there is no combustion source / process due to which gaseous pollutants will emit. The PM emission from proposed stack has been taken maximum 30 mg/Nm³. The details are presented in **Table 4.1** as under.

Table 4.1: Stack and Emission Details

S.No.	Input Parameter	Bag house of cement mill	Bag house of coal mill
1.	Stack height from Ground (m)	30	30
2.	Inner Diameter of stack/Duct (m)	2	2
3.	Flue Gas Temperature (°C)	120	135
4.	Gas Exit velocity (m/s)	12	15
5.	Emission of PM ₁₀ (g/sec)	0.21	0.23
6.	Emission of PM _{2.5} (g/sec)	0.10	0.12
7.	Emission of SO ₂ (g/sec)	0.07	0.14
8.	Emission of NO _x (g/sec)	0.33	0.36
9.	Air Pollution Control Device (APCD)	Reverse Pulse Jet bag filters based on the most modern technology are proposed to be installed to ensure that the dust emissions are within the prescribed limits i.e. < 30 mg/NM ³ as prescribed	

4.9.7 Results & Discussions

The predictions have been made for the summer season i.e. Mar. – May'2023. The hourly data on wind speed, direction, atmospheric stability, temperature have been used.

For the short-term simulations, the concentration was estimated around 396 receptors to obtain an optimum description of variations in concentrations over the site in 10 km. covering 36 directions for the monitoring period. For each time scale i.e. for 24 Hrs. the model computes the 50 highest ground level concentrations observed during the period over all measurement points. The first highest 24 hourly average concentrations predicted for PM is presented below;

S.No.	Pollutants	Max. GLC observed, ($\mu\text{g}/\text{m}^3$)	Distance and Direction (Towards)
1	PM ₁₀	1.9	1000 m and SE
2	PM _{2.5}	1.1	1000 m and SE
3	SO ₂	0.9	1000 m and SE
4	NO _x	2.0	1000 m and SE

The isopleths for incremental concentrations of PM is presented in **Figure 4.1 (A)**.

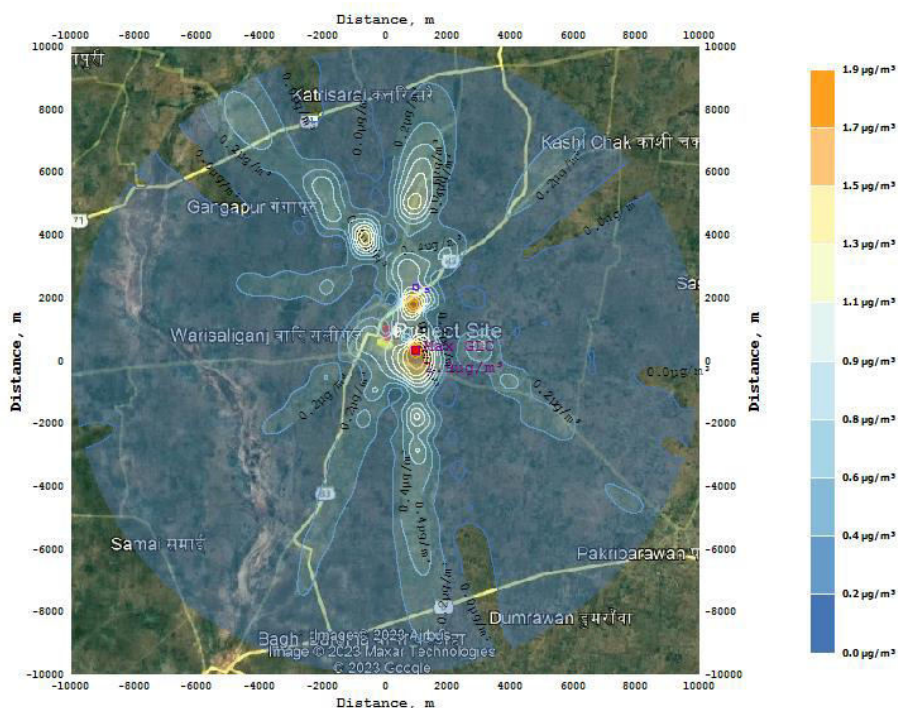


Figure 4.1(A) : Isopleth for 24 Hr. Incremental Concⁿ PM₁₀ ($\mu\text{g}/\text{m}^3$)

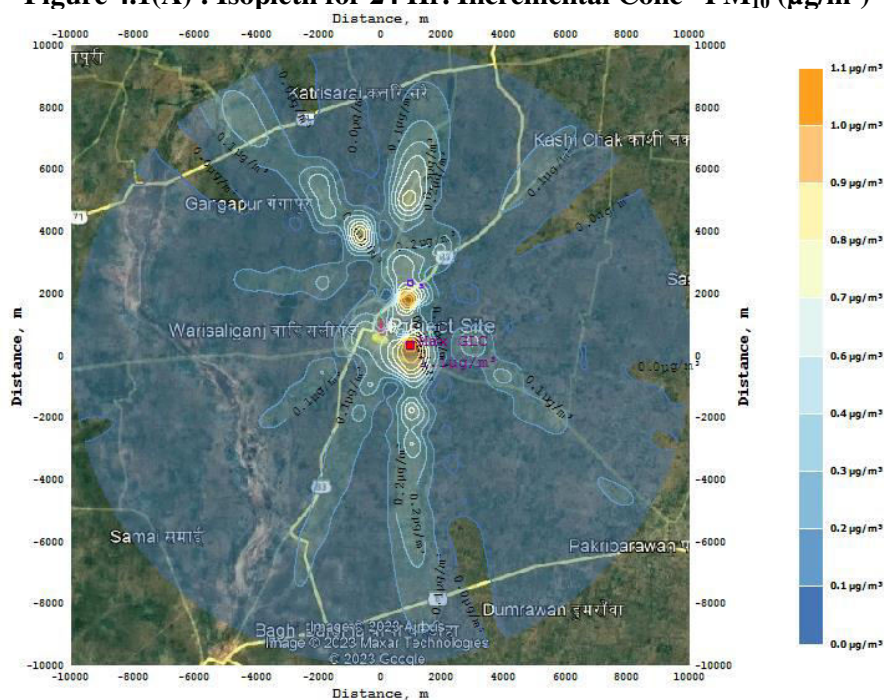


Figure 4.1(B) : Isopleth for 24 Hr. Incremental Concⁿ PM_{2.5} ($\mu\text{g}/\text{m}^3$)

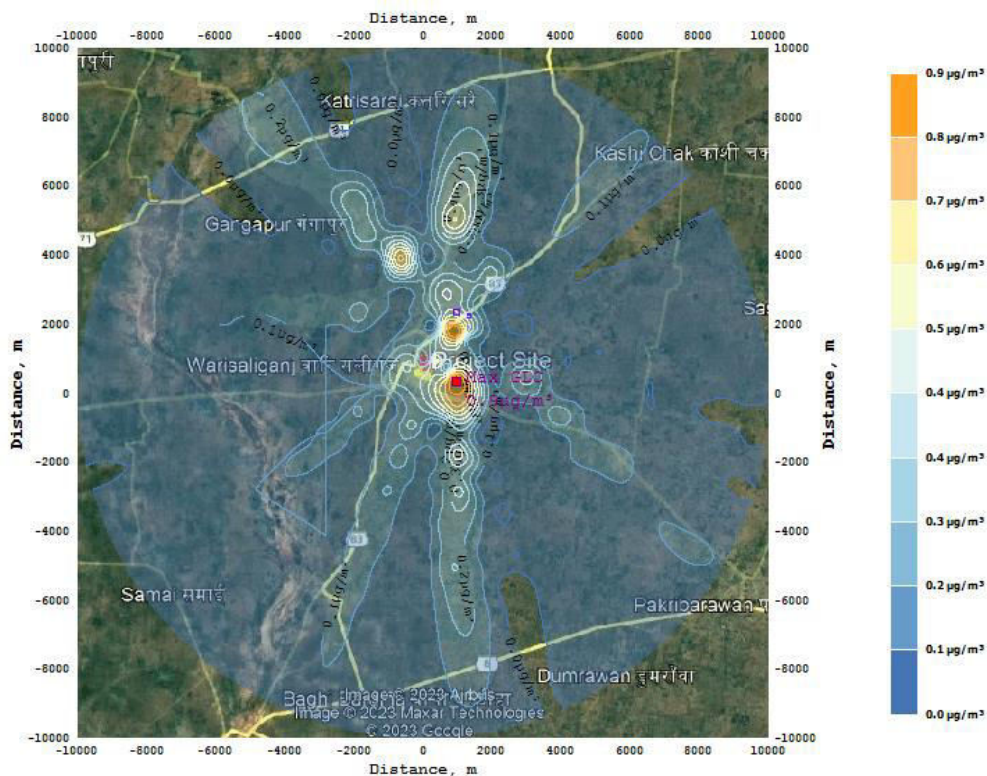


Figure 4.1(C) : Isoleth for 24 Hr. Incremental Concⁿ SO₂ (µg/m³)

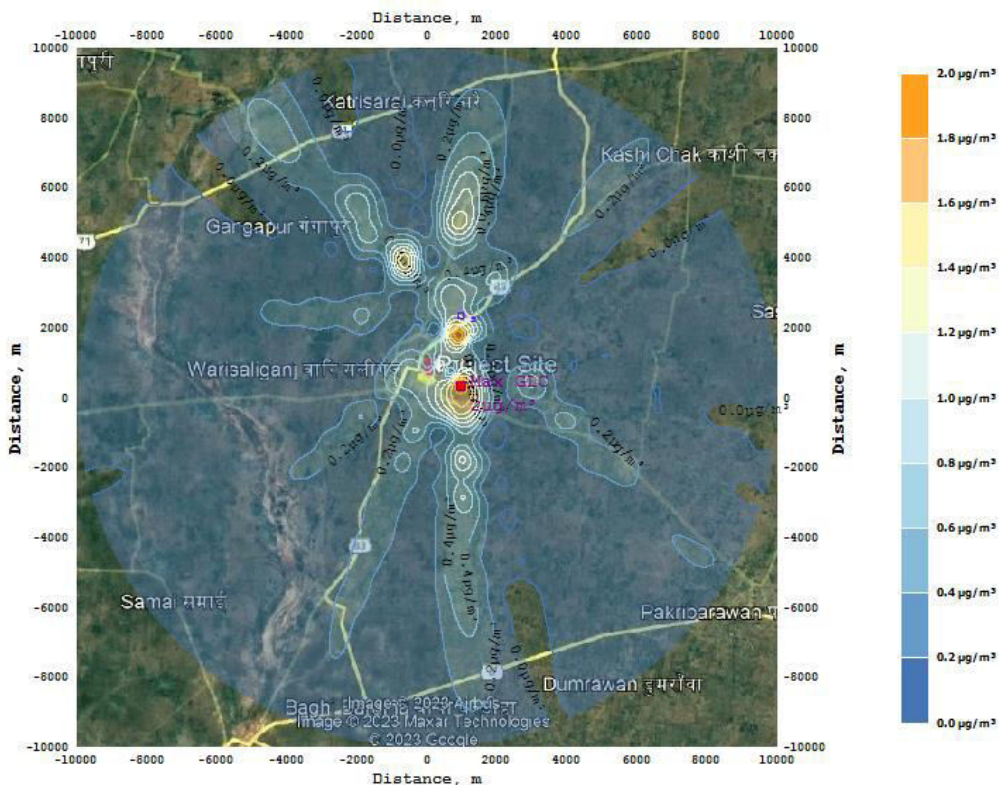


Figure 4.1(D) : Isoleth for 24 Hr. Incremental Concⁿ NO₂ (µg/m³)

4.9.7 Resultant Concentrations after Commissioning of the Project

The resultant concentration after the commissioning of the proposed project on the GLC of pollutants as predicted and super imposing the predicted values on the maximum baseline concentrations recorded during the study period respective to the direction and distance of the monitoring location is as under. The cumulative ground level concentrations (baseline + increment) after commissioning of the proposed project are presented in **Table 4.3**.

Table 4.3 : Predicted Maximum Cumulative Short Term Ground Level Concentration

Pollutants	Maximum Incremental Concentration due to Proposed project $\mu\text{g} / \text{m}^3$	Location		AAQ Conc. in SE direction Recorded during study period $\mu\text{g} / \text{m}^3$	Resultant Conc. $\mu\text{g} / \text{m}^3$	NAAQS Standard for PM_{10}
		Distance In Meter	Direction			
PM₁₀	1.9	1000	SE	54.7	56.6	100
PM_{2.5}	1.1	1000	SE	35.4	36.5	60
SO₂	0.9	1000	SE	14.9	15.8	80
NO₂	2.0	1000	SE	28.0	30.0	80

The predicted GLCs of Pollutants after commissioning of the proposed project is significant to add up on the existing ambient air quality. However, the proposed air pollution control systems will further improve the existing ambient air quality and help in bringing down the concentrations in ambient air quality.

The estimated cumulative GLCs after commissioning of the proposed project are found to be within the National Ambient Air Quality Standards 2009.

Hence it can be concluded that the impact on Ambient Air Quality of the nearby areas by the proposed new project will be insignificant.

Moreover, the environment around the project site has enough buffer to assimilate these values. The favorable wind and the proposed height of stack will disperse

these pollutants in different directions fast to longer distance with negligible concentrations.

Therefore, because of the proposed new project the anticipated adverse impact on ambient air quality can be minimized by adoption of proper and effective air pollution control measures.

4.10 Impacts of Secondary Emissions due to Vehicular Movement ;

Vehicular movement in and around the site are the major source of secondary emission. Loads of Pollutants arising from emissions by vehicle plying from nearest state highway to the project site have been calculated on the following assumptions;

Traffic Density of Study Area ;

The project site is located near SH-82, Nawada-Gaya Road. To assess the existing pollution load due to plying of vehicles in the study area, traffic survey was conducted on 14th Apr. 2023 near SH-82 Road. Traffic Scenario of the project area is as under ;

Time (Hrs.)	TYPE OF VEHICLE			HCV's
	2 Wheelers	3 Wheelers	4 Wheelers & LCV's	
06-07	35	5	15	16
07-08	49	12	18	24
08-09	81	10	22	12
09-10	85	16	36	26
10-11	96	18	40	30
11-12	86	11	44	24
12-13	111	10	55	21
13-14	131	6	67	18
14-15	103	12	90	12
15-16	106	16	97	21
16-17	122	11	110	24
17-18	105	9	84	19
18-19	72	8	71	16
19-20	53	5	55	15
20-21	26	6	43	21
21-22	12	4	23	15
22-23	8	2	26	12

Time (Hrs.)	TYPE OF VEHICLE			HCV's
	2 Wheelers	3 Wheelers	4 Wheelers & LCV's	
23-24	1	1	12	19
00-01	6	1	8	25
01-02	2	0	6	20
02-03	0	1	5	22
03-04	5	2	7	25
04-05	10	5	8	32
05-06	22	9	12	43
TOTAL	1327	180	954	512

Due to proposed new project there will be increment in traffic density in the project area. Incremental Traffic Scenario will be as under ;

Type of Vehicle	Present Scenario	Increase in Vehicles due to proposed project	Increment in Traffic Load due to Proposed New project
HTV (Trucks, Tractors, etc.)	512	100	612
MTV (Car & Jeeps)	954	15	1061
LTV (Two & Three Wheelers)	1507	100	1681

Incremental Pollution Load due to movement of vehicles during proposed new project and Operation Stage of proposed new project will be as under ;

Existing Pollution Load (based on CPCB Document CUPS/10/1982-83) due to traffic density of project area is as under;

Type of vehicle	Total No. of vehicles / Day	Pollution Load (Kg./Day)				
		CO	HC	NO2	SO2	SPM
HTV (Trucks, Tractors etc.)	512	4.5	0.75	7.5	0.53	0.27
MTV (Diesel based 4 Wheelers)	382	0.27	0.07	0.24	0.10	0.11
MTV (Petrol based 4 Wheelers)	572	22.8	3.43	1.83	0.05	0.19
LTV (2 & 3 Wheelers)	1507	40.9	24.0	0.17	0.05	0.48
TOTAL		68.5	28.3	9.7	0.72	1.05

Incremental Pollution Load (based on CPCB Document CUPS/10/1982-83) due to movement of vehicles during Operation Stage of proposed cement grinding project within IA Warsaliganj will be as under;

Type of vehicle	Total No. of vehicles / Day	Pollution Load (Kg./Day)				
		CO	HC	NO ₂	SO ₂	SPM
HTV (Trucks, Tractors etc.)	612	4.8	0.79	7.9	0.56	0.28
MTV (Diesel based 4 Wheelers)	424	0.28	0.07	0.25	0.10	0.11
MTV (Petrol based 4 Wheelers)	637	23.6	3.53	1.88	0.05	0.19
LTV (2 & 3 Wheelers)	1681	41.9	24.6	0.17	0.05	0.49
TOTAL		70.5	29.0	10.2	0.76	1.08

4.11 Impact on Noise Environment

The major sources of noise pollution would be running of machineries. The plant machineries shall be maintained properly with regular oiling and greasing to reduce the noise pollution.

There is no major noise prone process except equipment for conveyor belt and grinding unit etc.

- By selecting low noise generating equipment, which would have below 85 dBA. This is taken care at the equipment design stage.
- By isolating the noise unit from the working personnel's continuous exposure by providing acoustic aids for plant personnel.
- By administrative & safety measures, providing noise level monitoring, remedial measures, providing noise safety appliances.

Proposed project will take all mitigation measures to control noise pollution. Some methods of noise pollution control have been outlined in **Table 4.5**.

Table 4.5: Noise Mitigation Measures

Mitigation Measures
1. By adopting smooth roads and yard.
2. By adopting good foundation, good alignment, well lubricated machineries.
3. Steam release, only occasional and for a small duration of time.
4. Proper sturdy foundation provided for all the machines and equipments.

Impacts of Secondary Emissions due to Vehicular Movement

4.12 Impact of Transportation

The raw materials like, Clinker, gypsum, Fly ash, slag are not a direct source of any kind of environmental pollution under normal climatic conditions. However, emission from the transporting vehicle may be a potential source of air pollution. Meanwhile, the emission may not be directly attributed to the contribution of the project – because the proponent would be using the exiting transportation facility available in the market and those vehicles will be complying with the standard emission through a mandatory “Pollution Under-Control Certificate”.

Therefore, the impact of transportation of the raw material and end product on the surrounding environment would be insignificant.

4.13 Impact on Terrestrial Ecology

Impact during Construction

The impact of construction activities would be primarily confined to the project site which is already in possession of proponent. As stated earlier, the land is principally agricultural & industrial in nature in the surrounding areas.

Removal of top soil often leads to soil erosion. Deposition of fugitive dust on pubescence leaves of nearby vegetation may lead to temporary reduction of photosynthesis. Such impacts would, however, be confined mostly to the construction phase and would also be regulated and minimized through adoption of such control measures as paving and surface treatment, water sprinkling and plantation schemes. The impact would generally be restricted within the plant boundary and the surrounding flora is unlikely to be affected.

The plant area would be extensively landscaped with development of green belts of width up to 2-5 m., consisting of a variety of species. Such plantation activities would enrich the ecology and improve the aesthetics of the area.

Impact during Operation

The impact on the terrestrial ecosystem due to the operation of the proposed project would mainly occur from deposition of air pollutants. Particulates are major pollutants. These pollutants affect biotic and abiotic components of the ecosystem individually and synergistically. Chronic and acute effects on plants and animals may be induced when the concentration of these pollutants exceed threshold limits.

The Particulate Matter (PM) depending upon their size and weight settle down at varying distances on vegetation and soil surfaces in the prevailing wind direction. Deposition of fly ash on the soil alters its physical and chemical characteristics. Such changes may hamper plant growth at higher concentrations. Foliar deposition interrupts gaseous exchange through stomatal clogging, thereby affecting plant growth.

In the present scenario the PM, level emitted from stack will be within the norms, as such no adverse effect can be expected. The emissions of particulates from the stacks will always remain below 30 mg/Nm³.

Furthermore, emission of PM through the proposed 30 m. tall stack results in a very wide dispersion of the particulates, leading to minimum annual average ground level concentrations. Such low concentration of PM in the air and its deposition would not induce any change in the ecosystem.

It would thus be observed that pollutant concentrations due to operation of the plant are much lower than the threshold limits for damage to terrestrial flora established above and as such, the impact on the terrestrial ecosystem would be marginal.

4.14 Impact on Aquatic Ecology

Impact during Construction

The construction waste waters would contain suspended impurities. These wastewaters would be subjected to sedimentation in settling basins, with adequate retention time where the suspended solids would settle and the clear supernatant water will be reused in construction work.

Impact during Operation

No water shall be discharged into the surface water body. As such, it may be concluded that no adverse effects leading to the depletion of growth of the existing aquatic biota are envisaged due to the operation of the project.

4.15 Impact on Demography & Socioeconomic

Impact during Construction

▪ *Impact on Demography* ---

The peak workforce strength during construction would rise-up to hundred persons. Though the technical persons and skilled labors would by and large, be imported from outside the study area, bulk of the labor force would comprise of unskilled and semi-skilled workers, a substantial number of whom would presumably be recruited from the surrounding areas itself. Since majority of the unskilled workforce would be from surrounding areas, they would settle in the villages.

Therefore, the demographic scenario including population, sex-ratio, literacy level etc. would undergo certain local changes within a limited peripheral zone. The overall impact over the study area would be marginal.

▪ *Impact on Socioeconomic* ---

Construction of any major industrial project invariably results in socioeconomic changes. The influx of material and money lends to change the economic status of the community. Markets, workshops and commercial centers would develop in the area.

Construction of the proposed project will involve a substantial unskilled labor force. Since most of the unskilled labor force will be from nearby village, unplanned and haphazard development of slums would not be significant. However, labour camps with provision of basic amenities of water supply and sanitation etc. would be provided which would go long way in curbing the degradation of the physical and aesthetic environment.

▪ *Project Affected Persons (PAP)* ---

There will not be any project affected person, due to the fact that the entire land required for the proposed project is owned by project proponent.

▪ *Rehabilitation and Resettlement Programme* ---

As mentioned earlier the land belongs to the project proponent, rehabilitation or resettlement problem do not exist.

Impact during Operation

▪ *Impact on Demographic Pattern* ---

Operation of the unit will require an appreciable quantum of skilled and semi-skilled workforce which, would have to be imported from outside the study area.

Moreover, a sizeable number of service class people who are directly connected with the operating personnel of the plant, e.g. house servants, washer man, barbers, shopkeepers etc. will flow in from the neighboring areas. As the plant and its ancillary facilities act as an active nucleus of activity, a shift of population towards this center will also occur within the study area. This would result in an alteration of the local demographic pattern. The literacy level of people and their families involved in the operation of the plant would certainly enhance the overall literacy rate within the study area. The population density in the peripheral zone will also tend to rise, though very marginally.

▪ *Impact on Socioeconomic* ----

This project will definitely alter the simple and quiet rural nature of the locality, which exists today.

