

IN THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. 622 OF 2022

IN THE MATTER OF:

ANIRUDA PANWAR

...Applicant

Versus

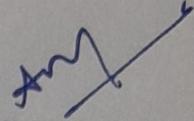
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE

CHANGE & ORS

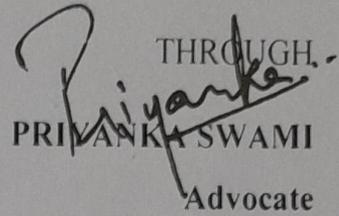
...Respondent(s)

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ANURAG KUMAR YADAV
DEPUTY DIRECTOR, DIRECTORATE OF
ENVIRONMENT U.P



THROUGH
PRIYANKA SWAMI
Advocate

Counsel for SEIAA, U.P.
Chamber 04, Shivalik Tower
Kaushambi, Ghaziabad

Date: __.02.2023

IN THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. ~~628~~ OF 2022

IN THE MATTER OF:

ANIRUDA PANWAR

...Applicant

Versus

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE

CHANGE & ORS

...Respondent(s)

ADDITIONAL REPLY ON BEHALF OF RESPONDENT NO.02- State
Level Environment Impact Assessment Authority (SEIAA), Uttar Pradesh.

MOST RESPECTFULLY SHOWETH: -

Preliminary submissions:-

ORDER

1. In compliance of order dated 15.12.2022, original record has been produced by respondent no. 6- UPSIDA and we have gone through the. original record and the same has been returned to the person who has brought the record.

2. Additional reply alongwith documents has been filed by respondent no. 7 vide email dated 18.01.2023.

3. Part arguments have been heard.

4. In the course of arguments, learned counsel for respondent no. 4-SEIA seeks time for filing copy of Environment Impact Assessment Report and learned counsel for respondent no. 6-UPSIDC seeks adjournment for filing copies of the relevant provisions of the Uttar Pradesh State Industrial Development Area-Land Development and Building Regulations and Industrial Development Plan of the industrial area in question.

5. The same be filed within 15 days by email at judicial-ngt@gov.in preferably in the form of searchable PDF/OCR Supported PDF and not in the form of Image PDF.

6. List for further arguments on 14.02.2023.

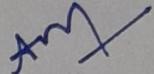
7. In the meanwhile, no further steps for establishment/operation of the Common Bio-Medical Waste Treatment Facility shall be taken by the Project Proponent on the basis of impugned environmental clearance and CTE in its favour which shall remain in abeyance.

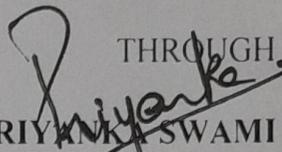
1. In light of the order pass by this Hon'ble Tribunal of dated 19.01.2023 "**In the course of arguments, learned counsel for respondent no. 4-SEIA seeks time for filing copy of Environment Impact Assessment Report**", the true copy of EIA report is attached herewith in compliance of the order as **Annexure I**.

PRAYER

It is, therefore, most respectfully prayed that this Hon'ble Tribunal may graciously be pleased to:

- i. Dismiss this Application with Exemplary cost Or
- ii. Pass any such other order as may deem fit.


Respondent


THROUGH
PRIYANKA SWAMI
Advocate

Counsel for SEIAA, U.P.
Chamber 04, Shivalik Tower
Kaushambi, Ghaziabad

Date: __.02.2023

IN THE NATIONAL GREEN TRIBUNAL
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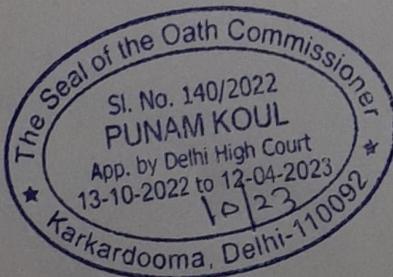
CHANGE & ORS

...Respondent(s)

AFFIDAVIT

Affidavit of Sh. ANURAG KUMAR YADAV, aged about 46 years s/o Sh. P.N.Singh, presently posted as DEPUTY DIRECTOR, DIRECTORATE OF ENVIRONMENT U.P., having office at E-12/1, NOIDA, Uttar Pradesh.

1. That I am posted as stated above and well conversant with the facts of the present case on the basis of official record and as such competent to swear this affidavit before this Tribunal.
2. That the accompanying reply has been drafted by our counsel upon my instructions based on official records.



3. That the contents of the accompanying reply are true and correct and the knowledge has been derived from official records and nothing material has been concealed there from.

I identify the Deponent who has signed/put thumb impression in my presence

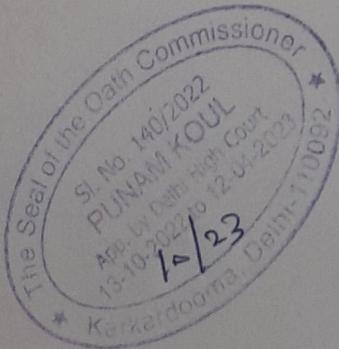
VERIFICATION

11 FEB 2023

Verified on solemn affirmation at New Delhi on this ____ day of February, 2023, that the contents of the foregoing affidavit are true and correct to the best of my knowledge and no part of it is false and nothing material has been concealed there from.

[Signature]
DEPONENT

[Signature]
DEPONENT



CERTIFIED THAT THE DEPONENT
Shri/Smt./Km. *Amrinder Kaur Yadav* ...
S/o, W/o, D/o, Sh. *P. H. Singh* ...R/o.....
Identified by *M.K.T.G.*
has solemnly affirmed at Delhi
on *1-1/23*
that the contents of the affidavit which
have been read over & explained to him/he,
are true & correct to his/her knowledge

Oath Commissioner KKD Court Delh

11 FEB 2023

To
The Chairman & Secretary
State Level Expert Appraisal Committee
Directorate of Environment, Govt. of U.P.
Dr. Bhimrao Ambedkar Paryavaran Parisar,
Vineet Khand-I, Gomti Nagar,
Lucknow-226010.

Date: 10.02.2022

Subject: Environmental Clearance of common Bio-medical Waste Treatment Facility (CBWTF) proposed by M/s Punahchakran Private Limited at Plot No. E - 25 and E - 26, UPSIDC Industrial Area, Babrala, District - Sambhal, Uttar Pradesh.

File No : 6497

Proposal No : SIA/UP/MIS/66542/2021

Dear Sir,

The Final EIA/EMP report has been prepared of common Bio-medical Waste Treatment Facility (CBWTF) proposed by M/s Punahchakran Private Limited at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District - Sambhal, Uttar Pradesh in prescribed format along with the necessary annexure as per EIA Notification dated 14th September 2006 and amendments.

The ToR of above mentioned project was auto granted vide proposal no. SIA/UP/MIS/66542/2021 dated 17.08.2021. In this reference Final EIA report is enclosed for kind consideration for grant of Environmental clearance.

Thanking you

Yours Faithfully



Authorized Signatory

(Authorized signatory)

(M/s Punahchakran Private Limited)

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FINAL EIA/EMP REPORT
FOR OBTAINING ENVIRONMENTAL CLEARANCE

FOR

“PROPOSED COMMON BIO MEDICAL WASTE TREATMENT FACILITY” SAMBHAL

7(d)(a) development of common Bio Medical Waste Treatment Facility

Particular	Capacity	Nos.
Incinerator	250 Kg/hr	1
Autoclave	1000 Kg/batch	1
Shredder	150 Kg/Hr	1
Chemical Disinfection Tank	1500 Liter	1
Effluent Treatment Plant	10 KLD	1

**Location: Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala,
District – Sambhal, Uttar Pradesh**

Total Plot Area: 3601.00 sqm (0.88 Acre)

Project Incharge : Shri Rajesh Kumar
Baseline Study Period : October 2021 to December 2021
Project Cost : Rs. 281 Lakh