As there will be flow of financial and material resources, there remains a large possibility of growth of population in the business, trade, commerce and service sector. The large inflow of financial and material resources accompanied with the urban culture complete with technological inputs as modern housing, water closets, radio, television, synthetic fibers, use of steel and aluminum, use of LPG/electricity for domestic cooking would all contribute towards changing the socioeconomic environment of the areas as this would introduce a mixed culture emphasizing urban traits in place of traditional, prevalent rural customs. The economic, cultural and technological changes are likely to induce social stress and ethical changes. All these would change the local life style.

Thus, a simple backward community may be transformed into a semi-urban complex within a short time frame. Such impacts are inevitable, that could also be felt in case of the proposed project; however, these would be attempted to be controlled and minimized by ensuring suitable human management, stable working conditions, security and the provision of adequate compensation.

▪ *Growth Dynamics and Stress Areas* ---

It has been observed that people always have a propensity to settle at locations where civic amenities as transportation, postal service, educational institutions, drinking water, market, medical treatment, electricity etc. are easily available within a short distance, as well as the working place being within a reasonable distance. Therefore, some migrated people would settle in the peripheral zone / proximate of the proposed project site.



CHAPTER – 5

ANALYSIS OF ALTERNATIVES

5.1 Introduction

IA Warsaliganj is one of the most prestigious projects of BIADA and is aimed towards offering the industrial land to Standalone Cement Grinding Units.

5.2 Justification for Site Selection

Project is being developed on land acquired by BIADA. As the land was vacant which was earlier used for Bihar State Sugar Corporation farm area, no displacement of population has been done for the present project.

Keeping in mind the availability of land, close proximity of railway station, airport, health care facility, schools, commercial markets and all other amenities, present site has been considered for development of Industrial Area for Standalone Cement Grinding Project.

Due to facts stated above no site alternatives have been considered for IA Warsaliganj project.



CHAPTER – 6

ENVIRONMENTAL MONITORING PLAN

6.1 Introduction

Monitoring of the post project environment is of utmost importance and has legal requirements. Regular monitoring of the environment helps in assessing the benefits of implementation of environment management plan. Proposed Project will adopt an effective monitoring plan with proper schedule as a step forward to ensure better environment management practices.

Monitoring involves periodic checking to ascertain whether activities are going according to the plans. It provides the necessary feedback for project management to keep the program on schedule. The purpose of the environmental monitoring plan is to ensure that the envisaged purpose of the project is achieved and results in desired benefits.

An environmental monitoring program is important as it provides useful information and helps to the effectiveness of mitigation measures:

- Assist in detecting the development of any unwanted environmental situation, and thus, provides opportunities for adopting appropriate control measures, and
- Define the responsibilities of the project proponents, contractors and environmental monitors and provides means of effectively communicating environmental issues among them.
- Define monitoring mechanism and identify monitoring parameters.
- Evaluate the performance and effectiveness of mitigation measures proposed in the Environment Management Plan (EMP) and suggest improvements in management plan, if required,

- Identify training requirement at various levels

6.1.1 Need for Environmental Monitoring

- Verify and support compliance with applicable Central & State environmental laws, regulations, permits, authorization, consent to operate, protocols and orders.
- Establish baselines and characterize trends in the physical, chemical, and biological condition of environmental media / matrix.
- Identify potential environmental problems and evaluate the need for remedial actions or measures to mitigate the problems.
- Detect, characterize, and report unplanned releases.
- Evaluate the effectiveness of flue gas from incinerator & leachate treatment and control, and pollution abatement programs.
- Determine compliance with commitments made in environmental impact statements, Form V – environmental statements, assessments
- EMS- ISO: 14001, safety analysis reports, or other official documents or for due diligence.

6.2 Objectives of Environmental Monitoring Program

- To evaluate the performance of mitigation measures proposed in the EMP.
- To evaluate the adequacy of Environmental Impact Assessment
- To suggest improvements in management plan, if required
- To enhance environmental quality.
- To implement and manage the mitigative measures defined in EMP.
- To undertake compliance monitoring of the proposed project operation and evaluation of mitigative measure.

6.3 Measurement Methodologies

6.3.1 Instruments to be used

The following instruments are being / will be used for data collection work in the monitoring Schedule:

- Respirable Dust Sampler (RDS)
- Fine Particulate Matter (FPM) Sampler
- Stack Monitoring Kit

- Sound Level Meter
- Micro Meteorological Station
- Water Level Indicator
- Global Positioning System (GPS)

In addition to the above instruments, the data on land use, vegetation and agricultural crops to be collected by the team by meeting with a large number of local inhabitants in the study area and different government departments / agencies

6.3.2 Monitoring Programme

The post project monitoring will include details of any major/ minor impact in the core zone and area within buffer zone for the following parameters: -

- Ambient Air Quality,
- Stack Emission
- Work zone Air quality,
- Water Quality and Ground Water Level
- Noise Level
- Wastewater Analysis
- Demography and socio-economic analysis based on last available census data for entire study area

This would be attained by collection of samples of water, stack emission, ambient air and work zone environment and analyzing the samples by various methods. Noise level would be monitored by a noise recorder and the data would be generated instantly.

Stack emission would be monitored from all the stacks. Work zone environment would be monitored at sensitive points of manufacturing areas, where the fugitive emissions would be visibly more.

The ambient air quality may be monitored at four locations, with one at the proposed project as the center point and the remaining three at 270° to each other in down wind direction. The locations would change with the season and the wind pattern.

6.3.3 Data Analysis

Monitoring data analysis will be done by MOEF&CC approved laboratory as per CPCB guidelines & timely submitted to concerned authority.

6.3.4 Monitoring / Reporting Schedule

The environmental monitoring must be done as per the schedule summarized in **Table 6.1**.

Table 6.1: Environment Monitoring Schedule

Environmental Component	Frequency of Monitoring / Sampling & Location	Parameters to be covered
Ambient Air Quality Monitoring	104 samples as per NAAQS 2009 (Biweekly basis)	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , & CO
Stack Emission Monitoring	Monthly for all Stacks / Exhaust	Flue Gas Temp., Velocity, Volumetric Flow Rate, & PM
Ambient Noise Level Monitoring	Monthly at 5 different locations	Ambient Equivalent contains noise level in dB(A) / Sound Pressure Level (Leq) at Day and Night Time
Ground Water / Drinking Water Quality	Monthly from Borewell and Drinking Water tap	pH, Turbidity, Total Dissolved Solids, Total Hardness, Calcium, Magnesium, Iron, Total residual free Chlorine, Alkalinity, Chloride, Sulphate, Nitrate, Fluoride, Coliform (MPN Value) & E.Coli
Surface Water Quality	2 stations in River Dhadhar U/s , D/s (One sample from upstream and one from downstream)	pH, Turbidity, Total Suspended Solids, Total Dissolved Solids, Chloride, DO, BOD, COD, Total Hardness, Total Alkalinity, Coliform (MPN Value), Faecal Coliform & E.Coli

6.3.5 Emergency Procedures

- Design, manufacture and construction of buildings, plant and machineries will be as per National and International Codes as applicable in specific cases and laid down by statutory authorities.
- Provision of adequate access ways for movement of equipment and personnel will be made.
- Minimum of two numbers of gates for escape during disaster will be provided.
- In the vicinity of main plant entrance, there will be an emergency assembly point where plant personnel will assemble in the event of any disaster.
- Adequate numbers of Fire Fighting Equipment and Fire Extinguishers will be installed in the work places for emergency purpose and the Supervisors / Workers will be trained to use the equipments.
- An ambulance will be provided in the factory premises.

- A qualified Doctor and a compounder will be employed for attending to any emergency

6.3.6 Budget allocation for Environmental Monitoring ;

Expenses for Environmental Monitoring Work at IA Warsaliganj will be the responsibility of the allottee for establishment of Standalone Cement Grinding Project.



CHAPTER - 7

ADDITIONAL STUDIES

7.1 Introduction

As per generic structure of the EIA/EMP report prescribed in EIA Notification dated 14.09.2006, this chapter is to comprise of risk assessment & disaster management, as well as public consultation. First Technical Presentation (for ToR approval) for the proposed project was held before SEAC/SEIAA, Bihar, the proposal was considered by the State Expert Appraisal Committee (SEAC), Bihar in its meeting held on 05.08.2023 for approval of TOR for preparation of EIA/EMP Report for obtaining Environmental Clearance.

As per the ToRs prescribed, the following Additional Studies were carried out for the proposed IA Warsaliganj project with Standalone Cement Grinding unit of 6 Million Ton / Annum Cement.

7.2 Public Hearing / Consultation

“Public Consultation” or “Public Hearing” refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

In view of the above, as per requirement of EIA notification 1006 and amendments thereof and as compliance to TOR issued by SEIAA, Bihar, Bihar vide F. No. SIA/7(c)/2449/2023 dated 24.08.2023 followed by TOR correction letter vide Ref. No. 334 Dt: 27.09.2023, Public hearing for the IA Warsaliganj Project for proposed Standalone cement grinding project will be conducted through Bihar State Pollution Control Board, Patna, after submission of the present Draft EIA/EMP Report.

After conducting public hearing, the issues raised during the public hearing, the response of the BCL along with action plan and budgetary allocation will be given in the final EIA report and submitted to SEIAA/SEAC Bihar for obtaining environment clearance.

7.3 Risk Assessment & Disaster Management Plan

Risk assessment and management is activity process about defining sources of uncertainty (risk identification), estimating the consequences of uncertain events/conditions (risk analysis), generating response strategies in the light of expected outcomes and finally, based on the feedback received on actual outcomes and risks emerged, carrying out identification, analysis and response generation steps repetitively throughout the life cycle to ensure that the project objectives are met.

Risk is often referred to as the presence of potential or actual threats or opportunities that influence the objectives of a project during construction, commissioning, or at time of use. Risk is also defined as the exposure to the chance of occurrences of events adversely or favorably affecting project objectives as a consequence of uncertainty.

7.3.1 Risk Assessment and Damage Control

Risk assessment is the determination of quantitative & qualitative value of risk related to a concrete situation and a recognized threat.

Activities requiring assessment of risk due to occurrence of most probable instances of hazard and accident are both on-site & off-site.

The cement grinding unit is labour intensive and does not use potentially hazardous manufacturing processes. Some examples of hazards are as under ;

- (i) Exposure to High Temperature
- (ii) Physical Hazards

EXPOSURE TO HIGH TEMPERATURES ;

The principal exposures to heat in the proposed project occur during handling of hot raw materials and operation & maintenance of hot equipments. Recommended prevention & control measures are as under ;

- Shielding surfaces where workers proximity and close contact with hot equipment is expected, using PPE i.e. insulated gloves & shoes.
- Minimizing the work time required in high temperature environments by implementing shorter shifts at these locations.

PHYSICAL HAZARDS ;

Injuries during project operations are typically related to slips, trips and falls, contact with falling/moving objects and lifting / over exertion. Other injuries may occur due to contact with or capture in, moving machinery (e.g. dump trucks, front loaders, forklifts). Activities related to maintenance of equipment, including crushers, mills, mill separators, fans, coolers and belt conveyors, represent a significant source of exposure to physical hazards. These hazards include the following ;

- Falling / impact with objects
- Hot surface burns
- Transportation
- Contact with allergic substances

Following mitigation measures will be implemented to prevent the physical hazards in the plant:

- Any person working on equipment with moving parts will personally ensure the equipment is de-energized, isolated and locked/tagged out.
- Any person working from a position with the potential risk for a fall from height will use fall protection measures.
- Prescribed PPE will be provided to all workers exposed to open processes or systems
- In case of any accident immediately & proper medical care will be provided at the plant site.

Following other mitigation measures will also be implemented for Risk assessment and damage control

- Design, manufacture and construction of buildings, plant and machineries will be as per National and International Codes as applicable in specific cases and laid down by statutory authorities.

- Provision of adequate access ways for movement of equipment and personnel will be made.
- Minimum of two numbers of gates for escape during disaster will be provided.
- In the vicinity of main plant entrance, there will be an emergency assembly point where plant personnel will assemble in the event of any disaster.
- Adequate numbers of Fire Fighting equipment and Fire extinguishers will be installed in the work places for emergency purpose and the Supervisors / Workers will be trained to use the equipments.
- An ambulance will be provided in the factory premises.
- A qualified Doctor and a compounder will be employed for attending to any emergency.

Emergencies may occur due to many reasons. It may occur due to natural causes like earthquake, cyclone, flood etc. It may occur due to malfunction of standard working systems or practices. There can be no set criteria for assessing the gravity of a disaster in the abstract since this depends to a large extent on the physical, economic and social environment in which it occurs. What would be consider a major disaster in a developing country, ill equipped to cope with the problems involved, may not mean more than a temporary emergency elsewhere. However, all disasters bring in their wake similar consequences that call for immediate action, whether at the local, national or international level, for the rescue and relief of the victims. This includes the search for the dead and injured, medical and social care, removal of the debris, the provision of temporary shelter for the homeless, food, clothing and medical supplies, and the rapid re-establishment of essential services.

7.3.2 Objectives of Risk & Disaster Management Plan

The overall objectives of the emergency plan will be :

- a) To localize the emergency and if possible eliminate it
- b) To minimize the effects of the accident on people & property.

Elimination will require prompt action by operations and works emergency staff using, e.g. fire fighting equipment, water sprays etc.

Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.

To deal with the above emergencies, the Emergency plan will be prepared.

Identification and Assessment of Hazards

Identification and Assessment of Hazards is crucial to on-site emergency planning and requires to systematically identify what emergencies could arise in the plant. Most major hazard accidents come within the following categories;

Events occurred during manufacturing process of cement

The following areas are identified as hazard prone in the proposed project where disaster management plan is required ;

a) Handling of Fine Dust

The hot raw materials will be stored in the silos. It is very common that the hot raw material gets jammed in the chute and screw conveyors. Always there is a possibility of hazard that the jammed material falls on the workers and due to hot temperature of the material, possibility of injury may occur to the worker. Sufficient care should be taken in the maintenance operations.

b) Handling of Cement

Cement is the fine dust which requires proper care in handling, storage and packing to avoid any health hazards.

The Risk & Disaster Management Plan (DMP) is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the Risk & Disaster Management Plan, it will be widely circulated and personnel training through rehearsals/drills.

The Risk & Disaster Management Plan would reflect the probable consequential severalties of the undesired event due to deteriorating conditions or through 'Knock on' effects. Further the management will be able to demonstrate that their assessment of the consequences uses good supporting evidence and is based on currently available and reliable information, incident data from internal and external sources and if necessary the reports of outside agencies.

To tackle the consequences of a major emergency inside the factory or immediate vicinity of the factory, a Risk & Disaster Management Plan has been formulated and this planned emergency document is called "Risk & Disaster Management Plan".

The objective of the Industrial Risk & Disaster Management Plan is to make use of the combined resources of the plant and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area;
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the Emergency.

In effect, it is to optimize operational efficiency to rescue, rehabilitation and render medical help and to restore normalcy.

7.3.3 Major Causes of On-site Emergency

Fire consequences can be disastrous, since cement plant will run on electricity only, where fire can be occur due to short circuit or electrical system malfunctioning. Preliminary hazard Analysis has provided a basis for consequence estimation. Estimation can be made by using various fire consequence calculations. During the study of risk assessment, the nature of damages is worked out and probability of occurrence of such hazards is also drawn up. Adequate fire fighting systems as per Tariff Advisory Committee (TAC) and OISD guidelines will be provided and maintained.

Communication is crucial factor in handling an emergency. In the proposed project any employee can raise an emergency alarm, so allowing the earliest possible action to be taken to control the situation.

Following on site measures will be adopted to avoid / minimize the risk of accidents & other hazards in proposed cement plant;

(i) Alarm & Communication System

Communication is crucial factor in handling an emergency. In the proposed project any employee can raise an emergency alarm, so allowing the earliest possible action to be taken to control the situation.

Alarm systems vary and will depend on the size of the plant. There will be an adequate number of points from an audible warning, or indirectly viz., a signal or message to a permanently manned location. The alarm will alert the people to implement appropriate emergency procedures. In areas where a high level of noise, it is necessary to install more than one audible alarm transmitter or flashing lights. Automatic alarms will also be installed on some appropriate sites.

There will be a reliable system for informing the emergency services as soon as the alarm is raised on site. The details of communication system will be agreed locally, in some cases it may be advisable to have a direct line to the fire brigade. Predetermined code words to indicate the scale and type of the emergency may be valuable.

(ii) Fire Fighting System

In view of vulnerability to fire, effective measures will be taken to minimize fire hazard. Fire protection is envisaged through hydrant and sprinkler system, designed as per the recommendation of TAC of Insurance Association of India. The following areas in the power supply section are mainly susceptible to fire:

- Cable galleries
- Electrical Switchgear / MCC room.
- Conveyors, transfer points, tunnels and storage yard.

For containment of fire and preventing it from spreading in cable galleries, section wise fire barriers with self-closing fire resistant doors will be provided. The ventilation systems, if any, provided in cable galleries will be interlocked with the fire alarm system, so that in event of a fire, the ventilation system will be automatically switched off. In order to avoid spreading of fire all cable entries opening in cable galleries, tunnels, channels, floors, barrier etc. will be sealed with non-inflammable / fire resistant sealing materials.

For detection & protection of the plant against fire hazard, any one or a combination of the following systems will protect susceptible areas:

- Hydrant System

- Automatic high velocity spray system
- Medium velocity spray system
- Portable fire extinguishers
- Fire alarm systems

Fire hydrant points will be provided throughout the premises. Automatic high velocity spray system will be provided for protection of transformers and cable galleries. Manual medium velocity spray system will be provided for protection.

Water for hydrant, spray and sprinkler system will be supplied from the firewater pumps located in firewater pump house adjacent to Raw Water Reservoir. Adequate number of portable and mobile chemical fire extinguishers will be provided at strategic locations throughout the plant. Fire detection and alarm system will be provided at strategic locations throughout the plant. Fire detection and alarm system will be provided to detect fire/smoke in vulnerable areas of the plant through smoke / heat detectors.

7.4 Emergency Action Plan

The emergency action plan consists of:

- First information
- Responsibilities of Work Incident Controller
- Responsibilities of Chief Incident Controller
- Responsibilities for Declaration of Emergency
- Responsibilities for Emergency Communication Officer
- Responsibilities of key personnel
- Responsibilities and action to be taken by essential staff and various teams during emergency and
- Responsibilities for All Clear Signal.

The first person who observes/identifies the emergencies will inform by shouting and by telephone to the Shift Engineer and Fire Station about the hazard. The Shift Engineer will inform to Works Incident Controller, Chief Incident Controller and also telephone operator will communicate it to all key personnel.

7.4.1 Responsibilities of Work Incident Controller

The Work Incident Controller on knowing about an emergency immediately will rush to the incident site and take overall charge and inform the same to Chief Incident Controller (General Manager). On arrival, he will assess the extent of emergency and decide if major

emergency exists and inform the communication officer accordingly. His responsibilities will be to ensure compliance to the duties (1 to 6) listed below.

7.4.2 Responsibilities of Chief Incident Controller

The General Manager, who is also the Chief Incident Controller, will assume overall responsibilities for the factory/storage site and its personnel in case of any emergency. His responsibilities are to:

1. Assess the magnitude of the situation and decide if staff needs to be evacuated from their assembly point to identified safer places. Declare on-site/off-site emergency.
2. Exercise direct operational control over areas other than those affected.
3. Undertake a continuous review of possible developments and assess in consultation with key personnel as to whether shutting down of the plant or any section of the plant and evacuation of personnel are required.
4. Liaison with senior officials of Police, Fire Brigade, Medical and Factories Inspectorate and provide advice on possible effects on areas outside the factory premises.
5. Look after rehabilitation of affected persons on discontinuation of emergency.
6. Issue authorized statements to news media, and ensures that evidence is preserved for inquiries to be conducted by the statutory authorities.

7.4.3 Responsibilities for Declaration of Major Emergency

- Making the emergency known inside the plant

The major emergency will be made known to everyone inside the plant by resounding the alarm. Separate alarms to warn different types of major emergencies such as fire and explosion or toxic gas escape will be provided. Public address system is also available throughout the plant.

Announcement will be made by the concerned official/interpreter in local language. Similarly announcement for termination of the emergency will also be announced.

7.4.4 Responsibilities of Emergency Communication Officer (ECO)

On hearing the emergency alarm he will proceed to Emergency Control Center. He will:

- Report to Chief Incident Controller and Work Incident Controller and maintain contact with them.
- On information received from the WIC of the situation, recommending if necessary, evacuate the staff from the assembly points.

- Identify suitable staff to act as runner or messenger who is listed in the Essential staff, between him and the Works Incident Controller if the telephone and other system of communication fail due to any reason.
- Maintain inventory of items in the emergency control center.
- Contact local meteorological office to receive early notification of changes in weather condition in case of gas leak and prolonged action.
- Maintain a log of incidents.
- Keep in constant touch with happenings at the emergency site and with WIC

7.4.5 Key Personnel

Apart from Works Incident Controller and Chief Incident Controller, other works personnel will have key role to play in providing advice and in implementing the decisions made by the Chief Incident Controller. The key personnel include:

A. Engineer-in-charge responsible for

- Operation
- Electrical Maintenance
- Mechanical maintenance
- C&I
- Chemical

B. Head of Personnel and Officers connected with Labour Welfare

C. Head (Technical Service)

7.4.6 Responsibilities of Key Personnel

▪ *Department Heads*

The departmental heads will provide assistance as required by the WIC. They will decide which members of their departments are required at the incident site.

▪ *Chief Personnel Manager*

- A. Report to Work Incident Controller;
- B. Ensure that all non-essential workers in the affected areas are evacuated to assembly points in consultation with the Chief Incident Controller;
- C. Receive reports from nominated persons from assembly points, and pass on the absence information services;
- D. Keep liaison with other coordinators to meet the requirements of services such as materials, security management, transportation, medical, canteen facilities etc. as required during emergency;

- E. Be in constant touch with the Chief Incident Controller and feed him correct information of the situation;
- F. Give information to press, public and authorities concerned on instructions from the CIC/WIC;
- G. Ensure that casualties receive adequate attention at medical center and arrange required additional help and inform relatives of the injured;
- H. Arrange to inform public on Radio and TV about evacuation etc.; and
- I. Arrange TV coverage on handling emergency.

- **In-Charge**

On knowing about an emergency, he will report to CIC and assist him in all activities. He will also liaison with all teams.

- **Medical Officer**

Medical Officer will render medical treatment to the injured and if necessary will shift the injured to nearby Hospitals. He will mobilize extra medical help from outside if necessary.

- **Safety Officer**

On hearing the Emergency alarm he will proceed to main entrance/main gate. He will:

- a) Make sure that all safety equipment are made available to the emergency teams;
- b) Arrange to control the traffic at the gate and the incident area;
- c) Direct the security staff to the incident site to take part in emergency operations under his guidance and supervision;
- d) Evacuate the persons in the plant or in the nearby areas as advised by WIC after arranging the transport through the Transport in-charge;
- e) Allow only those people who are associated with handling emergency;
- f) Maintain law and order in the area, if necessary seek the help of police and
- g) Maintain communication with CIC/WIC and ECO.

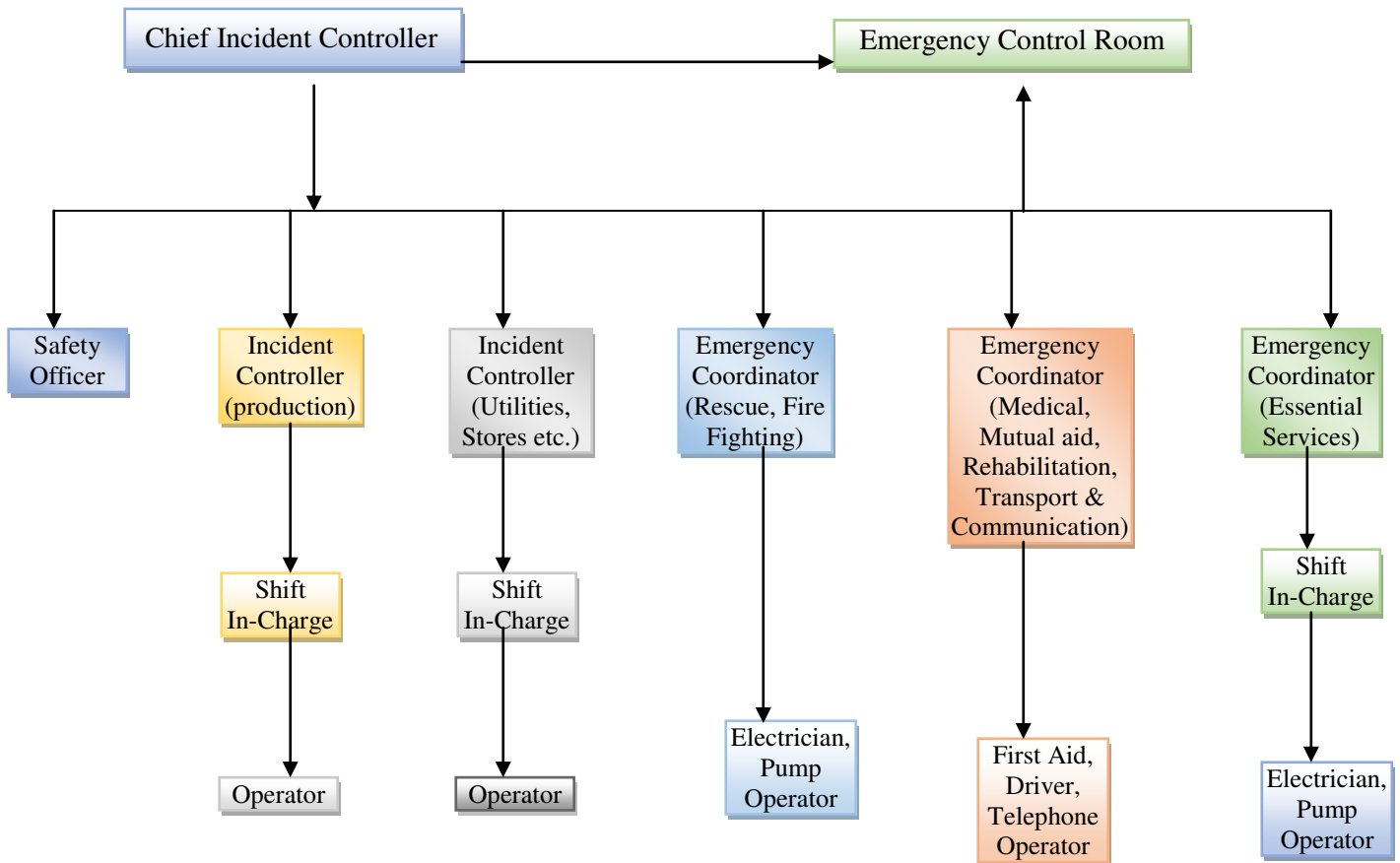
- **Fire Office**

On hearing the emergency, he will reach the fire station and arrange to sound the alarm as per the type of emergency in consultation with WIC, He will:

- a) Guide the fire fighting crew i.e. firemen and trained plant personnel and shift the fire fighting facilities to the emergency site. Adequate facilities will be made available;
- b) Take guidance of the WIC for fire fighting as well as assessing the requirement of outside help;
- c) Maintain communication with WIC, CIC and ECO.

- Transport -in-Charge
On hearing the emergency alarm he will immediately report to Work Incident Controller. He will:
 - a) Ensure availability of auto base vehicles for evacuation or other duties, when asked for ; and
 - b) Make all arrangements regarding transportation.

The onsite emergency plan structure is presented in Figure below ;



7.5 Off-Site Emergency Preparedness Plan

The task of preparing the Off-Site Emergency Plan lies with the district collector, however the off-site plan will be prepared with the help of the local district authorities. However, it can be observed from the risk modeling that the damage contours will be within the plant boundary and therefore on-site emergency plan has more significance. The off-site emergency preparedness plan should be based on the following guidelines.

Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off-site emergency. Off-

site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighboring population.

The off-site plan in detail will be based on those events, which are most likely to occur, but other less likely events, which have severe consequence, will also be considered. Incidents which have very severe consequences yet have a small probability of occurrence should also be considered during the preparation of the plan. However, the key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off-site plan are described below. Depending on local arrangements, the responsibility for the off-site plan should be either rest with the works management or, with the local authority. Either way, the plan should identify an emergency co-ordinating officer, who would take the overall command of the off-site activities. As with the on-site plan, an emergency control center should be setup within which the emergency co-ordinating officer can operate.

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors:

- a) In the case of a major fire but without explosion risk areas close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically
- b) If a fire is escalating, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people will be advised to stay indoors and shield themselves from the fire
- c) For release or potential release of toxic materials, limited evacuation may be appropriate down wind if there is time. The decision would depend partly on the type of housing "at

risk". Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty house, which can exist close to factories, offer little or no protection.

The major difference between releases of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say 300 m per minute covers a large area of land very quickly. Any consideration of evacuation should take this into account. Although the plan will have sufficient flexibility built in to cover the consequences of the range of accidents identified for the on-site plan, it will cover in some detail the handling of the emergency to a particular distance from each major hazard works.

7.5.1 Aspects proposed to be considered in the Off-Site Emergency Plan

The main aspects, which will be included in the emergency plan, are:

- *Organization*

Details of command structure, warning systems, implementation procedures, emergency control centers. Names and appointments of incident controller, site main controller, their deputies and other key personnel.

- *Communications*

Identification of personnel involved, communication center, call signs, network, and lists of telephone numbers.

- *Specialized knowledge*

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized chemical knowledge, laboratories.

- *Voluntary organizations*

Details of organizers, telephone numbers, resources etc.

- *Chemical information*

Details of the any hazardous substances stored or procedure on each site and a summary of the risk associated with them.

- *Meteorological information*

Arrangements for obtaining details of whether conditions prevailing at the time and whether forecasts.

- *Humanitarian arrangements*

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

- *Public information*

Arrangements for (a) dealing with the media press office; (b) informing relatives, etc.

- *Assessment of Emergency Plan*

Arrangements for: (a) collecting information on the causes of the emergency; (b) reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.5.2 Role of the Emergency Co-ordinating Officer

The various emergency services should be co-ordinated by an emergency co-ordinating officer (ECO), who will be designated by the district collector. The ECO should liaise closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

7.5.3 Role of the Local Authority

The duty to prepare the off-site plan lies with the local authorities. The emergency planning officer (EPO) appointed should carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO should liaise with the works, to obtain the information to provide the basis for the plan. This liaison should ensure that the plan is continually kept up to date. It will be the responsibility of the EPO to ensure that all those organizations which will be involved off site in handling the emergency, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off-site plans should be organized by the EPO.

7.5.4 Role of Police

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. Their functions should include controlling bystanders evacuating the public, identifying the dead and dealing with casualties and informing relatives of death or injury.

7.5.5 Role of Fire Authorities

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions and toxic release. Fire authorities in the region should be appraised about the location of all stores of flammable materials, water and foam supply points and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants and, on occasion, as observers of exercises involving only site personnel.

7.5.6 Role of Health Authorities

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, will have a vital part to play following a major accident and they will form an integral part of the emergency plan. For major fires, injuries should be the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. For major toxic releases, the effects vary according to the chemical in question, and the health authorities should be appraised about the likely toxic releases from the plant which will be unable then in dealing with the aftermath of a toxic release with treatment appropriate to such casualties.

Major off-site incidents are likely to require medical equipment and facilities additional to those available locally and a medical " mutual aid " scheme should exist to enable the assistance of neighboring authorities to be obtained in the event of an emergency.

7.6 Occupational Health & Safety

The proposed plant where multifarious activities are involved during construction, erection, testing, commissioning, operation and maintenance, the men, materials and machines are the basic inputs. Along with the boons, the industrialization generally brings several problems like occupational health and safety.

The industrial planner, therefore, has to properly plan and take the steps to minimize the impacts of industrialization and to ensure appropriate occupational health, safety including fire plans. All these activities again may be classified under construction and erection and operation and maintenance. The proposed safety plan is given below:

7.6.1 Occupational Health

Occupational health needs attention both during construction and erection and operation and maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

▪ **Construction and Erection**

The occupational health problems envisaged at this stage can mainly be due to constructional accident and noise. To overcome these hazards, in addition to arrangements to reduce it within TLV's, personal protective equipment's will also be supplied to workers.

▪ **Operation and Maintenance**

The problem of occupational health, in the operation and maintenance phase is due to noise hearing losses. Suitable personnel protective equipment will be given to employees. The working personnel will be given the following appropriate personnel protective equipment:

- Industrial Safety Helmet
- Crash Helmets
- Face shield with replacement acrylic vision
- Zero power plain goggles with cut type filters on both ends
- Zero power goggles with cut type filters on both sides and blue color glasses
- Welders equipment for eye and face protection
- Cylindrical type earplug
- Ear muffs
- Canister Gas mask
- Self contained breathing apparatus
- Safety belt/line man's safety belt
- Leather hand gloves
- Canvas cum leather hand gloves with leather palm
- Electrically tested electrical resistance hand gloves
- Industrial safety shoes with steel toe and
- Electrical safety shoes without steel toe and gumboots.

Full fledge hospital facilities will be made available round the clock for attending emergency arising out of accidents, if any. All working personnel will be medically examined at least once in every year and at the end of his term of employment. This is in addition to the pre-employment medical examination.

7.7 Safety Plan

Safety of both men and materials during construction and operation phases is of concern. The preparedness of an industry for the occurrence of possible disasters is known as emergency plan.

Keeping in view the safety requirement during construction, operation and maintenance phases at the Plant, the project proponent would formulate safety policy with the following regulations:

- To allocate sufficient resources to maintain safe and healthy conditions of work
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment
- To ensure that adequate safety instructions are given to all employees
- To provide wherever necessary protective equipment, safety appliances and clothing and to ensure their proper use
- To inform employees about materials, equipment or processes used in their work which are known to be potentially hazardous to health or safety
- To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and up to date knowledge
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work
- To provide appropriate instruction, training, retraining and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service;
- To organize collection, analysis and presentation of data on accident, sickness and incident involving personal injury or injury to health with a view to taking corrective, remedial and preventive action
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees
- To publish/notify regulations, instructions and notices in the common language of employees
- To prepare separate safety rules for each types of occupation/processes involved in the project and
- To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipment's, work places and operations.

7.8 Safety Organization

– Construction and Erection Phase

A qualified and experienced safety officer will be appointed. The responsibilities of the safety officer includes identification of the hazardous conditions and unsafe acts of

workers and advise on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of Safety Rules/ Statutory Provisions. In addition to employment of safety officer by Plant, every contractor, who employs more than 250 workers, will also employ one safety officer to ensure safety of the worker, in accordance with the conditions of contract.

– **Operation and Maintenance Phase**

When the construction is completed the posting of safety officers would be in accordance with the requirement of Factories Act and their duties and responsibilities would be as defined there of.

7.9 Safety and Quality Circle

In order to fully develop the capabilities of the employees in identification of hazardous processes and improving safety and health, safety and quality circles would be constituted in each area of work. The circle would consist of 5-6 employees from that area. The circle normally will meet for about an hour every week.

7.10 Safety Training

Safety training would be provided by the Safety Officers with the assistance of faculty members called from Professional Safety Institutions and Universities. In addition to regular employees, limited contractor labors would also be provided safety training. To create safety awareness safety films would be shown to workers and leaflets would be distributed. Some precautions and remedial measures proposed to be adopted to prevent fires are:

- Compartmentation of cable galleries, use of proper sealing techniques of cable passages and crevices in all directions would help in localizing and identifying the area of occurrence of fire as well as ensure effective automatic and manual fire fighting operations
- Spread of fire in horizontal direction would be checked by providing fire stops for cable shafts
- Reliable and dependable type of fire detection system with proper zoning and interlocks for alarms are effective protection methods for conveyor galleries
- House keeping of high standard helps in eliminating the causes of fire and regular fire watching system strengthens fire prevention and fire fighting and
- Proper fire watching by all concerned would be ensured.

7.11 Health and Safety Monitoring Plan

All the potential occupational hazardous work places would be monitored regularly. The health of employees working in these areas would be monitored once in a year for early detection of any ailment due to exposure of plant operation.

7.12 Social Impact Assessment. R&R Action Plans

Public relations strategy has been developed to select employment avenues for local population; provide training to local people and later employing them in the plant as per their skill and job knowledge, purchase local goods and services; encourage local entrepreneurship around the plant, encourage women's participation in environmental conservation measures and create awareness about environmental health and pollution, encourage respect for local culture, traditions, religious beliefs and promote local folk dance, music and sports.

Impact during Construction

▪ *Impact on Demography* ---

The peak workforce strength during construction would rise-up to hundred persons. Though the technical persons and skilled labors would be from outside the area, bulk of the labor force would comprise of unskilled and semi-skilled workers, a substantial number of whom would presumably be recruited from the surrounding areas itself. Since majority of the unskilled workforce would be from surrounding areas, they would settle in the villages.

Therefore, the demographic scenario including population, sex-ratio, literacy level etc. would undergo certain local changes within a limited peripheral zone. The overall impact over the study area would be marginal.

▪ *Impact on Socioeconomic* ---

Establishment of any major industrial project invariably results in socioeconomic changes. The influx of material and money lends to change the economic status of the community. Markets, workshops and commercial centers would develop in the area.

Establishment of the proposed project will involve a substantial unskilled labor force. Since most of the unskilled labor force will be from nearby village, unplanned and haphazard development of slums would not be significant. However, labour camps with provision of basic amenities of water supply and sanitation etc. would be provided which would go long way in curbing the degradation of the physical and aesthetic environment.

▪ *Project Affected Persons (PAP) ---*

There will not be any project affected person, due to the fact that the entire land required for the proposed project is vacant and owned by project proponent on lease hold basis.

▪ *Rehabilitation and Resettlement Programme ---*

As mentioned earlier the land belongs to the project proponent, rehabilitation or resettlement problem do not exist.

Impact during Operation

▪ *Impact on Demographic Pattern ---*

The proposed project will generate employment opportunities both in direct and indirect manner. In direct mode people will get additional jobs in proposed expansion project and in indirect mode people will be appointed as company authorized dealers & sellers. The total Contractor's manpower approx. 210 Nos. (Direct employment 60 and indirect employment 150) including, Managerial Staff, Technical Staffs and labours will be employed / engaged temporarily during plant erection and commissioning only in proposed cement project. However all existing manpower will be adequate for operations.

Moreover, a sizeable number of service class people who are directly connected with the operating personnel of the plant, e.g. house servants, washer man, barbers, shopkeepers etc. will flow in from the neighboring areas. As the plant and its ancillary facilities act as an active nucleus of activity, a shift of population towards this center will also occur within the study area. This would result in an alteration of the local demographic pattern. The literacy level of people and their families involved in the operation of the plant would certainly enhance the overall literacy rate within the study area. The population density in the peripheral zone will also tend to rise, though very marginally.

▪ *Impact on Socioeconomic* ----

This project will definitely alter the simple and quiet rural nature of the locality, which exists today.

As there will be flow of financial and material resources, there remains a large possibility of growth of population in the business, trade, commerce and service sector. The large inflow of financial and material resources accompanied with the urban culture complete with technological inputs as modern housing, water closets, radio, television, synthetic fibers, use of steel and aluminum, use of LPG/electricity for domestic cooking would all contribute towards changing the socioeconomic environment of the areas as this would introduce a mixed culture emphasizing urban traits in place of traditional, prevalent rural customs. The economic, cultural and technological changes are likely to induce social stress and ethical changes. All these would change the local life style.

Thus, a simple rural community may be transformed into a semi-urban complex within a short time frame. Such impacts are inevitable, that could also be felt in case of the proposed project; however, these would be attempted to be controlled and minimized by ensuring suitable human management, stable working conditions, security and the provision of adequate compensation.

▪ *Growth Dynamics and Stress Areas* ---

It has been observed that people always have a propensity to settle at locations where civic amenities as transportation, postal service, educational institutions, drinking water, market, medical treatment, electricity etc. are easily available within a short distance, as well as the working place being within a reasonable distance.

Therefore, some migrated people would settle in the peripheral zone / proximate of the proposed project site.



CHAPTER – 8

PROJECT BENEFITS

8.1 Introduction

IA Warsaliganj, is one of the most prestigious projects of Bihar Industrial Area Development Authority (BIADA) and is aimed towards establishment of Standalone Cement Grinding Project.

8.2 Improvement in the Physical / Social Infrastructure

In order to promote Industrialization in Bihar State, BIADA is allotting land to investors in different Industrial Area within Bihar State. BIADA is providing basic infrastructural facilities, viz. approach roads, boundary walls and water etc. within its industrial area projects. Proposed cement grinding unit for production of different types of cement, target state of Bihar and Jharkhand as potential market. Bihar is lagging behind in the infrastructure and development sector due to lack of capital formation and a sense of uncertainty in the minds of the entrepreneurs for creating big ventures.

However, even the above facts 6.7 million ton consumption is much lower than the 15-17 million ton consumed by larger states as Maharastra and Tamil Nadu which reflects that this growth will increase with real estate development in Bihar.

In the period 2011-12, Bihar was the country's fastest growing state in economic terms, with growth rate of 13.1 % for the year 2011-12. This followed a growth rate of 14.8% in the previous years.

Moreover, consumption of cement will increase further because of increasing demand of rural housing sector in Bihar. Total installed capacity of cement in Bihar is 12 Million Ton (MT) comprising of 4 large units under operation. Consumption of cement in Bihar is more than the amount produced. Therefore, setting up of new cement plants in Bihar are viable option for entrepreneurs.

Cement demand in India is expected to increase due to government's push for large infrastructure projects, leading to 322 million tonnes of cement by 2018 end. India's cement demand is expected to reach 424 million tonnes per annum (MTPA) by 2022. The housing sector is the biggest demand driver of cement, accounting for about 60-70 per cent of the total consumption in India. The other major consumers of cement include infrastructure at 10-15 per cent, commercial construction at 10-14 per cent and industrial construction at 8-10 per cent. To meet the rise in demand, cement companies are expected to add 127 million tonnes (MT) capacity over the next 3-4 years. The cement capacity in India may register a growth of 6-7 per cent by next year end to 491 MT from the current level of 465 MT. It may increase further to 592 MT by the end of 2022. The demand Indian cement industry is catered by a few companies. The top 20 cement companies meeting almost 70 per cent of the total cement production of the country.

In 2011-12 around 6.17 MT out of the target region demand i.e. 6.74 MT is met by the outside players of Madhya Pradesh, Jharkhand, Chattisgarh, Orissa & West Bengal. The other states supplying cement to Bihar are U.P., Maharashtra, Rajasthan and A.P.

The Government of Bihar endeavors to work towards rapid economic growth with regional balance to bring about prosperity in the state. One of the priority areas of the government is to create a favorable investment environment for increasing industrial production and to create employment opportunities.

The New Industrial Policy proposes to add maximum value to the available abundant natural resources in the state. The policy aims to provide necessary infrastructure for investment, reducing the cost of production for the investor and ensuring an investor friendly administration.

Keeping in view the present market trend as well as the present infrastructure requirement for economic growth of the Bihar in particular and the Eastern region as a whole for the proposed Cement Grinding unit at Industrial Area, Block Warsaliganj, Dist.: Nawada, Bihar is a viable project and will not face any problem in marketing its product.

Since the state of Bihar is expected to remain a cement deficit zone and the deficit is likely to be increasing progressively in the coming years, any new company desiring to set up cement manufacturing facilities would have no problem in selling its

production in the state. Being a local cement producer the company would get freight advantage.

Construction project requires a large number of manpower in the form of labors. Though the surrounding area is rural, there are plenty of unemployed persons who can be engaged as local labours. The total number of persons required for construction of the project will be around 100 during construction stage and 25 staffs required at operation stage including skilled, semi-skilled and unskilled persons, thus same number of persons will have earnings from this project.

In addition, local people may be engaged during construction and operation as security personal and maintenance staffs for this project which will have economical and social impact on the unemployed youths.

The community can look forward to benefit due to more jobs and also better access to utilities. The benefit relate to the direct employment associated with the construction. Considering the increasing emphasis of employment in the village, the locals would have the opportunities for jobs, closer to their place of stay. Expenditure incurred by those employed at the project will boost local economy in the village. Jobs would be created for unskilled, semi-skilled as well as skilled labour category, for which locals would be given preference and there by the overall development of the region is envisaged.

8.3 Corporate Environment Responsibility (CER)

CER is a voluntary activity of an enterprise/entity/project authorities which supports social interests and environmental issues. It is the activity to contribute to the welfare of the society and not only maximize their profits. CER, in fact, is about business giving back to the society. CER is the commitment of businesses to contribute for sustainable economic development of the society by working with the employees, their families, local community to improve their lives in ways for overall development.

BIADA has allocated an amount of Rs. 12 Lakhs (2 % of total project cost i.e. Rs. 6 crore) towards CER activities.

8.4 Employment potential –skilled; semi-skilled and unskilled

Proposed project activities will require skilled, semi skilled and unskilled labor force during construction and commissioning stage of the project.

Due to proposed project 250 nos. of persons will get employed in different capacities within proposed Cement Grinding Project within IA Warsaliganj.

8.5 Other Tangible Benefits

The proposed Cement Grinding Project within IA Warsaliganj project will increase the economic activities around the area, creating avenues for direct/indirect employment in the post project period. There would be a wider positive economic impact in terms of generating opportunities for other business too due to establishment of IA Warsaliganj.



CHAPTER – 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification vide Gazette Notification No. S.O. 1533 Dt: 14th Sept., 2006 and amendments thereof, Appendix III, Generic Structure of EIA, SL. No. 9, “Environmental Cost Benefit Analysis” is applicable only, if the same is recommended at the Scoping stage.

Not applicable, as this chapter is needed if recommended at the scoping stage and ibn TOR granted by SEIAA, Bihar Environmental Cost Benefit Analysis has not been asked for.



CHAPTER - 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 Introduction

In view of the global concept of sustainable development, Environment Management is a crucial segment of Industrial Management. Apart from the social obligation, the industries are liable to meet a series of statutory norms laid by Government bodies. Better environment management means less waste generation, better resources management leading to cost savings. Further, it gives a better public image. Therefore, preparation of Environmental Management Plan is a must to fulfill bifocal aspect of the statutory compliance as well as that of social concern. Water needs for the proposed project is reasonably low, but generally this resource is declining. Thus, on one hand one should use it less and on the other the source should not be left polluted for others. Air environment needs to be continuously managed, because all human being needs inhalation every moment, so also is Flora and Fauna dependent on it. The biological aspects, soil and ground water are all interdependent.

Thus, there is a need of proper environmental management and a conscious plan for it.

10.2 Objectives of Environmental Management Plan

- a) To define the components of environmental management.
- b) To prepare an environmental hierarchy.
- c) To prepare a checklist for statutory compliance.
- d) To prepare for an environmental concerned organization.
- e) To prepare a schedule for monitoring and compliance.
- f) Environmental management plan will be implemented under the following aspects such as ;

- Air environment
- Noise environment
- Water environment
- Solid waste
- Greenbelt
- Implementation of EMP and monitoring programme

10.3 Checklist of Statutory Obligations

There are a number of environmental statutes required to be attained by the industries. The proposed project will obey the provisions of all relevant Acts, Rules, Notifications and Orders.

The checklist of these obligations, which facilitates the obedience of the laws of land are given below:

- a) Water (Prevention and Control of Pollution) Act, 1974;
- b) Water (Prevention and Control of Pollution) Cess Act, 1977;
- c) Air (Prevention and Control of Pollution) Act, 1981;
- d) Environment (Protection) Act, 1986 and amendments thereof;
- e) Environment (Protection) Rules, 1986 and amendment thereof;
- f) Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016;
- g) All the conditions laid at consent under Water Act, 1974;
- h) All the conditions laid at consent under Air Act, 1981; and
- i) EIA Notification'2006 and amendments thereof.

10.4 Implementation of Environmental Clearance Conditions ;

Conditions of Environmental Clearance will be implemented by the investors to whom BIADA allocated IA Warsaliganj for establishment of Standalone Cement Grinding Project. An Environment Management Cell (EMC) will be developed by an effective mixing of a group of technical experts from various fields of the project to look after the all obligatory requirements and shall be responsible for the effective implementation of all environmental pollution control measures. The EMC will be headed by qualified environmental experts.

10.5 Construction Phase Environment Management

BIADA has allotted the IA Warsaliganj to investors for establishment of Standalone Cement Grinding Project. BIADA will only develop basic infrastructure facility for IA Warsaliganj, viz., Boundary Wall, Office, Security room etc. and hand over the site to investors of Standalone Cement Grinding Project for further development.

10.5.1 Site Preparation

The development of IA Warsaliganj site for erections of Standalone Cement Grinding Project plant structure, office building and other allied activities shall require careful management planning as the construction activities shall be located in plain barren land owned by the project proponent. Therefore, construction site development process should incorporate certain precautions.

It is necessary to control the dust nuisance that would be created by excavation, leveling and transportation activities so that impacts on the various components of environment would be minimized.

10.5.2 Sanitation

The construction area should be provided with proper and sufficient sanitation facilities in order to maintain adequate hygiene condition of working personnel.

10.5.3 Noise

Though noise level of construction activities shall not be very high, still some specific sources of noise like welding, transportation, movement of earth movers, tractors, concrete or asphalt mixing etc. will be carried out in a controlled manner. Neither the plant nor the construction workers would be exposed to excessive noise levels.

10.5.4 Construction Equipment and Waste

Transport vehicles as well as transport routes will be properly maintained during whole construction phase to minimize smoke / dust emission from vehicle exhausts and unpaved roads. Composite solid wastes including metal scrape, earthwork, other wastes, getting generated in construction process should be disposed off in safe manner.

10.5.5 Site Security

Construction site has a potential hazardous environment. To ensure that the local inhabitants and stray cattle are not exposed to these hazards, the site shall be secured by fencing and manned entry points. It will be fully illuminated during nighttime.

10.6 Operational Phase Environment Management

10.6.1 Air Environment

The monitored ambient air quality has been found to be within the norms of NAAQS 2009, prescribed by Central Pollution Control Board. However, to improve the air quality and minimize the impact due to the proposed Greenfield cement grinding project operations proper care will be taken by the project authorities.

Moreover, Standalone cement grinding unit will install proper air pollution control device i.e. Reverse Pulse Jet Bag Filter system based on most modern technology and ensure their effective operation and proper maintenance to minimize air pollution level. Proposed green belt will also act as damper for air & noise pollution. Mostly dust capturing species will be planted to further minimize the air pollution load due to operation of Cement project.

Stack Emission results will be maintained within $< 30 \text{ mg/Nm}^3$ which is within the limits of BSPCB & E (P) Rules.

10.6.2 Fugitive Emissions

Following precautionary measures will be adopted for controlling and minimizing fugitive dust emission ;

- Water spraying will be done inside and around the factory premises for dust suppression.
- Proper maintenance and clearing of the roads inside the plant to avoid excess fugitive dust generation
- Raw materials and cement carrying trucks will be covered to stop dust emission
- Monitoring of the consented parameters at ambient station
- Monitor the work zone at various stations to satisfy the corporate requirements for health and environment.

10.6.3 Water Environment

The water will be used only for cooling and domestic purposes and only domestic waste water will be generated. No industrial waste water will be generated, hence there will not be any adverse effect on the water environment by operation of the proposed project. Domestic waste water will be diverted into a septic tank followed by soak pit.

Moreover, it is proposed to implement Rain water harvesting scheme in which rain water will be stored in open pond (Area approx 1-2 Acre. will be proposed) and rain water discharged from rooftop to collect in recharge pits in the ground. Thus, any excess rainwater collected, will help in recharging the groundwater.

10.6.4 Noise Environment

The following precautionary measures are to be adopted in the proposed project ;

- While purchasing the major plant equipment or machines, these machineries and equipment must meet the CPCB and MoEFCC standards. Proper care must be taken at the time of installation to insulate/enclose all the noise sources to avoid occupational exposure to the workers and also to minimize the generation of excess noise level.
- Monitor the ambient noise level and work zone noise level as per the monitoring schedules to conform the stipulated norms.
- Noise attenuation devices such as ear mufflers must be provided to the workers in the high noise exposure areas.
- Regular maintenance and greasing of equipment and machineries will further reduce the noise level inside the factory periphery.

10.6.5 Biological Environment

Special attention is required to maintain green belt in and around the factory premises.

- Adequate provisions will be provided to facilitate daily watering of all plants and lawns. Special attention provided during summer to ensure that the green belt does not suffer from water shortage.
- Development and maintenance of green belt to be considered as a priority issue.
- No outside soil is brought for any building developments.
- The emissions of particulate matter from the stacks are to be maintained within the limit of 30 mg/Nm³.

10.6.6 Socio-Economic Environment

- The operators and workers are to be trained in various aspects of ESH (Environment, Safety and Health). The managers and officers involved in Environment Management Cell shall undergo refresher workshop and up-gradation of information on various environmental issues.
- The project authorities will help in promoting the activities related to environmental awareness in nearby villages.
- The project authorities will help in promoting local people for livelihood commensurate with their will, skill and abilities.
- Project authorities have proposed to construct Dispensaries and will appoint a part time doctor for employees and to service the local people.
- Project authorities also intend to start a primary school for helping the children of the employees and surrounding village population.
- Many other welfare measures will be taken from time to time.
- Project authorities have allocated an amount of Rs. 12 lakhs towards Corporate Environmental Responsibilities (CER).

10.7 3R's Concept of Waste Minimization, (Reuse, Recycle & Recover techniques)

- Cement dust will be generated from dust collection system.
- Cement dust generated from dust collection system will be collect and will be recycled and resued in cement manufacturing process.
- Cooling water will be recycle and reuse in close circuit arrangement.
- STP treated water will be recycle and reuse within premises for dust suppression and green belt irrigation.

10.8 Energy Conservation

Following measures will be adopted to make the proposed project more energy efficient. Specific energy conservation measures proposed are as under:

- Installation of energy efficient lightings. Use of energy saving light fittings.
- Installation of LED lights.
- Procurement of energy efficient machineries
- Minimizing idle running of vehicle, machines and electrical appliances.

- Optimizing loads and periodic preventive maintenance & lubrication
- Awareness training & motivational programmes

10.9 **Occupational Safety and Health**

All precautionary methods will be adopted by the proponent to reduce the risk of exposure of employees to occupational safety and health hazards.

Pre and post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee. Pulmonary function test and periodical medical check up will be done once in every year.

The following tests will be conducted for each worker :

- Lung Function Test
- Radiology – X-ray
- Pulmonary Function Test
- Audiometric Test
- General clinical examination with emphasis on respiratory system
- Pre employment examinations
- Periodical medical examinations at the time of employment and after completion of employment.

For the safety of workers, personnel protective appliances like hand gloves, goggles, aprons, ear mufflers, nose mask etc. will be provided. Nose mask will be provided at places, where there is possibility of dust generation.

Proper ventilation system will be provided in the process area.

10.10 **Risk Assessment and Damage Control**

- Design, manufacture and construction of buildings, plant and machineries will be as per National and International Codes as applicable in specific cases and laid down by statutory authorities.
- Provision of adequate access ways for movement of equipment and personnel will be made.
- Minimum of two numbers of gates for escape during disaster will be provided.

- In the vicinity of main plant entrance, there will be an emergency assembly point where plant personnel will assemble in the event of any disaster.
- Adequate numbers of Fire Fighting equipment and Fire extinguishers will be installed in the work places for emergency purpose and the Supervisors / Workers will be trained to use the equipments.
- An ambulance will be provided in the factory premises.
- A qualified Doctor and a compounder will be employed for attending to any emergency.

10.11 Green Belt

As per CPCB/ MoEF&CC guidelines 33 % area about 9.82 hectare of plant area will be utilized for green belt development / plantation so as to mitigate the effects of emissions from the plant. The treated waste water from the plant will be utilized for the greenbelt development. Roads for vehicular movement will be paved and adequate mitigation measures will be provided to prevent fugitive emissions. Tree density of 1500 trees per hectare with local board leaf specification will be planted

Plantation: Ecological Need and Location

Tree plantation is known for improving the aesthetic and climatological environment of the area. Properly designed green belt would help in abating air pollution up to a significant degree. To make the proposed project complex verdant, healthy and hazard proof, requisite plantation at proper locations is needed with particular emphasis on aesthetics, protection against noise and fugitive emissions.

The locations in the proposed unit where vegetal covers are required to be provided are:

- Along the outermost boundary, wherever possible
- Along road and pathways
- On the all remaining vacant land inside the premises

Plantation Design and Plant Species

In view of the different functional requirements of the plant the pattern of plantation around the unit is discussed under curtain, avenue, field (vacant land) and ornamental plantations.

To help, restrict the movement of pollutants from inside to outside and *vice versa*, a thick green belt will be developed at the peripheral limits of the proposed unit along the boundary

wall. Essentially the peripheral plantation would act as a barrier to movement of pollutants and noise.

Curtain of plants and tress, depending upon the space availability will be planted along with the outermost boundary of the proposed units. The following species may be planted:

Botanical Name	Common Name
<i>Polyalthia pendula</i>	Ashok Pendula
<i>Tectonagrandis</i>	Teak
<i>Tamarindus indicus</i>	Imli
<i>Bauhinia Purpuria</i>	Kachnar
<i>Dalbargia sisoo</i>	Sheesham
<i>Azadirachta indica</i>	Neem
<i>Cassia Fistula</i>	Amaltas
<i>Ficus religiosa</i>	Pipal
<i>Mangifera indica</i>	Aam

In the proposed green belt approx. 14750 nos. (33 % of the total proposed green belt 9.12 ha) of trees (@ 1500 trees/ha.) will be planted in phase-wise manner during the construction and operation stage of the proposed standalone cement mill project.

10.12 Rain Water Harvesting Plan

It is proposed to collect all the Rain Water Falling on the Terrace through the Rain Water downtakes which shall be grouped and taken to a rain water harvesting tank with by pass arrangement for first wash rinse as well as to by pass into the storm water drain. The surface water of the Ground level shall be grouped to percolate into recharge pits all around the compound wall. The water shall recharge the ground water table.

For Harvesting the Rain Water falling on the Plot it is proposed to have Recharge Pits filled with aggregate media for percolation of Rain Water in the aquifer.

Part of this water is expected to percolate down to the groundwater table thus acting as a recharge system. The natural purification process (filtration and adsorption phenomena while percolation through soil) is expected to further enhance the water quality by the time the water reaches the groundwater table.

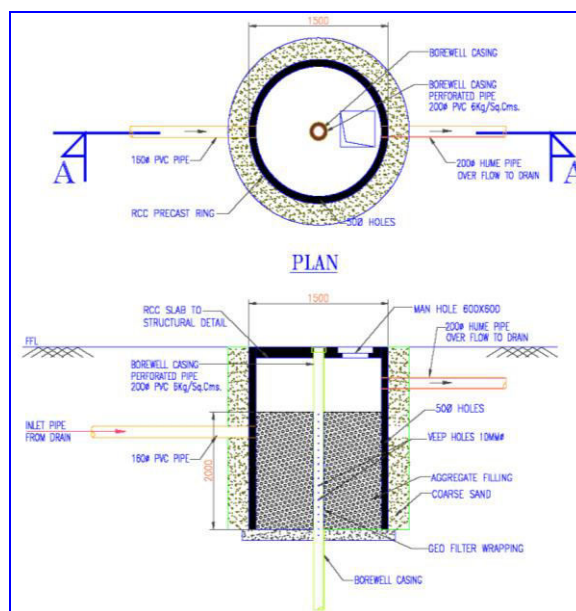


Figure 10.1: Typical Rain water Harvesting Structure

Type of Area	Area in M ²	Run-Off Coefficient	Annual Avg. Rainfall in m.	RWH Potential (m ³)
Roof Area	31812	0.90	0.85	24336
Paved Area	27837	0.85	1.06	25081
Open Area	139810	0.30	0.85	35651
Green Belt Area	91175	0.20	0.85	15499
TOTAL				100568 M³
Annual Rainwater Harvesting Potential				

10.13 Environmental Monitoring Schedule

Monitoring of the post project environment is of utmost importance and has legal requirements. Regular monitoring of the environment helps in assessing the benefits of implementation of environment management plan. Proposed Project will adopt an effective monitoring plan with proper schedule as a step forward to ensure better environment management practices.

This would be attained by collection of samples of water, stack emission, ambient air and work zone environment and analyzing the samples by various methods. Noise level would be monitored by a noise recorder and the data would be generated instantly.

Stack emission would be monitored from stacks. Work zone environment would be monitored at sensitive points of manufacturing areas, where the fugitive emissions would be visibly more.

The ambient air quality may be monitored at four locations, with one at the proposed project as the center point and the remaining three at 120° to each other in down wind direction. The locations would change with the season and the wind pattern.

The environmental monitoring must be done as per the schedule summarized in Table 10.1 below.

Table 10.1: Environment Monitoring Schedule

Environmental Component	Frequency of Monitoring / Sampling & Location	Parameters to be covered
Ambient Air Quality Monitoring	104 samples as per NAAQS 2009 (Biweekly basis)	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , & CO
Stack Emission Monitoring	Monthly for all Stack / Exhaust	Flue Gas Temp., Velocity, Volumetric Flow Rate & PM
Ambient Noise Level Monitoring	Monthly at 5 different locations	Ambient Equivalent contains noise level in dB(A) / Sound Pressure Level (Leq) at Day and Night Time
Ground Water / Drinking Water Quality	Monthly from Borewell and Drinking Water tap	pH, Turbidity, Total Dissolved Solids, Total Hardness, Calcium, Magnesium, Iron, Total residual free Chlorine, Alkalinity, Chloride, Sulphate, Nitrate, Fluoride, Coliform (MPN Value) & E.Coli
Surface Water Quality	2 stations namely in River Ganga and Punpun Monthly (One sample from upstream and one from downstream)	pH, Turbidity, Total Suspended Solids, Total Dissolved Solids, Chloride, DO, BOD, COD, Total Hardness, Total Alkalinity, Coliform (MPN Value), Faecal Coliform & E.Coli

10.14 Environmental Management Cost

The total fiscal estimation for EMP is indicated to be Rs. 25 crore, details are given in **Table no. 10.2.**

Table 10.2: Cost of Environmental Protection Measures

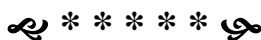
Particulars	Amount in INR, Lakhs
A. One Time Installation Cost	
1. Installation of Air Pollution Control System	17.35 crore
2. Green Belt Development & Plantation	0.60 crore
3. STP Capacity of 15 KL	0.15 Crore

4. Medical centre, PPE (Personnel Protective Equipment)	1.5 crore
5. Fire hydrant system, Fire alarm, Water sprinklers, Gas leak detecting system	0.5 crore
Total	20.1 crore
B. Recurring Cost / Annum	
1. Environmental Monitoring	0.25 crore
2. Running Cost of Pollution Control Equipments	3.5 crore
3. Greenbelt maintenance & Plantation	0.25 crore
4. Medical centre, PPE (Personnel Protective Equipment)	0.4 Crore
5. Fire hydrant system, Fire alarm, Water sprinklers, Gas leak detecting system	0.4 Crore
Total	4.8 Crore
Grand Total (A+B)	24.9 crore

10.15 Compliance to the CREP Guidelines

All the guidelines as mentioned in CREP for Cement plants will be followed.

Adequate Pollution Control Measures i.e. Reverse Pulse jet bag filter system will be installed to reducing air pollution load. This will help reducing emission under the prescribed limit. For minimizing and controlling Air Pollution due to the proposed cement mill project. Adequate Stack height of 30 m. will be provided for wider dispersion of pollutants. No Industrial Waste water will be generated or discharged.



CHAPTER - 11

SUMMARY & CONCLUSION

11.0 Introduction

The present proposal is for environment clearance of Industrial Area, Warsaliganj (IA Warsaliganj), being developed by Bihar Industrial Area Development Authority (BIADA), Industry Deptt., Govt. of Bihar. As per EIA Notification 2006 and amendments thereof, the Project falls under category B of Item 7 (c) of Schedule I, having total land area 29.77 ha., housing one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA (2 * 3 Million TPA).

11.1 Project Location ;

Bihar Industrial Area Development Authority (BIADA) has proposed to establish Industrial Area at Warsaliganj, Dist. Nawada which will consist of Standalone cement grinding unit. Geo Co-ordinates of Project Site are Latitude 25⁰'26.47"N & Longitude 85⁰'38'35.88"E. Project site is about 16 kms NE from dist. headquarter at Nawada & which is well connected by road and rail with rest of the country. Project site of BIADA is located about 500 m. away from SH-83, which connects BIADA Industrial Area to Dist. Headquarters at Nawada and rest of Country. Nearest railway station is Warsaliganj at 1 Km. distance in North direction on Gaya Kiul Sec, of ECR.

The registered address of project proponent is BIADA, Udyog Bhawan, East Gandhi Maidan, Dist. Patna. Land description of IA Warsaliganj project is Mauza Mosma, Khata No. 759, Khesra No. 30, 1, Samichak, Khata No. 59, Khesra 167, 169, 171, 172, 173, 168/174, Sherpur Khata No. 1099, Khesra No. 4140, 4144, 4239, 4146, 4145, 4148, 4149, 4150, 4151, Mafi, Khesra No. 4800, 4801, 4802, Block Warsaliganj, Dist. Nawada, Bihar.

11.2 Environmental Sensitivity

<i>Particulars</i>	<i>Details</i>
• Location	Mauza – Mosma, Samichak, Sherpur, Mafi, Block - Warsaliganj, Dist. Nawada, Bihar
• Elevation above mean sea level	93-98 m.
• Nearest Railway Station	Warsaliganj Railway Station : 1 Km. Nawada Railway Station : 16 Km.
• Nearest Highway	SH – 83 (0.5 Km. W)
• Nearest Major City	Warsaliganj (0.5 Km.)
• Nearest River	River Sakri (5.5 Km. W)
• National Park, Reserve Forest	Not exist within 10 km. radius
• Wildlife Sanctuary	
• Biosphere Reserve, Hill & Valleys	

11.3 Salient Features of the Project

Activity	Sl. No. in Schedule of EIA Notification 2006	Category of Project	Capacity
Industrial estates /Parks/ Complex/ areas, export processing Zone, Special Economic Zones (SEZs), Biotech Parks, Leather complex	7 (C)	B Industrial estates housing at least one Category B industry and area <500 ha.	Total Land Ares 29.77 Ha. (73.58 Acres)
Standalone Cement Grinding Project	3(b)	B	6 Millin TPA (2 * 3 Million TPA)

Proposed Manufacturing & Production Details of IA Warsaliganj ;

Manufacturing Facilities	Production Capacity	
Standalone Cement Grinding Project	Ordinary Portland Cement (OPC) / Portland Pozzolana Cement (PPC) / other cements	6 Million TPA (2 * 3 Million TPA)

		ITEM	Requirement in MTPA	Source
a) Raw Materials	:	Clinker	5.7 Million Ton/Annum	Odisha, Chhattisgarh, M.P.
		Flyash	2.1 Million Ton/Annum	NTPC Barh, Kahalgaon & Barauni
		Gypsum	0.48 Million Ton/Annum	Rajasthan
		Slag	3.9 Million Ton/Annum	West Bengal, Jharkhand
		Coal (for HAG)	0.14 Million Ton/Annum	ECL & CCL, Jharkhand
b) Power	:	36 MW from SBPDCL Grids		
c) Source of Water	:	Own Borewell		
d) Water Requirement	:	600 KLD		
e) Total Cost of IA Warsaliganj Project	:	Rs. 6 Crore		
f) Tentative Cost of proposed Standalone Cement Grinding Project within IA Warsaliganj	:	Rs. 1400 Crore		

11.4 Process Description

For manufacturing cement, clinker, fly ash & slag have to be ground with gypsum, which acts as a set-retarder. This will depend upon the available Fly ash fineness. There are various technologies available for cement grinding project. In the proposed Cement Grinding Unit Cement based on Vertical Roller Miller will be adopted for production of cement.

The Clinker will be received by trucks/wagons and unloaded at site by truck/wagon tippler. The clinker will be reclaimed through front end loader and fed into a dump hopper for further transportation to the Clinker silo. From silo clinker will be transported to clinker hopper by belt conveyors.

Gypsum will be unloaded through truck tippler and will be stored in the Gypsum storage yard. From the storage yard Gypsum will be reclaimed through pay loader/ front end loader and will be feed to Gypsum hopper for onward transmission to mill hoppers by belt conveyors. If Mineral Gypsum is to be used Gypsum crusher will be used to crush the Gypsum before feeding it to Gypsum hopper.

Fly ash will be sourced from nearby Thermal Power plant in closed tankers. The fly ash from closed tankers will be unloaded pneumatically and transported through pipeline. It will be stored in the Fly ash storage silo. The fly ash silo will have aeration at the bottom for easy extraction of material. The fly ash from the silo will be extracted through motorized dosing valve and it will be transported to the mill inlet/outlet (as per requirement) through air slides.

Clinker, Gypsum & Fly Ash will be extracted through Weigh feeders and fed to the mill inlet. If required there shall also be a provision of feeding fly ash in mill outlet elevator for direct feeding into the separator. Cement mill is envisaged to produce Pozzolana Portland Cement (PPC) & Portland Pozzolona Cement (PPC). Ground cement will be conveyed through air slide & bucket elevator to the cement silo.

From the silo, cement will be extracted and filled in surge hopper of the packing machine and subsequently cement will be packed in HDPE bags. The packed bags will be loaded in trucks spiral chute.

11.5 **EXISTING BASELINE ENVIRONMENT SCENARIO :**

Baseline environment data for all the components has been collected during the period Mar-May'2023. The detail findings are here as under ;

[i] Meteorology :

The daily average temperature was recorded to be in the range of 18.1 – 44.3 °C during the study period. The maximum reading was found to be 44.3 °C during Apr.'23 and the minimum was found to be 18.1 °C during Mar.'23. The average value of temperature was computed to be 31.36 °C.

During the study the average relative humidity was found to be in the range of 18 – 68%. The minimum values was found during Apr.'23 and maximum value was found during Mar.'2023. The average value of Relative Humidity was computed to be 41.6%.

No rainfall was observed during the study period.

The wind is predominantly blowing from WNW to SE. The wind speeds are of the range of 0.32 – 5.4 m/sec. and the calm condition is 5.2 %.

[ii] Demographic Profile

According to 2011 census of India, Warsaliganj population is 153,067 people are living in this Block, of which 79,533 are male and 73,534 are female. Warsaliganj population estimated to be 195,926 in 2022. Literate people are 74,342 out of 45,467 are male and 28,875 are female. Total workers are 59,646 depends on multi skills out of which 38,942 are men and 20,704 are women. Total 13,720 Cultivators are depended on agriculture farming out of 10,921 are cultivated by men and 2,799 are women. 17,402 people works in agricultural land as a labour in Warsaliganj, men are 11,905 and 5,497 are women.

The prevailing sex ratio in the study area is 921 females per 1000 males.

[iii] Socio Economic Profile

Agriculture is the one of the main sources of income in the study area. About 23.05 % of the total population are cultivators. 54.58 % of the total population has been found to be working as agricultural labourers. 3.87 % are household industrial workers and about 18 % of the total population has been in to other occupations..

[iv] Topography and Land Use

Topography of the study area is more or less flat to uneven, with surface level variation of about 1 m. The average height of the ground surface at the proposed plant site is about 98 m. above mean sea level (MSL). The present pedigenic and sedimentation processes in this basin are essentially the continuation of those prevailing since Mid Miocene.

[v] Water Quality

8 ground water samples & 2 surface water samples were collected & analyzed from the study area.

Ground Water Quality

The water samples were found to be free from contaminations due to Fluoride & Boron. The dissolved solids level in the water samples were found in the range of 246 - 383 mg/l., which is in the acceptable and permissible limits of IS 10500: 2012. The water sample from Vill. Katauna was having the minimum TDS while maximum dissolved solids were found at Bojhwan.

The chlorides were found to be in the range of 18 - 24 mg/l. The Sulphates were found in the range of 6.4 – 12.2. Total hardness values in the range of 156 - 208 mg/l. It is within the permissible limits of IS 10500:2012. Total Alkalinity values were in the range of 184 - 244 mg/l.

Values of Iron are in range of 0.38 – 0.82 mg/l. & values for Zinc are in range of 0.38 – 0.46 mg/l.

Surface Water Quality

The surface water can be best used for Irrigation and domestic purposes except drinking use.

[vi] Ambient Air Quality :

To ascertain the baseline Ambient Air Quality status of the study area, monitoring of AAQ was conducted at 8 locations around the project area. Summary results are as under ;

Stn. No.	Location Name	24-hourly average concentration ($\mu\text{g}/\text{m}^3$)									
		PM ₁₀		PM _{2.5}		SO ₂		NO ₂		CO (mg/m^3)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
S1	Project Site	34.4	54.4	21.3	35.5	6.0	13.9	10.7	24.7	0.10	0.27
S2	Bazidpur	43.5	59.0	27.8	36.5	6.4	10.2	12.7	31.1	0.11	0.44
S3	Bojhwan	39.5	53.7	23.7	31.8	5.2	9.5	11.4	28.9	0.05	0.23
S4	Katrisarai	42.4	58.2	25.1	34.9	8.4	14.0	14.5	25.6	0.08	0.36
S5	Katauna	41.9	59.7	24.9	34.9	6.9	16.9	12.4	23.7	0.06	0.19
S6	Saur	36.5	65.5	21.0	35.4	6.0	10.9	13.4	32.2	0.07	0.35
S7	Sikandra	37.1	61.2	22.3	35.8	5.6	13.0	11.3	30.4	0.08	0.46
S8	Dosut	43.0	54.7	25.8	35.4	6.1	14.9	12.6	28.0	0.08	0.40

It can be observed from the above table the AAQ status around the project area is well within the limits of NAAQS, 2009

11.6 ENVIRONMENTAL IMPACTS OF IA WARSALIGANJ WITH PROPOSED CEMENT GRINDING PROJECT ;

There are two sources from which the environment of the area can be affected if suitable control measures are not strictly applied. These are, discharge of waste

water either on land or in surface water bodies and emissions from the stack. Both these two aspects have been taken into consideration while envisaging the proposed cement grinding project. No industrial waste water will be generated or discharged outside project premises. Domestic wastewater will be treated through STP inside the project premises.

Cement mill will be equipped with pulse jet bag filters & Dust collection system for minimizing air pollution load.

However, Air Quality Impact prediction shows that after establishment of proposed cement grinding unit predicted incremental GLCs of Pollutants is not found to be significant to add up on the existing ambient air quality.

The green belt/ plantation will be made as per CPCB guidelines and local species will be used for plantation.

11.7 **SOLID WASTE GENERATION AND MANAGEMENT**

Cement dust will be Collected from Dust Collection Systems and recycle and reuse in cement manufacturing process.

Main features of the solid waste management plan conceived for the project is as follows:

- Ash will be generated from the combustion of coal used in HAG and the entire quantity of ash will be used in PPC manufacturing. Proper ash handling system will be provided to ensure no dust generation during handling, filling and transportation.
- Dust collected by the bag filters will be automatically recycled in the system
- Other solid waste will be in the form of rejected conveyor belts, torn/ damaged cement bags, paper/ wooden/ plastic waste etc. which are not hazardous in nature and will be sold to recyclers on regular basis

11.8 **IMPACT ON SOCIO ECONOMIC STATUS**

Proposed IA Warsaliganj Project for cement project may change socio economic condition of the nearby areas. As there will be flow of financial and material resources, there remains a large possibility of growth of population in the business, trade, commerce and service sector. The inflow of financial and material resources would contribute towards changing the socioeconomic environment of the areas as this would introduce a mixed culture emphasizing urban traits in place of traditional,

prevalent rural customs. The economic, cultural and technological changes are likely to induce social stress and ethical changes. All these would enhance the local economy.

To improve the socio-economic aspects of the study area, as per MoEFCC, guidelines, based on cost of project, requisite amount has been allocated for CER activities by BIADA and proposed Standalone Cement Grinding Project, detailed as under;

- a. BIADA has allocated an amount of Rs. 12 Lakhs (2 % of total project cost i.e. Rs. 6 crore) towards CER activities.
- b. Standalone Cement Grinding Project has allocated an amount of Rs. 7 Crores (0.5% of total project cost i.e. Rs. 1400 Crores).

11.9 ENVIRONMENTAL MANAGEMENT PLAN

A comprehensive Environmental Management Plan has been prepared under which the unit will adopt measures in preserving the environment from degradation. Important among those are Green Belt Development Plan which would act as Noise damper also. The environmental monitoring program on all components of environment has been drawn and indicated in the EMP in detail which is a part of EIA.

Proposed Cement Grinding Project at IA Warsaliganj will adopt all measures for better environmental management. Pulse Jet Bag Filters with dust collection system will be installed with Cement Mill for better air environment, because man needs inhalation every moment, so also is Flora and Fauna dependent on it. Cement project will develop & maintain green belt and plantation all around the project premises for better environmental management.

11.10 OCCUPATIONAL HEALTH AND SAFETY

Project authorities of proposed cement grinding project within IA Warsaliganj will adopt all precautionary measures to reduce the risk of exposure of employees to occupational safety and health hazards. Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

11.11 RAINWATER HARVESTING

Keeping in mind the importance of water, it is proposed to conserve water by rainwater harvesting by which the subsoil water condition / moisture content is maintained / improved to a great extent. Also it is proposed to harness rainwater from the roof area by collecting the same in a rainwater collection tank of suitable capacity and will be recharged to ground water aquifers.

11.11 CONCLUSION

- No Industrial Waste water will be generated due to operation of proposed cement grinding project within IA Warsaliganj.
- Ground water characteristics are also well within the limits of IS 10500:2012.
- Emissions from Stacks of proposed cement mill will within the limits of E(P) Rules.
- Ambient Air Quality within the study area are within the National Ambient Air Quality Standards (Nov. '2009).
- Ambient Noise Level of the project area is also well within the limits for Industrial Area.
- Generated solid wastes (Cement Dust) from project operation is being re-utilized at the source end.
- Good green belt, plantation & landscaping will be developed and maintained within the premises.



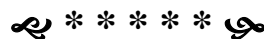
CHAPTER – 12

DISCLOSURE OF CONSULTANT

Keeping in line with the requirement of EIA Notification 2006 and having a high degree of concern, for the environment and in order to assess the likely impacts arising out of the proposed project, BIADA has retained services of a QCI Accredited EIA Consultant, **M/s Paramarsh Servicing Environment and Development, Lucknow**, Accredited under “EIA consultant Organizations Accreditation Scheme” of Quality Council of India vide Certificate No. NABET/EIA/2124/RA0224 Dt: 30.12.2021, valid upto: May 01.05.2024, through its Empanelled agency, Shiva Test House, Patna, to carryout the study on Environmental Impact Assessment (EIA) and preparation of Environmental Management Plan for their IA Warsaliganj Project, housing Standalone Cement Grinding Project of 6 Million TPA.

The present EIA cover the baseline data generation, predictions and evaluation of impact on various environmental components, Environmental Management Plan and Damage Assessment due to violation of EIA Notification.

Paramarsh Servicing Environment and Development, Lucknow, is an accredited EIA Consultant Organization, accredited by Quality Council of India. Accreditation Certification is show here as under ;





National Accreditation Board for Education and Training



Certificate of Accreditation

Paramarsh Servicing Environment and Development, Lucknow

M.S.-1/10 Sector A, Sitapur Road Yojna, Ram Ram Bank Chauraha, Aliganj, Lucknow-226024

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2	Thermal power plants	4	1 (d)	A
3	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
4	Cement plants	9	3 (b)	B
5	Asbestos milling and asbestos based products	12	4 (c)	A
6	Pesticides industry and pesticide specific intermediates	17	5 (b)	A
7	Synthetic organic chemicals industry	21	5 (f)	A
8	Distilleries	22	5 (g)	A
9	Pulp & paper industry excluding manufacturing of paper from wastepaper and manufacture of paper from ready pulp without bleaching	24	5 (i)	A
10	Sugar Industry	25	5 (j)	B
11	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	B
12	Highways	34	7 (f)	B
13	Building and construction projects	38	8 (a)	B
14	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Nov 09 2021 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/21/2197 dated Dec 30, 2021. The accreditation needs to be renewed before the expiry date by Paramarsh Servicing Environment and Development, Lucknow following due process of assessment.

Sr. Director, NABET
Dated: Dec 30, 2021

Certificate No.
NABET/EIA/2124/RA 0224

Valid up to
May 01, 2024

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.



निबंधन संख्या पी0टी0-40



बिहार गजट

असाधारण अंक

बिहार सरकार द्वारा प्रकाशित

5 ज्येष्ठ 1942 (श10)

(सं0 पटना 316) पटना, मंगलवार, 26 मई 2020

उद्योग विभाग

अधिसूचना

26 मई 2020

सं० 5/स० अधिसूचना (बिहार राज्य चीनी निगम)-06/2020-1413—बिहार औद्योगिक क्षेत्र विकास प्राधिकार अधिनियम, 1974 औद्योगिक क्षेत्रों के सुनियोजित विकास एवं उद्योगों को बढ़ावा देने तथा इससे सम्बद्ध विषयों पर उपबंध करने हेतु वर्ष 1974 में अधिसूचित किया गया था। वर्तमान में बिहार औद्योगिक क्षेत्र विकास प्राधिकार में 52 औद्योगिक क्षेत्र/विकास केन्द्र/वृहत औद्योगिक प्रांगण हैं।

इस अधिनियम की धारा 2(च) में औद्योगिक क्षेत्र से अभिप्रेत है कि, "ऐसा कोई क्षेत्र, जिसके लिए धारा 3 के अधीन कोई प्राधिकार गठित किया गया हो" तथा धारा "4क औद्योगिक क्षेत्र- (1) औद्योगिक क्षेत्र में कतिपय एक या एक से अधिक निम्नलिखित भूमि अंतर्विष्ट होंगी:- (i) राज्य सरकार द्वारा अर्जित तथा इस अधिनियम की धारा-9 के अधीन प्राधिकार को अंतरित सभी भूमि।"

उक्त के आलोक में गन्ना उद्योग विभाग के संकल्प ज्ञापांक- 01/रेगु-6-6004/2012-पार्ट-221/पटना दिनांक 11.02.2020 द्वारा बिहार राज्य चीनी निगम की आठ इकाइयों यथा लोहट, हथुआ (डिस्टीलरी), बनमनखी, वारसलीगंज, गोरौल, गुरारू, न्यू सिवान एवं सिवान तथा उपलब्ध अतिरिक्त फार्म लैंड कुल 2442.41 एकड़ को उद्योग स्थापना हेतु बिहार औद्योगिक क्षेत्र विकास प्राधिकार को हस्तांतरित करने का निर्णय लिया गया है। उक्त प्रस्ताव पर मंत्रिपरिषद् की दिनांक 18.12.2019 की बैठक में मद सं0-23 के रूप में स्वीकृति प्राप्त है।

अतः बिहार औद्योगिक क्षेत्र विकास प्राधिकार अधिनियम, 1974 की धारा 2(च), धारा 4(क)(i) एवं अन्य सुसंगत प्रावधानों के तहत प्रदत्त शक्तियों द्वारा गन्ना उद्योग विभाग के संकल्प ज्ञापांक-01/रेगु-6-6004/2012-पार्ट-221/पटना दिनांक 11.02.2020 द्वारा लिये गये निर्णय के आलोक में बिहार राज्य चीनी निगम से हस्तांतरित निम्नांकित क्षेत्रों को बिहार औद्योगिक क्षेत्र विकास प्राधिकार अधिनियम, 1974 के अन्तर्गत औद्योगिक क्षेत्र के रूप में अधिसूचित की जाती है:-

क्रम संख्या	बियाडा, क्षेत्रीय कार्यालय	जिला	बिहार राज्य चीनी निगम की इकाईयों का नाम	इकाई की कुल उपलब्ध भूमि (एकड़ में)
1.	पटना	नवादा	वारसलीगंज	73.58
2.	पटना	गया	गुरारू	27.36
3.	पटना	बिहटा	बिहटा (फार्म लैण्ड)	789.92
4.	पटना	बक्सर	नवानगर (फार्म लैण्ड)	
5.	मुजफ्फरपुर	पूर्वी चम्पारण	सुगौली (फार्म लैण्ड)	55.03
6.	मुजफ्फरपुर	मुजफ्फरपुर	मोतीपुर (फार्म लैण्ड)	897.40
7.	मुजफ्फरपुर	गोपालगंज	हथुआ (डिस्टीलरी सहित)	105.29
8.	मुजफ्फरपुर	वैशाली	गोरौल	54.41
9.	मुजफ्फरपुर	सिवान	न्यू सिवान	28.30
10.	मुजफ्फरपुर	सिवान	सिवान	32.58
11.	दरभंगा	मधुबनी	लोहट	213.00
12.	दरभंगा	मधुबनी	सकरी (फार्म लैण्ड)	46.99
13.	भागलपुर	पूर्णिया	बनमंखी	118.55
कुल:-				2442.41

यह अधिसूचना राजपत्र में इसके प्रकाशन की तिथि से प्रभावी होगी।

बिहार-राज्यपाल के आदेश से,
प्रदीप कुमार,
सरकार के अपर सचिव।

अधीक्षक, सचिवालय मुद्रणालय,
बिहार, पटना द्वारा प्रकाशित एवं मुद्रित।
बिहार गजट (असाधारण) 316-571+10-डी0टी0पी0।
Website: <http://egazette.bih.nic.in>



राजस्व एवं भूमि सुधार विभाग, बिहार
सरकार
प्रपत्र-XIV ख
(देखें नियम-10)
लगान रसीद

ऑनलाइन
Running Unique No.: 1805230636468272266
(Receipt No.)

जिला:- Nawada	अंचल:- Warisaliganj
हल्का:- मोसमा	मौजा :- मोसमा
जमाबंदी सं०:- 852 भाग वर्तमान:- 1 पृष्ठ संख्या:- 1014	मौजा/थाना सं०:- 533
जमाबंदी रेयत का नाम:- मोहिनी सुगर मिल अभिभावक का नाम:- वारिस	पता:- मोसमा वारिसलीगंज ,

खाता संख्या 759, 759	खेसरा संख्या 30, 1	रकबा/डिसमिल 2 एकड़ 30 डिसमील 0 हेक्टर
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सालाना मांग(बकाया और वर्तमान) चालू वित्तीय वर्ष का

वित्तीय वर्ष	सालाना दर	बकाया	वर्तमान	सूद	कुल	अभियुक्ति(बकाया का वर्ष कब से कब तक)
जमाबंदी लगान	30.00	180.00	30.00	0.00	210.00	2017-2018 से 2023-2024
सेस(लगान का 50 प्रतिशत स्वास्थ्य सेस, 50 प्रतिशत शिक्षा सेस, 25 प्रतिशत रोड सेस एवं 20 प्रतिशत कृषि सेस)	43.50	261.00	43.50	0.00	310.00	2017-2018 से 2023-2024
कुल	73.50	441.00	73.50	0.00	520.00	2017-2018 से 2023-2024

वसूली

वित्तीय वर्ष	बकाया के विरुद्ध वसूली	वर्तमान मांग के विरुद्ध कुल वसूली	कुल वसूली	अवशेष राशि(बकाया का वर्ष कब से कब तक)	अभियुक्ति
लगान	180.00	30.00	210.00	2017-2018 से 2023-2024	
सेस(लगान का 50 प्रतिशत स्वास्थ्य सेस, 50 प्रतिशत शिक्षा सेस, 25 प्रतिशत रोड सेस एवं 20 प्रतिशत कृषि सेस)	261.00	43.50	310.00	2017-2018 से 2023-2024	
कुल	441.00	73.50	520.00	2017-2018 से 2023-2024	

कुल बकाया-520.00

वसूल की गयी राशि शब्दों में- Five Hundred Twenty Rupees

तिथि- 18-05-2023



यह एक कम्प्यूटर जनित प्रति है।

किसी भी प्रकार की अशुद्धियों के लिए सम्बन्धित अंचलाधिकारी से संपर्क करें।

12-Oct-2020



बिहार सरकार

राजस्व एवं भूमि सुधार

विभाग

अंचल अधिकारी का

कार्यालय

Warisaliganj, Nawada

नामांतरण शुद्धि-पत्र

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 CRSLPWarisaliganj8173
 10/12/2020


न्यायालय अंचल अधिकारी, Uday Prasad अंचल Warisaliganj जिला राजस्व
 ग्राम समीचक राजस्व थाना संख्या 534 दाखिल -खारिज वाद संख्या एवं वर्ष
 316/R27 2020 - 2021 नया भाग वर्तमान 3 नया पृष्ठ संख्या 17 जिससे

निम्नलिखित भूमि खारिज कि जानी है...

पुराने रैयत का नाम - कारपोरेशन लिमिटेड इकाई अभिभावक का नाम
 -वारिसलीगंज

खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
59	167	4 एकड़ 33 डिसमील	1	67
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
59	169	40 डिसमील	1	67
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
59	171	7 एकड़ 37 डिसमील	1	67
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
59	172	1 एकड़	1	67
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या

59	173	15 एकड़ 09 डिसमील	1	67
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
59	168/174	41 डिसमील	1	67

जमाबंदी रैयत का नाम बिहार स्टेट शुगर-पिता बाप अबू -करपशन प्राइवेट इकाई

उपर्युक्त जमाबंदी से घटायी जानेवाली भूमि के ब्यौरे					भू- राजस्व
राजस्व ग्राम/राजस्व थाना संख्या	खाता संख्या	खेसरा संख्या	भूमि का रकबा	चौहद्दी	
समीचक 534	59	167	1 एकड़ 33 डिसमील		
	59	169	40 डिसमील		
	59	171	7 एकड़ 37 डिसमील		
	59	172	1 एकड़		
	59	173	1 एकड़		
	59	168/174	15 एकड़ 09 डिसमील		
			41 डिसमील		

दाखिल-खारिज के उपरान्त नए जमाबंदी रैयत का नाम एवं भूमि के ब्यौरे

नए जमाबंदी रैयत का नाम एवं पूर्ण पता	नई जमाबंदी में प्रविष्ट किये जानेवाले भूमि के ब्यौरे					भू- राजस्व
	राजस्व ग्राम राजस्व थाना संख्या	खाता संख्या	खेसरा संख्या	भूमि का रकबा	चौहद्दी	
(BIADA स्वयं- BIADA, जाति-N/A, पता-Bihar Industrial Area Development Authority Patna)						300

नए जमाबंदी रैयत का नाम एवं पूर्ण पता	नई जमाबंदी में प्रविष्ट किये जानेवाले भूमि के ब्यौरे				भू- राजस्व	
				4 एकड़ 33 डिसमील 40 डिसमील 7 एकड़ 37 डिसमील 1 एकड़ 15 एकड़ 99 डिसमील 41 डिसमील	पूरब पश्चिम उत्तर दक्षिण पूरब पश्चिम उत्तर दक्षिण पूरब पश्चिम उत्तर दक्षिण उत्तर दक्षिण पूरब पश्चिम उत्तर दक्षिण	
	समीचक/534	59 59 59 59 59 59	167 169 171 172 173 168/174			

Approved By : Uday Prasad

अंचल अधिकारी

Warisaliganj

यह एक कंप्यूटर जनित प्रति है

12 Oct 2020



बिहार भूमि

बिहार सरकार
राजस्व एवं भूमि सुधार
विभाग
अंचल अधिकारी का
कार्यालय
Warisaliganj, Nawada
नामांतरण शुद्धि-पत्र

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CRSLPWarisaliganj8167
10/12/2020



न्यायालय अंचल अधिकारी, Uday Prasad अंचल Warisaliganj जिला राजस्व
ग्राम शेरपुर राजस्व थाना संख्या 495 दाखिल -खारिज वाद संख्या एवं वर्ष 310/R27
2020 - 2021 नया भाग वर्तमान 32 नया पृष्ठ संख्या 98 जिससे

निम्नलिखित भूमि खारिज कि जानी है...

पुराने रैयत का नाम - मोहनी सुगर मील अभिभावक का नाम -

खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4140	55 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4144	5 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4239	9 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4146	2 एकड़ 75 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4145	1 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4148		1	3432

		4 एकड़ डिसमील		
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4149	1 एकड़50 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4150	32 डिसमील	1	3432
खाता न.	प्लॉट न.	भूमि का रकबा.	पिछला भाग वर्तमान	पिछला पृष्ठ संख्या
1099	4151	25 एकड़58 डिसमील	1	3432

जमाबंदी रैयत का नाम	मोहनी सुगर मील -पिता/बाप/अबू -
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उपर्युक्त जमाबंदी से घटायी जानेवाली भूमि के ब्यौरे					भू- राजस्व
राजस्व ग्राम/राजस्व थाना संख्या	खाता संख्या	खेसरा संख्या	भूमि का रकबा	चौहद्दी	
शेरपुर/495			55 डिसमील		
			5 डिसमील		
		1099	4140	9 डिसमील	
		1099	4144	2 एकड़75 डिसमील	
		1099	4239	डिसमील	
		1099	4146	1 डिसमील	
		1099	4145	4 एकड़2 डिसमील	
		1099	4148	डिसमील	
		1099	4149	1 एकड़50 डिसमील	
		1099	4150	डिसमील	
	1099	4151	32 डिसमील 25 एकड़58 डिसमील		

दाखिल-खारिज के उपरान्त नए जमाबंदी रैयत का नाम एवं भूमि के ब्यौरे

नए जमाबंदी रैयत का नाम एवं पूर्ण पता	नई जमाबंदी में प्रविष्ट किये जानेवाले भूमि के ब्यौरे					भू-राजस्व
(BIADAस्वयं- BIADA, जाति- अन्य, पता-Bihar Industrial Area Development Authority Patna)	राजस्व ग्राम/ राजस्व थाना संख्या	खाता संख्या	खेसरा संख्या	भूमि का रकबा	चौहद्दी	350
	शेरपुर/495	1099	4140	55	पूरब	
		1099	4144	डिसमील	पश्चिम	
		1099	4239	5	उत्तर	
		1099	4146	डिसमील	दक्षिण	
		1099	4145	9	पूरब	
		1099	4148	डिसमील	पश्चिम	
		1099	4149	2	उत्तर	
		1099	4150	एकड़75	दक्षिण	
		1099	4151	डिसमील	पूरब	
				1	पश्चिम	
				डिसमील	उत्तर	
				4	दक्षिण	
				एकड़2	पूरब	
				डिसमील	पश्चिम	
			1	उत्तर		
			एकड़50	दक्षिण		
			डिसमील	पूरब		
			32	पूरब		
			डिसमील	पश्चिम		
			25	उत्तर		
			एकड़58	दक्षिण		
			डिसमील	पूरब		
				पश्चिम		
				उत्तर		
				दक्षिण		
				पूरब		
				पश्चिम		

नए जमाबंदी रैयत का नाम एवं पूर्ण पता	नई जमाबंदी में प्रविष्ट किये जानेवाले भूमि के ब्यौरे					भू- राजस्व
					उत्तर दक्षिण पूरब पश्चिम उत्तर दक्षिण पूरब पश्चिम उत्तर दक्षिण	

Approved By : Uday Prasad

अंचल अधिकारी

Warisaliganj

यह एक कंप्यूटर जनित प्रति है

यह प्रपत्र केवल प्रार्थी की जानकारी के लिए है

इसका उपयोग किसी भी न्यायालय में साक्ष्य के रूप में नहीं किया जा सकता है।



सेवा में,

कार्यकारी निदेशक,

विभागा, पटना।

विजय-नारसलीगंज चीनी मील नवादा के स्थल सत्यापन एवं सीमांकन कार्य के संबंध में।

महोदय,

उपर्युक्त विषय के संबंध में कहना है दिनांक 06/07/2020 एवं दिनांक 07/07/2020 को नारसलीगंज चीनी मील के भूमि का संयुक्त रूप से दिये गये एनएचपी(आर)0 कैंप मूचि के अनुसार निरीक्षण एवं सत्यापन कार्य किया गया। निरीक्षण एवं सत्यापन में पता चला कि चीनी मील का जमीन तीन मौजा में विभक्त पता है जो निम्नवत है।

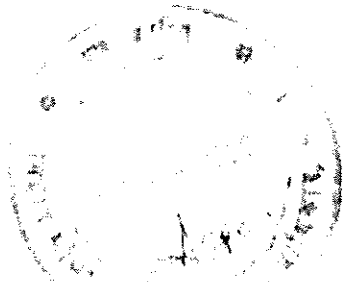
1. रेलवे लाईन से पूर्व

मौजा/सामीप्यक-	खेसरा नं०-	रकबा-	
	171	7.37	एकड़
	173	15.99	एकड़
	172	1.00	
	174	41	डिसमिल
शरपुर	4144	5	डिसमिल
	4239	9	डिसमिल
	4146	2.75	एकड़
	4145	1	डिसमिल
	4148	4 एकड़ 02	डिसमिल
	4149	1 एकड़ 50	डिसमिल
	4150		32 डिसमिल
	4151	25 एकड़ 58	डिसमिल
	टोटल-	59 एकड़ 09	डिसमिल

2. रेलवे लाईन से पश्चिम

सामीप्यक	167-	4.33	एकड़
	169	40	डिसमिल
शरपुर मौजा	4140	55	डिसमिल
मौजा मार्फत	4901	32	डिसमिल
	4902	6	डिसमिल

टोटल- 5 एकड़ 06 डिसमिल



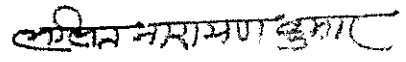
3. रेलवे लाईन एवं वारसलीगंज मुख्य सड़क से पश्चिम

मौजा माफी-	खेसरा न०-	रकवा
	4800	21 डिममिल (स्थान पर रैती भवन निर्मित)
	4801	5 डिसमिल "
	4802	8 डिसमिल "
टोटल-	34	डिसमिल

कुल भूमि 65.09 एकड़ भूमि का निरीक्षण एवं सत्यापन किया गया जिसका नजरी नक्शा एवं सर्वे नक्शा में संकेतिक रूप दिखाया गया। संलग्न।

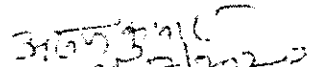
रेलवे लाईन से पूर्व वाली भूखण्ड में खेसरा सं०- 4239 एवं 4146 के अंश भाग में अतिक्रमित कर मकान एवं चहारदिवारी निर्मित है, साथ ही मौजा सामीचक में भी प्रखण्ड कार्यालय के सामने खेसरा सं०- 167 में करीब बीस घर दलीत जुग्गी एवं झोपड़ी निर्मित है। मौजा माफी के खेसरा सं०- 4800, 4801, 4802 में भवन निर्मित है, स्थलीय सत्यापन हेतु अतिक्रमित भूमि स्थनीय अंचलाधिकारी एवं अंचल अमीन एवं संबंधित राजस्व ह० कर्मचारी के द्वारा सत्यापन कराना परिलक्षित होता है।

विश्वासभाजन

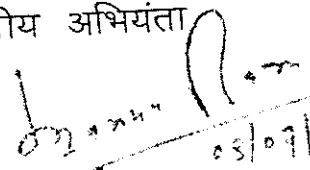


08/07/2020

अमीन


08/07/2020

कनीय अभियंता


08/07/2020
क्षेत्रीय प्रभारी

Ref.: 3036/...../

Allotment Letter

Date :- 6/5/23

From,

Deputy General Manager, I/c Land Allotment
BIADA, Patna.

To,

Ms Ambuja Cement LimitedMr. Bhimsi Kachhot - Chief - Strategy & Business Development
Address: - Adani Corporate house, Shantigram, Near Vaishnav Devi Circle,
S. G. Highway, Khodiyar Ahmedabad GJ 382421 IN
Contact no: - 9820796131
Email id: - bhimsi.kachhot@adani.com**Subject: Regarding land allotment to M/s Ambuja Cement Limited in Industrial Area, Warsaliganj.**

Sir/Madam,

Upon the recommendation of the PCC dated **02.05.2023** We are pleased to inform that **M/s Ambuja Cement Limited** has been allotted **3158535.60 sqft.** on plot no **IP-1 & IP-2 in Industrial Area, Warsaliganj of Gaya cluster** for establishment of **Cement Grinding Unit** on the lease of 90 years.

1. The Allottee shall abide by the terms and conditions as laid down under Clause 8(b) of the BIADA Land Allotment Policy, 2022, as enclosed herewith in **Annexure-1**.
2. The terms and conditions of payment is explained under **Annexure-2** to this allotment letter. The Allottee shall have to pay total cost of land with maintenance charges and other applicable charges as per the **Annexure-2** of this allotment letter.
3. The conditions of time frame for Initiation of construction work, start of trial production, full commercial production and non-adherence of the schedule of the activity are mentioned under **Annexure-3A** and **3B** respectively.
4. The allottee shall submit a self-declaration form accepting the terms and conditions mentioned in the format as enclosed in **Annexure-4**. The same shall be compulsorily submitted in original to the DGM of the concerned Cluster at the time of possession of the land.
5. The unit shall display a signage containing unit details such as Name of the unit, Plot no, Name of the Product/Service and Registration No, etc.
6. This allotment letter is purely provisional and the Managing Director reserves the right for any alteration or modification herein.

PCC Dated: - 02.05.2023

Yours faithfully,


Deputy General Manager, I/c Land Allotment

AMBIENT AIR QUALITY DATA**Location:** Project Site, (S1)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
02.03.23	44.4	26.6	8.7	15.4	0.15
05.03.23	48.5	29.1	13.3	23.7	0.21
09.03.23	43.1	25.9	9.5	17.0	0.11
14.03.23	38.6	24.4	11.0	19.6	0.10
18.03.23	47.8	28.2	8.8	15.7	0.18
21.03.23	46.2	27.1	10.7	19.0	0.14
24.03.23	34.4	21.3	13.9	24.7	0.13
28.03.23	43.1	30.2	12.3	21.8	0.10
01.04.23	49.5	35.5	6.2	11.1	0.18
04.04.23	50.3	30.0	9.4	16.8	0.15
08.04.23	42.6	25.8	8.0	14.2	0.17
13.04.23	45.6	29.6	8.0	14.3	0.26
19.04.23	51.3	32.6	10.7	19.1	0.23
22.04.23	51.6	30.5	6.9	12.3	0.21
25.04.23	54.4	32.2	7.1	12.7	0.17
29.04.23	44.8	28.5	7.1	12.7	0.18
03.05.23	45.4	27.6	7.9	14.1	0.14
06.05.23	51.9	34.6	10.2	18.2	0.11
10.05.23	53.6	32.2	6.2	11.0	0.16
14.05.23	50.6	30.9	6.5	11.5	0.15
19.05.23	40.6	26.1	8.8	15.6	0.19
23.05.23	52.5	31.3	6.0	10.7	0.23
26.05.23	49.1	29.4	7.6	13.5	0.21
29.05.23	45.5	25.2	10.1	18.0	0.27
Min ^m . Conc ⁿ	34.4	21.3	6.0	10.7	0.10
Max ^m . Conc ⁿ	54.4	35.5	13.9	24.7	0.27
Average Conc ⁿ	46.9	28.9	9.0	15.9	0.17
98% ile Conc ⁿ	54.0	35.1	13.6	24.2	0.27
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Bazidpur, (S2)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
02.03.23	53.5	32.1	9.3	14.1	0.14
05.03.23	43.5	27.8	9.8	14.9	0.11
09.03.23	54.3	32.9	8.8	13.4	0.16
14.03.23	57.5	34.5	7.2	16.8	0.11
18.03.23	53.5	32.3	8.4	22.1	0.12
21.03.23	55.0	32.9	7.1	15.9	0.15
24.03.23	59.0	35.8	8.4	12.7	0.28
28.03.23	56.2	34.0	6.6	15.2	0.34
01.04.23	44.8	28.0	9.2	14.0	0.15
04.04.23	50.3	30.2	6.6	16.1	0.21
08.04.23	55.9	35.5	7.4	22.1	0.44
13.04.23	51.7	32.1	8.8	25.1	0.26
19.04.23	57.5	32.4	7.6	26.6	0.22
22.04.23	54.6	31.0	8.6	18.5	0.18
25.04.23	53.5	32.2	7.1	31.1	0.28
29.04.23	54.5	33.0	8.8	25.9	0.26
03.05.23	48.9	31.1	6.4	28.3	0.32
06.05.23	57.5	36.1	6.8	30.3	0.28
10.05.23	44.6	28.8	8.8	26.8	0.25
14.05.23	47.7	33.3	6.6	29.0	0.30
19.05.23	48.6	34.5	10.2	29.8	0.36
23.05.23	49.4	33.2	7.4	25.1	0.34
26.05.23	55.1	36.5	8.8	28.2	0.42
29.05.23	56.8	35.3	9.2	26.4	0.37
Min ^m . Conc ⁿ	43.5	27.8	6.4	12.7	0.11
Max ^m . Conc ⁿ	59.0	36.5	10.2	31.1	0.44
Average Conc ⁿ	52.7	32.7	8.1	22.0	0.25
98% ile Conc ⁿ	58.3	36.3	10.0	30.7	0.43
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Bojhwan, (S3)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
02.03.23	47.9	28.3	6.4	12.5	0.11
05.03.23	44.6	27.0	5.8	11.4	0.06
09.03.23	39.5	23.7	9.3	18.2	0.08
14.03.23	49.9	29.2	5.2	23.6	0.23
18.03.23	45.3	27.2	8.2	16.1	0.05
21.03.23	53.7	31.8	9.0	17.6	0.15
24.03.23	41.7	25.1	6.4	25.2	0.16
28.03.23	40.9	24.4	7.2	22.1	0.13
01.04.23	51.3	30.6	8.2	20.0	0.18
04.04.23	52.1	31.1	5.2	27.1	0.16
08.04.23	43.8	26.1	5.2	16.3	0.10
13.04.23	50.5	30.1	9.1	17.7	0.16
19.04.23	49.2	29.4	7.4	19.7	0.12
22.04.23	45.5	27.2	8.0	22.8	0.18
25.04.23	43.5	25.9	7.8	15.3	0.08
29.04.23	47.2	28.2	5.2	25.2	0.19
03.05.23	46.1	27.5	5.6	26.1	0.15
06.05.23	44.2	26.4	6.4	23.7	0.11
10.05.23	47.2	28.2	8.4	22.6	0.06
14.05.23	44.0	25.5	9.5	18.6	0.12
19.05.23	52.3	31.0	9.0	17.6	0.10
23.05.23	48.2	28.3	5.8	28.9	0.16
26.05.23	41.6	24.3	6.4	21.7	0.10
29.05.23	49.5	29.3	7.8	15.3	0.20
Min ^m . Conc ⁿ	39.5	23.7	5.2	11.4	0.05
Max ^m . Conc ⁿ	53.7	31.8	9.5	28.9	0.23
Average Conc ⁿ	46.6	27.7	7.2	20.2	0.13
98% ile Conc ⁿ	53.0	31.5	9.4	28.1	0.22
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Katrisarai, (S4)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
02.03.23	44.1	25.5	9.3	17.9	0.18
05.03.23	48.3	29.3	8.4	15.7	0.25
09.03.23	52.1	30.7	10.3	19.8	0.11
14.03.23	54.3	32.5	12.1	22.3	0.24
18.03.23	56.9	34.9	13.1	24.0	0.12
21.03.23	56.7	33.5	11.2	20.4	0.27
24.03.23	46.4	27.3	13.5	24.8	0.11
28.03.23	44.9	26.4	11.7	21.5	0.16
01.04.23	58.2	34.8	9.8	18.2	0.30
04.04.23	43.2	26.0	8.5	15.8	0.26
08.04.23	48.8	29.3	12.6	23.1	0.08
13.04.23	45.9	27.1	10.7	19.8	0.12
19.04.23	50.1	30.0	8.9	16.5	0.14
22.04.23	49.3	29.6	14.0	25.6	0.11
25.04.23	47.9	28.6	8.9	16.5	0.34
29.04.23	51.8	31.0	10.7	19.8	0.31
03.05.23	57.1	34.3	10.3	19.0	0.12
06.05.23	43.9	26.0	8.4	14.5	0.34
10.05.23	42.4	25.1	12.1	22.3	0.18
14.05.23	56.2	33.6	8.5	15.6	0.33
19.05.23	45.5	27.2	13.1	24.0	0.36
23.05.23	43.4	25.5	11.4	20.7	0.16
26.05.23	48.1	28.6	9.3	17.3	0.17
29.05.23	49.1	28.9	12.0	22.2	0.34
Min ^m . Conc ⁿ	42.4	25.1	8.4	14.5	0.08
Max ^m . Conc ⁿ	58.2	34.9	14.0	25.6	0.36
Average Conc ⁿ	49.4	29.4	10.8	19.9	0.21
98% ile Conc ⁿ	57.7	34.9	13.8	25.2	0.35
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Katauna, (S6)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
01.03.23	44.3	26.9	11.1	15.9	<0.05
04.03.23	46.6	28.1	15.3	21.6	0.11
08.03.23	50.5	29.9	9.5	13.8	0.14
13.03.23	49.0	29.1	9.0	13.1	0.17
17.03.23	41.9	24.9	11.6	16.6	0.14
20.03.23	44.3	26.2	14.8	20.9	0.12
23.03.23	50.3	28.9	6.9	14.8	0.08
27.03.23	49.7	29.5	8.7	13.1	0.13
02.04.23	47.4	28.5	16.9	23.7	0.08
05.04.23	45.0	27.0	13.2	18.7	0.19
09.04.23	59.7	34.9	13.7	19.4	0.06
14.04.23	48.2	28.9	16.3	23.0	0.12
18.04.23	43.5	26.0	12.1	17.3	0.10
21.04.23	55.9	30.2	7.9	12.8	<0.05
24.04.23	54.2	32.8	12.7	18.0	0.14
28.04.23	42.7	26.0	15.8	22.3	0.12
02.05.23	48.2	28.8	8.4	12.4	0.18
05.05.23	45.0	27.1	14.2	20.1	0.15
09.05.23	43.5	25.4	10.0	14.5	<0.05
13.05.23	51.3	31.2	15.8	22.3	0.10
18.05.23	53.4	34.1	9.0	13.5	0.13
21.05.23	50.5	30.3	13.7	18.8	0.10
24.05.23	46.6	28.1	15.3	20.4	<0.05
27.05.23	45.8	27.6	16.9	22.6	0.17
Min ^m . Conc ⁿ	41.9	24.9	6.9	12.4	0.06
Max ^m . Conc ⁿ	59.7	34.9	16.9	23.7	0.19
Average Conc ⁿ	48.2	28.8	12.4	17.9	0.13
98% ile Conc ⁿ	58.0	34.5	16.9	23.4	0.18
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Saur, (S6)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
03.03.23	44.4	26.2	7.2	15.1	0.11
06.03.23	38.8	21.0	9.7	20.3	0.15
10.03.23	45.0	26.8	8.4	17.7	0.28
15.03.23	38.5	23.1	6.2	22.2	0.10
19.03.23	50.0	30.0	7.2	18.4	0.26
22.03.23	36.5	21.1	7.9	24.4	0.24
25.03.23	52.2	30.5	6.6	13.9	0.07
29.03.23	39.8	23.1	9.5	20.0	0.22
03.04.23	44.3	26.2	6.4	13.4	0.11
06.04.23	54.8	22.6	7.5	15.7	0.26
10.04.23	43.7	26.0	9.5	20.0	0.35
15.04.23	41.7	24.9	8.7	18.2	0.35
20.04.23	37.4	21.2	6.8	14.2	0.31
23.04.23	46.6	27.2	8.1	17.1	0.18
26.04.23	49.0	29.1	10.9	32.2	0.12
30.04.23	43.0	25.9	6.0	14.2	0.27
04.05.23	51.1	30.4	6.9	14.4	0.32
07.05.23	58.8	26.8	8.4	30.4	0.11
11.05.23	56.1	32.3	6.5	20.2	0.16
15.05.23	60.2	35.4	9.1	19.2	0.08
20.05.23	54.3	30.2	7.2	15.1	0.17
24.05.23	59.8	28.4	10.2	18.2	0.10
27.05.23	65.5	25.2	7.5	15.7	0.26
30.05.23	56.7	31.8	7.0	14.6	0.22
Min ^m . Conc ⁿ	36.5	21.0	6.0	13.4	0.07
Max ^m . Conc ⁿ	65.5	35.4	10.9	32.2	0.35
Average Conc ⁿ	48.7	26.9	7.9	18.5	0.20
98% ile Conc ⁿ	63.1	34.0	10.6	31.4	0.35
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Sikandara, (S7)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
03.03.23	45.0	26.6	8.9	13.7	0.17
06.03.23	41.9	25.3	7.4	12.6	0.46
10.03.23	37.1	22.3	9.5	18.2	0.22
15.03.23	46.9	27.4	11.3	17.5	0.34
19.03.23	42.6	25.5	9.7	15.1	0.37
22.03.23	49.9	29.9	8.4	13.1	0.22
25.03.23	39.2	23.6	12.1	18.7	0.23
29.03.23	38.4	22.9	10.6	16.5	0.33
03.04.23	58.8	32.6	9.6	14.9	0.38
06.04.23	49.0	29.2	13.0	20.1	0.23
10.04.23	41.1	24.5	7.8	12.1	0.29
15.04.23	56.6	31.8	8.5	13.2	0.08
20.04.23	46.2	27.6	9.4	14.6	0.13
23.04.23	42.7	25.5	10.9	16.9	0.26
26.04.23	40.8	24.4	7.4	30.4	0.41
30.04.23	44.4	26.5	12.1	18.7	0.29
04.05.23	43.3	25.9	10.2	19.4	0.22
07.05.23	61.2	35.8	11.4	17.6	0.17
11.05.23	48.9	30.2	10.9	16.8	0.15
15.05.23	41.3	23.9	8.9	13.8	0.35
20.05.23	49.1	29.1	8.4	29.2	0.11
24.05.23	45.3	26.6	6.6	21.4	0.24
27.05.23	39.1	22.9	10.4	16.1	0.23
30.05.23	46.5	27.5	5.6	11.3	0.30
Min ^m . Conc ⁿ	37.1	22.3	5.6	11.3	0.08
Max ^m . Conc ⁿ	61.2	35.8	13.0	30.4	0.46
Average Conc ⁿ	45.6	27.0	9.5	17.2	0.26
98% ile Conc ⁿ	60.1	34.3	12.6	29.8	0.44
NAAQS 2009	100	60	80	80	4

AMBIENT AIR QUALITY DATA**Location:** Dosut, (S8)

Date of Monitoring	24 hourly concentration (in $\mu\text{g}/\text{m}^3$)				
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO (mg/m^3)
01.03.23	48.5	28.9	10.0	20.9	0.21
04.03.23	44.8	26.8	7.7	12.6	0.35
08.03.23	47.5	28.5	8.0	14.8	0.20
13.03.23	49.4	29.5	9.5	20.1	0.29
17.03.23	46.6	28.8	10.8	22.4	0.40
20.03.23	54.7	32.6	7.5	13.9	0.18
23.03.23	52.4	31.3	9.7	18.5	0.12
27.03.23	50.3	30.2	8.7	18.5	0.16
02.04.23	53.8	32.3	6.1	13.0	0.22
05.04.23	51.8	31.1	11.3	20.3	0.14
09.04.23	50.5	33.8	8.4	14.3	0.10
14.04.23	48.9	29.4	12.1	24.8	0.39
18.04.23	43.0	25.8	7.2	14.4	0.28
21.04.23	51.2	30.7	10.0	20.9	0.32
24.04.23	45.9	27.5	12.1	24.8	0.12
28.04.23	46.4	30.1	7.4	15.4	0.36
02.05.23	50.0	30.0	10.4	21.7	0.08
05.05.23	46.9	34.2	8.3	14.6	0.20
09.05.23	51.7	31.1	11.7	24.0	0.33
13.05.23	44.5	35.4	9.1	19.3	0.27
18.05.23	54.1	32.4	8.2	17.7	0.17
21.05.23	50.2	33.6	7.4	16.2	0.29
24.05.23	49.5	29.7	13.0	28.0	0.16
27.05.23	53.5	32.1	14.9	24.4	0.12
Min ^m . Conc ⁿ	43.0	25.8	6.1	12.6	0.08
Max ^m . Conc ⁿ	54.7	35.4	14.9	28.0	0.40
Average Conc ⁿ	49.4	30.7	9.6	19.0	0.23
98% ile Conc ⁿ	54.4	34.8	14.0	26.5	0.40
NAAQS 2009	100	60	80	80	4

**बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी
द्वारा
प्रस्तावित**

**इंडस्ट्रियल एरिया (29.77 ha) की स्थापना
(स्टैंडअलोन सीमेंट ग्राइंडिंग परियोजना हेतु)**

**परियोजना स्थल :-
मौजा मौसमा, शेरपुर, माफ़ी, समीचक,
ब्लॉक वारसलीगंज
जिला : नवादा**

का

कार्यकारी सारांश

1.0 परिचय :-

बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी (बियाडा) बिहार सरकार के उद्योग विभाग की एक अंगीभूत इकाई हैं जो कि बिहार राज्य में आद्योगिक क्षेत्रों की स्थापना एवं क्रियान्वयन का कार्य करती हैं। बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी की स्थापना सन 1971 में हुई थी।

इंडस्ट्रियल एरिया, वारसलीगंज बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी की एक परियोजना हैं और इसका उद्देश्य इंडस्ट्रियल संस्थाओं को उद्योगिकी की स्थापना के लिए एक शानदार अवसर प्रदान करना हैं।

बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी के द्वारा वारसलीगंज, नवादा में इंडस्ट्रियल एरिया (आई. ए.), स्थापित करने का उद्देश्य है जिसमें सीमेंट ग्राइंडिंग परियोजना लगायी जाएगी। परियोजना स्थल नवादा जिला मुख्यालय से लगभग 16 किलोमीटर उत्तर पूर्व में है जो देश के बाकी हिस्सों से सड़क और रेल मार्ग द्वारा अच्छी तरह से जुड़ा हुआ है।

इंडस्ट्रियल एरिया, वारसलीगंज के पास कुल 29.77 हे. भूमि हैं, जिसका मौजा मोस्मा खाता नंबर 759, खेसरा नंबर 30, समीचक खाता नंबर 59, खेसरा 167, 169, 171, 172, 173, 168/ 174, शेरपुर खाता नंबर 1099, खेसरा नंबर 4140, 4144, 4239, 4146, 4145, 4148, 4149, 4150, 4151, माफ़ी खेसरा नंबर 4800, 4801, 4802, ब्लॉक वारसलीगंज, डिस्ट्रिक्ट नवादा, बिहार हैं।

परियोजना	उत्पाद	क्षमता
औद्योगिक क्षेत्र	औद्योगिक भूमि	29.77 हेक्टेयर
स्टैंडअलोन सीमेंट ग्राइंडिंग परियोजना	सीमेंट	6 मिलियन टन प्रति वर्ष

2.0 परियोजना स्थल एवं पर्यावरणीय संवेदनशीलता :-

• परियोजना स्थल	मौजा मौसमा, शेरपुर, माफ़ी, समीचक, ब्लॉक वारसलीगंज नवादा बिहार - 805130	
• परियोजना क्षेत्र भौगोलिक समन्वय	आक्षांश	देशांतर
	25 ⁰ 0'26.47"N	85 ⁰ 38'35.88"E
• समुद्र तल से ऊंचाई	93-98 मीटर	
• कुल भूमि	29.77 हेक्टेयर (73.56 एकड़)	

• निकटतम रेलवे स्टेशन	वारसलीगंज रेलवे स्टेशन (1.0 किलोमीटर) नवादा रेलवे स्टेशन (16.0 किलोमीटर)
• निकटतम राजमार्ग	एस० एच० – 83 (0.5 किलोमीटर)
• निकटतम मुख्य शहर	वारसलीगंज
• निकटतम नदी / जल निकाय	सकरी - (5.5 किलोमीटर)
• राष्ट्रीय उद्यान, आरक्षित वन	10 किलोमीटर की परिधि में यह उपलब्ध नहीं है
• वन्य प्राणी अभ्यारण्य	
• बायोस्फियर रिज़र्व, पर्वत, घाटियाँ	

3.0 परियोजना सारांश:-

बिहार इंडस्ट्रियल एरिया डेवलपमेंट ऑथोरिटी (बियाडा) के द्वारा वारसलीगंज, नवादा में इंडस्ट्रियल एरिया (आई. ए.), स्थापित करने का उद्देश्य है, जिसमें, सीमेंट ग्राइंडिंग परियोजना लगायी जाएगी।

4.0 उत्पादन प्रक्रिया

सीमेंट निर्माण के लिए क्लिंकर, फ्लाई ऐश और स्लैग को जिप्सम के साथ इंटरग्राउंड करना पड़ता है, जो सेट-रिटेलर के रूप में कार्य करता है। यह उपलब्ध फ्लाई ऐश की गुणवत्ता पर निर्भर करेगा। सीमेंट ग्राइंडिंग परियोजना के लिए विभिन्न प्रौद्योगिकियां उपलब्ध हैं। वर्टिकल रोलर मिलर पर आधारित प्रस्तावित सीमेंट ग्राइंडिंग यूनिट कार्य करेगी।

क्लिंकर ट्रकों / वैगनों द्वारा प्राप्त किया जाएगा और साइट पर अनलोड करने के लिए ट्रक / वैगन टिपलर का इस्तेमाल किया जायेगा। क्लिंकर को फ्रंट एंड लोडर के माध्यम से पुनः प्राप्त किया जाएगा और क्लिंकर साइलो को आगे परिवहन के लिए डंप हॉपर में डाला जाएगा। साइलो से क्लिंकर को बेल्ट कन्वेयर के माध्यम से क्लिंकर हॉपर में ले जाया जाएगा।

जिप्सम को ट्रक टिपलर के माध्यम से उतारा जाएगा और जिप्सम भंडारण यार्ड में संग्रहीत किया जाएगा। भंडारण यार्ड से जिप्सम को पेय लोडर / फ्रंट एंड लोडर के माध्यम से पुनः प्राप्त किया जाएगा और बेल्ट कन्वेयर द्वारा मिल हॉपर को आगे ट्रांसमिशन के लिए जिप्सम हॉपर में डाला जाएगा। यदि खनिज जिप्सम का उपयोग किया जाना है तो जिप्सम क्रशर का उपयोग जिप्सम हॉपर में डालने से पहले जिप्सम को महीन रूप देने के लिए किया जाएगा।

आस-पास के थर्मल पावर प्लांट से बंद टैंकरों में फ्लाई ऐश को लाया जाएगा। बंद टैंकरों से निकलने वाली फ्लाई ऐश को न्युमेटिक रूप से उतारा जाएगा और पाइप लाइन के माध्यम से भेजा जाएगा। इसे फ्लाई ऐश स्टोरेज साइलो में स्टोर किया जाएगा। फ्लाई ऐश साइलो सामग्री के आसान निष्कर्षण के लिए तल पर वायु संचारण होगा। साइलो से फ्लाई ऐश को मोटराइज्ड डोजिंग वाल्व के माध्यम से

निकाला जाएगा और इसे एयर स्लाइड के माध्यम से मिल इनलेट / आउटलेट (आवश्यकता के अनुसार) तक पहुंचाया जाएगा।

क्लिंगर, जिप्सम और फ्लाई ऐश को वेट फीडर के माध्यम से निकाला जाएगा और मिल इनलेट को भेजा जाएगा। यदि आवश्यक हो तो विभाजक में प्रत्यक्ष फीडिंग के लिए मिल आउटलेट लिफ्ट में फ्लाई ऐश भेजने का भी प्रावधान होगा। सीमेंट मिल की परिकल्पना पॉज़ोलाना पोर्टलैंड सीमेंट (पी.पी.सी) और पोर्टलैंड पॉज़ोलोना सीमेंट (पी.पी.सी) के उत्पादन के लिए की गई है। ग्राउंड सीमेंट को एयर स्लाइड और बकेट एलेवेटर के माध्यम से सीमेंट साइलो तक पहुंचा दिया जाएगा।

साइलो से, सीमेंट को पैकिंग मशीन के सर्ज हॉपर में निकाला जाएगा और बाद में एच.डी.पी.ई बैग में सीमेंट पैक किया जाएगा। पैकड बैग ट्रकों में लोड किया जाएगा।

5.0 आधारभूत पर्यावरणीय अध्ययन

विभिन्न पर्यावरणीय मानकों के उत्पन्न आधारभूत तथ्य प्रस्तावित स्थल के 10 किमी के दायरे में मार्च 2022 से मई 2023 के दौरान अध्ययन किया गया था और निष्कर्ष नीचे प्रस्तुत की जा रही है।

(i) **मौसम :-**

नवादा जिले में कोई मौसम विज्ञान वेधशाला नहीं है। पड़ोसी जिलों में गया और जमुई वेधशालाओं के आंकड़ों से संकेतित तापमान और अन्य मौसम संबंधी स्थिति को सामान्य रूप से जिले की जलवायु परिस्थितियों के प्रतिनिधि के रूप में लिया जा सकता है। गर्मी का मौसम दिन के तापमान में लगातार वृद्धि के साथ मार्च से शुरू होता है और जून के पहले सप्ताह तक रहता है। मई आम तौर पर सबसे गर्म महीना होता है, जिसमें औसत अधिकतम तापमान लगभग 40°C और औसत न्यूनतम तापमान लगभग 26°C होता है। मानसून की शुरुआत से पहले अलग-अलग दिनों में दिन का तापमान 45°C से ऊपर जा सकता है। गर्मी के मौसम में चलने वाली झुलसा देने वाली उत्तर-पश्चिमी हवाएँ काफी असुविधाजनक होती हैं। नवंबर के मध्य से दिन और रात के तापमान में तेजी से गिरावट आती है। जनवरी आम तौर पर सबसे ठंडा महीना होता है, जिसमें औसत अधिकतम तापमान लगभग 24 डिग्री सेल्सियस और औसत न्यूनतम तापमान लगभग 10 डिग्री सेल्सियस होता है। पश्चिमी विक्षोभ के पारित होने के साथ, शीत लहर की स्थिति जिले में आती है और इस दौरान न्यूनतम तापमान लगभग 2 डिग्री सेल्सियस तक गिर जाता है।

दक्षिण-पश्चिम मानसून के मौसम के दौरान और मानसून के बाद और सर्दियों के मौसम की सुबह में सापेक्षिक आर्द्रता आम तौर पर लगभग 75% अधिक रहती है। वर्ष का सबसे शुष्क

भाग ग्रीष्म ऋतु है जब विशेषकर दोपहर में आर्द्रता 25% से 30% के बीच रहती है। वर्ष के शेष समय में दोपहर में सापेक्ष आर्द्रता 45% से 65% के बीच रहती है।

मानसून के बाद और सर्दियों के मौसम में हवाएं आम तौर पर हल्की से मध्यम होती हैं और गर्मियों और मानसून के मौसम में कुछ हद तक मजबूत होती हैं। मानसून के बाद और सर्दियों के मौसम के दौरान हवाएं आम तौर पर शांत होती हैं या सुबह दक्षिण/दक्षिण-पश्चिम दिशा से चलती हैं और दोपहर में हवाएं आम तौर पर उत्तर-पश्चिमी होती हैं। ग्रीष्म ऋतु में हवाएं अधिकतर सुबह दक्षिण-पश्चिमी और दोपहर में उत्तर-पश्चिमी होती हैं। पूर्वी हवाएं गर्मी के मौसम के अंत से शुरू होती हैं और दक्षिण-पश्चिम मानसून के मौसम के दौरान प्रबल रहती हैं।

प्री-मॉनसून और मॉनसून सीज़न में बंगाल की खाड़ी में उत्पन्न होने वाले तूफान और अवसाद तट को पार करने के बाद उत्तर-पश्चिम से उत्तर दिशा की ओर बढ़ते हैं और जिले और इसके आसपास के इलाकों को प्रभावित करते हैं, जिससे कई बार तेज आंधी और बारिश होती है। गरज के साथ तूफान पूरे वर्ष भर आते रहते हैं, हालाँकि मानसून अवधि के दौरान इनकी आवृत्ति अधिक होती है। गर्मियों के दौरान और कभी-कभी मानसून के शुरुआती भाग में धूल भरी आंधी और तूफान जिले को प्रभावित करते हैं। राज्य भर में पश्चिमी विक्षोभ के पारित होने के साथ सर्दी के मौसम में कभी-कभी कोहरा जिले को प्रभावित करता है।

(ii) जनसँख्या सम्बन्धी विवरण:-

भारत की 2011 की जनगणना के अनुसार, वारिसलीगंज की कुल जनसंख्या 153,067 लोग इस ब्लॉक में रहते हैं, जिनमें 79,533 पुरुष और 73,534 महिलाएं हैं। 2022 में वारिसलीगंज की जनसंख्या 195,926 होने का अनुमान है। साक्षर लोगों में से 74,342 हैं, जिनमें से 45,467 पुरुष और 28,875 महिलाएं हैं। कुल श्रमिक 59,646 हैं जो बहु कौशल पर निर्भर हैं जिनमें से 38,942 पुरुष और 20,704 महिलाएं हैं। कुल 13,720 किसान कृषि पर निर्भर हैं, जिनमें से 10,921 पुरुष खेती करते हैं और 2,799 महिलाएं खेती करती हैं। वारिसलीगंज में 17,402 लोग कृषि भूमि पर मजदूरी करते हैं, जिनमें पुरुष 11,905 और 5,497 महिलाएं हैं। अध्ययन क्षेत्र में प्रचलित लिंगानुपात प्रति 1000 पुरुषों पर 921 महिलाएं हैं।

इंफ्रास्ट्रक्चर और अन्य सुविधाएं

पूरा अध्ययन क्षेत्र वारिसलीगंज शहर एवं जिला मुख्यालय, नवादा से पक्की सड़क के द्वारा जुड़ा हुआ है। सारे आधारभूत संरचनाएं एवं सुविधाएं इंडस्ट्रियल एरिया, वारिसलीगंज परियोजना क्षेत्र से 5 – 10 कि. मि. की परिधि में उपलब्ध है।

(iii) पानी :-

8 स्थानों से भूमिगत जल के नमूने एकत्र किये गए हैं एवं दो स्थानों से सतही जल के नमूने एकत्र किये गए हैं और परीक्षित परिणाम अनुमेय सीमा के भीतर हैं।

सभी पानी के नमूने सहमत स्वाद में रहे थे। सभी पानी के नमूनों का रंग 5 हैजेन यूनिट से कम पाया गया। सभी पानी के नमूने की गंध स्वीकार्य थी।

फ्लूराइड और बोरोन के कारण पानी के नमूने दूषित होने से मुक्त पाए गए। पानी के नमूनों में घुलनशील ठोस स्तर 246 - 383 मिलीग्राम / लीटर की सीमा में पाए गए जो की अनुमेय सीमा के अंदर है। कटौना के पानी के नमूना में न्यूनतम टी.डी.एस. था जबकि अधिकतम बोझवां में पाया गया।

क्लोराइड 14-18 मिलीग्राम लीटर की सीमा में पाए गए। सल्फेट्स 6.4 – 12.2 मिलीग्राम / लीटर की सीमा में पाए गए थे। कुल कठोरता का मान 156 - 208 मिलीग्राम / लीटर की सीमा में पाया गया। कुल क्षारीयता मान 184 - 244 मिलीग्राम / लीटर पाया गया।

अन्य सभी मापदंडों को पीने के पानी के लिए निर्धारित IS 10500:2012 की अनुमेय सीमा के भीतर ही पाया गया है।

(iv) वायु :-

परिवेशीय वायु गुणवत्ता की निगरानी 8 स्थानों पर की गई। सारांश नीचे प्रस्तुत किया गया है।

क्रम ० सं०	स्थान का नाम											
		पी. एम. ₁₀		पी. एम. _{2.5}		सल्फर डाइऑक्साइड		नाइट्रोजन डाइऑक्साइड		कार्बन मोनोऑक्साइड		
		न्यून.	अधिक.	न्यून.	अधिक.	न्यून.	अधिक.	न्यून.	अधिक.	न्यून.	अधिक.	
(माइक्रोग्राम / घन मी.)											(मिलीग्राम / घन मी.)	
S1	परियोजना स्थल	34.4	54.4	21.3	35.5	6.0	13.9	10.7	24.7	0.10	0.27	
S2	बाजीदपुर	43.5	59.0	27.8	36.5	6.4	10.2	12.7	31.1	0.11	0.44	
S3	बोझवां	39.5	53.7	23.7	31.8	5.2	9.5	11.4	28.9	0.05	0.23	
S4	कतरीसराय	42.4	58.2	25.1	34.9	8.4	14.0	14.5	25.6	0.08	0.36	
S5	कटौना	41.9	59.7	24.9	34.9	6.9	16.9	12.4	23.7	0.06	0.19	
S6	सौर	36.5	65.5	21.0	35.4	6.0	10.9	13.4	32.2	0.07	0.35	
S7	सिकंदरा	37.1	61.2	22.3	35.8	5.6	13.0	11.3	30.4	0.08	0.46	
S8	दोसुत	43.0	54.7	25.8	35.4	6.1	14.9	12.6	28.0	0.08	0.40	

परिवेशीय वायु गुणवत्ता के अध्ययन से पता चलता है की क्षेत्र की वायु गुणवत्ता केंद्रीय सरकार द्वारा निर्धारित एन.ए.ए.क्यू.एस 2009 के परिमेय सीमा के भीतर है।

(v) ध्वनि :-

8 स्थानों पर ध्वनि स्तर की जांच की गयी है। विभिन्न स्थानों पर दर्ज किये गए ध्वनि स्तर निर्धारित अनुमेय स्तर के भीतर है।

दिन एवं रात्रि में अधिकतम ध्वनि स्तर कृष्णापुर रोड में तथा न्यूनतम ध्वनि स्तर दिन एवं रात्रि में परियोजना स्थल में पाया गया।

6.0 पर्यावरणीय प्रभाव और संचालन योजना

वायु प्रदूषण नियंत्रण के उपाय :-

निर्माण अवधि के दौरान धूल और धुएं के प्रमुख स्रोत डीजी सेट, वाहनों की आवाजाही और निर्माण गतिविधियां हैं। इन प्रभावों को कम करने के लिए निर्माण क्षेत्र के चारों ओर नियमित रूप से पानी का छिड़काव किया जाएगा और निर्माण सामग्री को तिरपाल से ढककर या अस्थायी शेड में रखकर ढके हुए क्षेत्र में संग्रहित किया जाएगा।

सीमेंट ग्राइंडिंग वाले संयंत्रों में पर्यावरण नियंत्रण पहलुओं पर अत्यधिक ध्यान दिया जाना चाहिए। प्रदूषण के तत्काल चिंता के दो पहलुओं में से, अर्थात् वायु और जल प्रदूषण, सीमेंट ग्राइंडिंग वाला संयंत्र वस्तुतः जल प्रदूषण से मुक्त है क्योंकि इसमें कोई अपशिष्ट शामिल नहीं है। यहां तक कि वायु प्रदूषण के संबंध में, जो मूल रूप से कणों और अवांछनीय गैसों दोनों के कारण हो सकता है, संयंत्र संचालन व्यावहारिक रूप से गैसीय पदार्थों का कोई उत्सर्जन सुनिश्चित नहीं करता है, जहां कण उत्सर्जन को स्वीकार्य सीमा के भीतर रखने के लिए पर्याप्त संख्या में पल्स जेट बैग फिलर्स स्थापित किए जायेंगे। सीमेंट ग्राइंडिंग, पैकिंग और प्रेषण की प्रक्रिया के दौरान धूल उत्पन्न होने के बिंदु।

उपरोक्त दर्शन को ध्यान में रखते हुए, प्रस्तावित सीमेंट ग्राइंडिंग प्लांट एक अत्याधुनिक तकनीक को अपनाएगा, जो न्यूनतम उत्सर्जन सुनिश्चित करता है और जो भी थोड़ा सा धूल उत्सर्जित होता है, उसे अधिकांश आधुनिक तकनीक का उपयोग करके पल्स जेट बैग फिलर्स का उपयोग करके लगभग पूरी तरह से पकड़ लिया जाता है।

अपशिष्ट जल उपचार :-

प्रस्तावित सीमेंट ग्राइंडिंग इकाई में पानी का उपयोग उत्पादन प्रक्रिया में नहीं किया जाएगा, पानी का उपयोग केवल बाहरी शीतलन और घरेलू उद्देश्यों के लिए किया जाएगा। इसलिए कोई भी औद्योगिक अपशिष्ट उत्पन्न और डिस्चार्ज नहीं किया जाएगा। लगभग 15 केएलडी घरेलू अपशिष्ट उत्पन्न किया जाएगा जिसे आईए वारसलीगंज के परिसर में प्रस्तावित एसटीपी में उपचारित किया जाएगा।

एमबीबीआर (मूविंग बेड बायो रिएक्टर) तकनीक पर आधारित 25 के.एल.डी सीवेज ट्रीटमेंट प्लांट (एसटीपी) स्थापित किया जाएगा।

हरित पट्टी का विकास :-

9.82 हे. आई. ए. वारसलीगंज परिसर में ग्रीन बेल्ट के रूप में विकसित किया जाएगा। क्षणिक उत्सर्जन को कम करने के लिए परियोजना परिसर के चारों ओर नियमित जल छिड़काव किया जाएगा।

7.0 ठोस अपशिष्ट प्रबंधन :-

आईए वारसलीगंज की प्रस्तावित सीमेंट ग्राइंडिंग परियोजना के संचालन चरण के दौरान उत्पन्न ठोस कचरे का संग्रहण, परिवहन और निपटान नगरपालिका ठोस अपशिष्ट (प्रबंधन और हैंडलिंग) नियम, 2016 (एम. एस. डब्ल्यू. नियम) के अनुसार किया जाएगा।

सभी बायोडिग्रेडेबल और गैर-बायोडिग्रेडेबल कचरे को नगरपालिका ठोस अपशिष्ट (प्रबंधन और हैंडलिंग) नियम, 2016 के अनुसार संभाला जाएगा। बायोडिग्रेडेबल डिब्बे से निकलने वाले कचरे को जैविक खाद तैयार करने के लिए बायो-कंपोस्टिंग में पुनः उपयोग किया जाएगा। गैर जैव-निम्नीकरणीय कचरे का निपटान सरकारी माध्यम से किया जाएगा। थ्री-बिन सिस्टम अपनाया जाएगा। किसी दिए गए क्षेत्र में अपशिष्ट उत्पादन की मात्रा और जनसंख्या घनत्व को ध्यान में रखते हुए भंडारण सुविधाएं बनाई और स्थापित की जाएंगी। विभिन्न श्रेणियों के कचरे के लिए अलग-अलग रंग के डिब्बे उपलब्ध कराए जाएंगे। प्रत्येक भवन में पहिएदार डिब्बे के तीन रंग: - गैर-पुनर्चक्रण योग्य कचरे के लिए गहरा भूरा, रसोई के भोजन / खाद योग्य बगीचे के कचरे के लिए हरा और कागज के लिए नीला।

औद्योगिक ठोस अपशिष्ट	जनित	प्रबंधन
सीमेंट	0.72 मिलियन टन प्रतिवर्ष	उत्पादन प्रक्रिया में पुनर्चक्रण

8.0 सामाजिक और आर्थिक स्थिति पर प्रभाव

किसी भी औद्योगिक परियोजना के निर्माण से निरपवाद रूप से सामाजिक आर्थिक परिवर्तन होते हैं। सामग्री और धन का प्रवाह समुदाय की आर्थिक स्थिति को बदलने के लिए आधार देता है। क्षेत्र में बाजार, कार्यशालाएं और वाणिज्यिक केंद्र विकसित होंगे।

प्रस्तावित परियोजना में पर्याप्त अकुशल श्रम बल शामिल होगा। चूँकि अधिकांश अकुशल श्रमिक पास के गाँव से होंगे, अनियोजित और अव्यवस्थित मलिन बस्तियों का विकास नहीं होगा। हालांकि, पानी की आपूर्ति और स्वच्छता आदि की बुनियादी सुविधाओं के प्रावधान के साथ श्रमिक शिविर प्रदान किए जाएंगे जो भौतिक और सौंदर्य पर्यावरण के क्षरण को रोकने में काफी मददगार साबित होंगे।

9.0 पर्यावरणीय प्रबंधन योजना

एक व्यापक पर्यावरण प्रबंधन योजना तैयार की गई है जिसके तहत इकाई पर्यावरण को क्षरण से बचाने के उपायों को अपनाएगी। उनमें से महत्वपूर्ण हरित पट्टी विकास योजना है जो ध्वनि अवरोधक के रूप में भी कार्य करेगी। पर्यावरण के सभी घटकों पर पर्यावरण निगरानी कार्यक्रम तैयार किया गया है और ईएमपी में विस्तार से इंगित किया गया है जो ई.आई.ए का एक हिस्सा है। इंडस्ट्रियल एरिया, वारसलीगंज में प्रस्तावित स्टैंडअलोन सीमेंट ग्राइंडिंग परियोजना बेहतर पर्यावरण प्रबंधन के लिए सभी उपाय अपनाएगा। बेहतर वायु पर्यावरण के लिए बॉयलर के साथ बैग फिल्टर्स लगाए जायेंगे, क्योंकि मनुष्य को हर पल सांस लेने की जरूरत होती है, इसलिए वनस्पति और जीव-जंतु भी इस पर निर्भर हैं। बेहतर पर्यावरण प्रबंधन के लिए परियोजना परिसर के चारों ओर हरित पट्टी का विकास और रखरखाव करेगा। प्रस्तावित परियोजना में पर्यावरण प्रबंधन के लिए 2 करोड़ रुपये की राशि आवंटित किया गया है।

सामाजिक उत्थान एवं सामाजिक कार्यों (सी.इ.आर) के लिए बियाडा द्वारा 12 लाख रु. की राशि निर्धारित की गयी है एवं प्रस्तावित स्टैंडअलोन सीमेंट ग्राइंडिंग परियोजना द्वारा 7 करोड़ रुपये की राशि निर्धारित की गयी है

10. स्वास्थ्य और सुरक्षा

इंडस्ट्रियल एरिया, वारसलीगंज में प्रस्तावित स्टैंडअलोन सीमेंट ग्राइंडिंग परियोजना व्यावसायिक सुरक्षा और स्वास्थ्य संबंधी खतरों के प्रति कर्मचारियों के जोखिम संपर्क को कम करने के लिए सभी एहतियाती उपाय अपनाएगा। सभी कर्मचारियों का प्री और पोस्ट मेडिकल चेक-अप किया जाएगा। कर्मचारियों की नियमित रूप से जांच की जाएगी और प्रत्येक कर्मचारी के लिए मेडिकल रिकॉर्ड बनाए रखा जाएगा।

11.0 वर्षा जल संचयन

जल के महत्व को ध्यान में रखते हुए, वर्षा जल संचयन द्वारा जल संरक्षण का प्रस्ताव है जिससे भूमिगत जल की स्थिति/नमी की मात्रा को काफी हद तक बनाए रखा/सुधारा जा सके। साथ ही यह भी प्रस्तावित है कि

छत क्षेत्र से वर्षा जल को उपयुक्त क्षमता के वर्षा जल संग्रह टैंक में एकत्रित करके भूजल जलभृतों में पुनर्भरण किया जाएगा।

12.0 उपसंहार

- परिसर के बाहर किसी भी औद्योगिक अपशिष्ट जल को सतह या जल निकायों में नहीं छोड़ा जाएगा।
- भूजल विशेषताएँ भी आई.एस 10500:2012 की सीमा के भीतर हैं।
- प्रस्तावित परियोजना से वायु उत्सर्जन ई(पी) नियमों की सीमा के भीतर होगा।
- अध्ययन क्षेत्र के भीतर औसत परिवेशी वायु गुणवत्ता राष्ट्रीय परिवेशी वायु गुणवत्ता मानकों (नवंबर 2009) के भीतर है।
- परियोजना क्षेत्र का परिवेशी ध्वनि स्तर भी औद्योगिक क्षेत्र की सीमा के भीतर है।
- परियोजना के संचालन से उत्पन्न ठोस कचरे का स्रोत के अंत में पुनः उपयोग किया जाएगा।
- परिसर के भीतर अच्छी हरित पट्टी और भूनिर्माण विकसित और बनाए रखा जाएगा।
- प्रस्तावित परियोजना प्रत्यक्ष और अप्रत्यक्ष दोनों तरह से रोजगार के अवसर पैदा करेगी। प्रत्यक्ष मोड में लोगों को प्रस्तावित परियोजना में अतिरिक्त नौकरियां मिलेंगी और अप्रत्यक्ष मोड में लोगों को कंपनी अधिकृत डीलर और विक्रेता के रूप में नियुक्त किया जाएगा।
- प्रस्तावित परियोजना की स्थापना करें और शुल्कों के रूप में उत्पन्न राजस्व के संदर्भ में राज्य सरकार के खजाने में भी जोड़ेगी।

*EXECUTIVE SUMMARY
OF EIA/EMP STUDY*

FOR

**INDUSTRIAL AREA, WARSALIGANJ
OF
BIHAR INDUSTRIAL AREA DEVELOPMENT AUTHORITY (BIADA)
(FOR STANDALONE CEMENT GRINDING PROJECT)
AT : MOSMA, WARSALIGANJ
DIST. NAWADA (BIHAR)**

SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT

1.0 Introduction

The present proposal is for environment clearance of Industrial Area, Warsaliganj (IA Warsaliganj), being developed by Bihar Industrial Area Development Authority (BIADA), Industry Deptt., Govt. of Bihar. As per EIA Notification 2006 and amendments thereof, the Project falls under category B of Item 7 (c) of Schedule I, having total land area 29.77 ha., housing one Cat. 'B' project of Stand alone Cement Grinding Project of 6.0 Million TPA (2 * 3 Million TPA).

2.0 Project Location ;

Bihar Industrial Area Development Authority (BIADA) has proposed to establish Industrial Area at Warsaliganj, Dist. Nawada which will consist of Standalone cement grinding unit. Geo Co-ordinates of Project Site are Latitude 25⁰0'26.47"N & Longitude 85⁰38'35.88"E. Project site is about 16 kms NE from dist. headquarter at Nawada & which is well connected by road and rail with rest of the country. Project site of BIADA is located about 500 m. away from SH-83, which connects BIADA Industrial Area to Dist. Headquarters at Nawada and rest of Country. Nearest railway station is Warsaliganj at 1 Km. distance in North direction on Gaya Kiul Sec, of ECR.

The registered address of project proponent is BIADA, Udyog Bhawan, East Gandhi Maidan, Dist. Patna. Land description of IA Warsaliganj project is Mauza Mosma, Khata No. 759, Khesra No. 30, 1, Samichak, Khata No. 59, Khesra 167, 169, 171, 172, 173, 168/174, Sherpur Khata No. 1099, Khesra No. 4140, 4144, 4239, 4146, 4145, 4148, 4149, 4150, 4151, Mafi, Khesra No. 4800, 4801, 4802, Block Warsaliganj, Dist. Nawada, Bihar.

3.0 Environmental Sensitivity

<i>Particulars</i>	<i>Details</i>
• Location	Mauza – Mosma, Samichak, Sherpur, Mafi, Block - Warsaliganj, Dist. Nawada, Bihar
• Elevation above mean sea level	93-98 m.
• Nearest Railway Station	Warsaliganj Railway Station : 1 Km. Nawada Railway Station : 16 Km.
• Nearest Highway	SH – 83 (0.5 Km. W)
• Nearest Major City	Warsaliganj (0.5 Km.)
• Nearest River	River Sakri (5.5 Km. W)
• National Park, Reserve Forest	<i>Not exist within 10 km. radius</i>
• Wildlife Sanctuary	
• Biosphere Reserve, Hill & Valleys	

4.0 Salient Features of the Project

Activity	Sl. No. in Schedule of EIA Notification 2006	Category of Project	Capacity
Industrial estates /Parks/ Complex/ areas, export processing Zone, Special Economic Zones (SEZs), Biotech Parks, Leather complex	7 (C)	B Industrial estates housing at least one Category B industry and area <500 ha.	Total Land Ares 29.77 Ha. (73.58 Acres)
Standalone Cement Grinding Project	3(b)	B	6 Millin TPA (2 * 3 Million TPA)

Proposed Manufacturing & Production Details of IA Warsaliganj ;

Manufacturing Facilities	Production Capacity	
Standalone Cement Grinding Project	Ordinary Portland Cement (OPC) / Portland Pozzolana Cement (PPC) / other cements	6 Million TPA (2 * 3 Million TPA)

		ITEM	Requirement in MTPA	Source
a) Raw Materials	:	Clinker	5.7 Million Ton/Annum	Odisha, Chhattisgarh, M.P.

		Flyash	2.1 Million Ton/Annum	NTPC Barh, Kahalgaon & Barauni
		Gypsum	0.48 Million Ton/Annum	Rajasthan
		Slag	3.9 Million Ton/Annum	West Bengal, Jharkhand
		Coal (for HAG)	0.14 Million Ton/Annum	ECL & CCL, Jharkhand
b) Power	:	36 MW from SBPDCL Grids		
c) Source of Water	:	Own Borewell		
d) Water Requirement	:	600 KLD		
e) Total Cost of IA Warsaliganj Project	:	Rs. 6 Crore		
f) Tentative Cost of proposed Standalone Cement Grinding Project within IA Warsaliganj	:	Rs. 1400 Crore		

5.0 Process Description

For manufacturing cement, clinker, fly ash & slag have to be ground with gypsum, which acts as a set-retarder. This will depend upon the available Fly ash fineness. There are various technologies available for cement grinding project. In the proposed Cement Grinding Unit Cement based on Vertical Roller Miller will be adopted for production of cement.

The Clinker will be received by trucks/wagons and unloaded at site by truck/wagon tippler. The clinker will be reclaimed through front end loader and fed into a dump hopper for further transportation to the Clinker silo. From silo clinker will be transported to clinker hopper by belt conveyors.

Gypsum will be unloaded through truck tippler and will be stored in the Gypsum storage yard. From the storage yard Gypsum will be reclaimed through pay loader/ front end loader and will be feed to Gypsum hopper for onward transmission to mill hoppers by belt conveyors. If Mineral Gypsum is to be used Gypsum crusher will be used to crush the Gypsum before feeding it to Gypsum hopper.

Fly ash will be sourced from nearby Thermal Power plant in closed tankers. The fly ash from closed tankers will be unloaded pneumatically and transported through pipeline. It will be stored in the Fly ash storage silo. The fly ash silo will have aeration at the bottom for easy extraction of material. The fly ash from the silo will be extracted through motorized dosing valve and it will be transported to the mill inlet/outlet (as per requirement) through air slides.

Clinker, Gypsum & Fly Ash will be extracted through Weigh feeders and fed to the mill inlet. If required there shall also be a provision of feeding fly ash in mill outlet elevator for direct feeding into the separator.

Cement mill is envisaged to produce Pozzolana Portland Cement (PPC) & Portland Pozzolona Cement (PPC). Ground cement will be conveyed through air slide & bucket elevator to the cement silo.

From the silo, cement will be extracted and filled in surge hopper of the packing machine and subsequently cement will be packed in HDPE bags. The packed bags will be loaded in trucks spiral chute.

6.0 Existing Baseline Environment Scenario :

Baseline environment data for all the components has been collected during the period Mar-May'2023. The detail findings are here as under ;

[i] Meteorology :

The daily average temperature was recorded to be in the range of 18.1 – 44.3 °C during the study period. The maximum reading was found to be 44.3 °C during Apr.'23 and the minimum was found to be 18.1 °C during Mar.'23. The average value of temperature was computed to be 31.36 °C.

During the study the average relative humidity was found to be in the range of 18 – 68%. The minimum values was found during Apr.'23 and maximum value was found during Mar.'2023. The average value of Relative Humidity was computed to be 41.6%.

No rainfall was observed during the study period.

The wind is predominantly blowing from WNW to SE. The wind speeds are of the range of 0.32 – 5.4 m/sec. and the calm condition is 5.2 %.

[ii] Demographic Profile

According to 2011 census of India, Warisaliganj population is 153,067 people are living in this Block, of which 79,533 are male and 73,534 are female. Warisaliganj population estimated to be 195,926 in 2022. Literate people are 74,342 out of 45,467 are male and 28,875 are female. Total workers are 59,646 depends on multi skills out of which 38,942 are men and 20,704 are women. Total 13,720 Cultivators are depended on agriculture farming out of 10,921 are cultivated by men and 2,799 are women. 17,402 people works in agricultural land as a labour in Warisaliganj, men are 11,905 and 5,497 are women.

The prevailing sex ratio in the study area is 921 females per 1000 males.

[iii] Socio Economic Profile

Agriculture is the one of the main sources of income in the study area. About 23.05 % of the total population are cultivators. 54.58 % of the total population has been found to be working as agricultural labourers. 3.87 % are household industrial workers and about 18 % of the total population has been in to other occupations..

[iv] Topography and Land Use

Topography of the study area is more or less flat to uneven, with surface level variation of about 1 m. The average height of the ground surface at the proposed plant site is about 98 m. above mean sea level (MSL). The present pedogenic and sedimentation processes in this basin are essentially the continuation of those prevailing since Mid Miocene.

[v] Water Quality

8 ground water samples & 2 surface water samples were collected & analyzed from the study area.

Ground Water Quality

The water samples were found to be free from contaminations due to Fluoride & Boron. The dissolved solids level in the water samples were found in the range of 246 - 383 mg/l., which is in the acceptable and permissible limits of IS 10500: 2012. The water sample from Vill. Katauna was having the minimum TDS while maximum dissolved solids were found at Bojhwan.

The chlorides were found to be in the range of 18 - 24 mg/l. The Sulphates were found in the range of 6.4 - 12.2. Total hardness values in the range of 156 - 208 mg/l. It is within the permissible limits of IS 10500:2012. Total Alkalinity values were in the range of 184 - 244 mg/l.

Values of Iron are in range of 0.38 - 0.82 mg/l. & values for Zinc are in range of 0.38 - 0.46 mg/l.

Surface Water Quality

The surface water can be best used for Irrigation and domestic purposes except drinking use.

[vi] Ambient Air Quality :

To ascertain the baseline Ambient Air Quality status of the study area, monitoring of AAQ was conducted at 8 locations around the project area. Summary results are as under ;

Stn. No.	Location Name	24-hourly average concentration ($\mu\text{g}/\text{m}^3$)									
		PM ₁₀		PM _{2.5}		SO ₂		NO ₂		CO (mg/m^3)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
S1	Project Site	34.4	54.4	21.3	35.5	6.0	13.9	10.7	24.7	0.10	0.27
S2	Bazidpur	43.5	59.0	27.8	36.5	6.4	10.2	12.7	31.1	0.11	0.44
S3	Bojhwan	39.5	53.7	23.7	31.8	5.2	9.5	11.4	28.9	0.05	0.23
S4	Katrisarai	42.4	58.2	25.1	34.9	8.4	14.0	14.5	25.6	0.08	0.36
S5	Katauna	41.9	59.7	24.9	34.9	6.9	16.9	12.4	23.7	0.06	0.19

S6	Saur	36.5	65.5	21.0	35.4	6.0	10.9	13.4	32.2	0.07	0.35
S7	Sikandra	37.1	61.2	22.3	35.8	5.6	13.0	11.3	30.4	0.08	0.46
S8	Dosut	43.0	54.7	25.8	35.4	6.1	14.9	12.6	28.0	0.08	0.40

It can be observed from the above table the AAQ status around the project area is well within the limits of NAAQS, 2009

7.0 ENVIRONMENTAL IMPACTS OF IA WARSALIGANJ WITH PROPOSED CEMENT GRINDING PROJECT ;

There are two sources from which the environment of the area can be affected if suitable control measures are not strictly applied. These are, discharge of waste water either on land or in surface water bodies and emissions from the stack. Both these two aspects have been taken into consideration while envisaging the proposed cement grinding project. No industrial waste water will be generated or discharged outside project premises. Domestic wastewater will be treated through STP inside the project premises.

Cement mill will be equipped with pulse jet bag filters & Dust collection system for minimizing air pollution load.

However, Air Quality Impact prediction shows that after establishment of proposed cement grinding unit predicted incremental GLCs of Pollutants is not found to be significant to add up on the existing ambient air quality.

The green belt/ plantation will be made as per CPCB guidelines and local species will be used for plantation.

8.0 SOLID WASTE GENERATION AND MANAGEMENT

Cement dust will be Collected from Dust Collection Systems and recycle and reuse in cement manufacturing process.

Main features of the solid waste management plan conceived for the project is as follows:

- Ash will be generated from the combustion of coal used in HAG and the entire quantity of ash will be used in PPC manufacturing. Proper ash handling system will be provided to ensure no dust generation during handling, filling and transportation.
- Dust collected by the bag filters will be automatically recycled in the system
- Other solid waste will be in the form of rejected conveyor belts, torn/ damaged cement bags, paper/ wooden/ plastic waste etc. which are not hazardous in nature and will be sold to recyclers on regular basis

9.0 IMPACT ON SOCIO ECONOMIC STATUS

Proposed IA Warsaliganj Project for cement project may change socio economic condition of the nearby areas. As there will be flow of financial and material resources, there remains a large possibility of growth of population in the business, trade, commerce and service sector. The inflow of financial and material resources would contribute towards changing the socioeconomic environment of the areas as this would

introduce a mixed culture emphasizing urban traits in place of traditional, prevalent rural customs. The economic, cultural and technological changes are likely to induce social stress and ethical changes. All these would enhance the local economy.

To improve the socio-economic aspects of the study area, as per MoEFCC, guidelines, based on cost of project, requisite amount has been allocated for CER activities by BIADA and proposed Standalone Cement Grinding Project, detailed as under;

- a. BIADA has allocated an amount of Rs. 12 Lakhs (2 % of total project cost i.e. Rs. 6 crore) towards CER activities.
- b. Standalone Cement Grinding Project has allocated an amount of Rs. 7 Crores (0.5% of total project cost i.e. Rs. 1400 Crores).

10.0 ENVIRONMENTAL MANAGEMENT PLAN

A comprehensive Environmental Management Plan has been prepared under which the unit will adopt measures in preserving the environment from degradation. Important among those are Green Belt Development Plan which would act as Noise damper also. The environmental monitoring program on all components of environment has been drawn and indicated in the EMP in detail which is a part of EIA.

Proposed Cement Grinding Project at IA Warsaliganj will adopt all measures for better environmental management. Pulse Jet Bag Filters with dust collection system will be installed with Cement Mill for better air environment, because man needs inhalation every moment, so also is Flora and Fauna dependent on it. Cement project will develop & maintain green belt and plantation all around the project premises for better environmental management. AN amount of Rs. 25.0 crores have been allocated for EMP activities.

11.0 OCCUPATIONAL HEALTH AND SAFETY

Project authorities of proposed cement grinding project within IA Warsaliganj will adopt all precautionary measures to reduce the risk of exposure of employees to occupational safety and health hazards. Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

12.0 RAINWATER HARVESTING

Keeping in mind the importance of water, it is proposed to conserve water by rainwater harvesting by which the subsoil water condition / moisture content is maintained / improved to a great extent. Also it is proposed to harness rainwater from the roof area by collecting the same in a rainwater collection tank of suitable capacity and will be recharged to ground water aquifers.

13.0 CONCLUSION

- No Industrial Waste water will be generated due to operation of proposed cement grinding project within IA Warsaliganj.
- Ground water characteristics are also well within the limits of IS 10500:2012.
- Emissions from Stacks of proposed cement mill will within the limits of E(P) Rules.
- Ambient Air Quality within the study area are within the National Ambient Air Quality Standards (Nov. '2009).
- Ambient Noise Level of the project area is also well within the limits for Industrial Area.
- Generated solid wastes (Cement Dust) from project operation is being re-utilized at the source end.
- Good green belt, plantation & landscaping will be developed and maintained within the premises.

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