PROMOTER	ENVIRONMENT CONSULTANT
 <p>M/s Punahchakran Private Limited Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh E-mail: punahchakran@gmail.com</p>	 <p>GAURANG ENVIRONMENTAL SOLUTIONS PVT. LTD #102, SNG Shree Ratna Apartments, Peetal factory, Jotwara Road, Jaipur. E-mail – gaurangenviro@gmail.com NABET Accreditation: NABET/ EIA/ 2023/ RA 0192 (Rev.01)</p>

January 2022

INDEMNIFICATION

Utmost care has been taken in preparation of this Report vis a vis **Common Bio Medical Waste Treatment Facility (CBWTF), Sambhal**, located at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh promoted by M/s Punahchakran Private Limited. The data incorporated in the report is generated through information received from project proponent received through e-mail, secondary information, besides stakeholders interaction and inputs. Due care has been taken to represent facts and figures and sources acknowledged. The purpose of this document is to facilitate environmental appraisal of the proposal and as such the exercise has been scientifically carried out. The Consultant stands indemnified against any consequences arising out of any inadvertent omissions.

REVISION HISTORY

Report No.	GESPL_453/2022/EIA/206
Type of Report	Final EIA/EMP Report
Revision No.	01
Issue to	M/s Punahchakran Private Limited
Issue Date	18.02.2022

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_453/2022/EIA/206	Rev No. 01

DISCLOSURE OF CONSULTANT ENGAGED

Declaration by Experts contributing to the Final Environmental Impact Assessment Report for Proposed Common Bio Medical Waste Treatment Facility (CBWTF), Sambhal, located at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh.

I hereby, certify that I was a part of the Final EIA team in the following capacity that developed the above EIA.

EIA Coordinator		Signature & Date
Name	Pooja Yadav	
Period of Involvement		
Contact Information	#102, SNG ShriRatna Apartment, Near Tambi Petrol Pump, Peetal Factory, Jhotwara Road, Jaipur – 302016 Phone No.:- 0141-4029115, 9782074776 Email id:- gaurangenviro@gmail.com	

Functional area experts:

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP	Pooja Yadav	<ul style="list-style-type: none"> • Verification of baseline data through secondary sources • Identifying and assessing quantum of emissions • Identification of probable impacts of the different air emissions from the project 	

			<ul style="list-style-type: none"> • Identification of suitable pollution control device 	
2	WP	Pooja Yadav	<ul style="list-style-type: none"> • Verification of baseline data through secondary sources • Designing of water balance and developing schemes for cascading use (recycle, reuse) of water • Identification of probable impacts of effluent/ waste water discharges in to the receiving environment/ water bodies, if any 	<i>Pooja Yadav</i>
3	SHW	Pooja Yadav	Identification of type of waste generated & suggesting methodologies for segregation, collection, transportation, treatment & disposal of waste as per various rules & guidelines	<i>Pooja Yadav</i>
4.	SE	Vinod Kumar Verma	<ul style="list-style-type: none"> • Review of baseline socio-economic report based on secondary data • Suggesting EMP-Social based on available data 	<i>Vinod Verma</i>
5	EB	Ginni Barotia	<ul style="list-style-type: none"> • Review of baseline • To recommend mitigation measures & greenbelt development plan. 	<i>Ginni Barotia</i>
6	HG	Vidya Bhushan Trivedi	Assessing the regional and local geology of the area based on secondary data available	<i>Vidya Trivedi</i>



7	GEO	VidyaBhushanTrivedi	Analysis of surface hydrological data based on secondary data available	<i>Vidya Trivedi</i>
8	SC	Pradyumna Despande	<ul style="list-style-type: none"> • Verification of baseline data through secondary sources • Assessment of fertility/ productivity of soil, nutrient availability based on secondary data & monitoring report. • Suggesting control measures for degradation of soil/soil conservation, analyzing effect of waste handling on soil 	<i>Pradyumna</i>
9	AQ	Mallikarjuna Murthy Guttula	<ul style="list-style-type: none"> • Analyzing micro meteorological data for use in air quality modeling • Collecting and using secondary data on meteorology like cloud cover, inversion related data, mixing heights etc., for air quality modeling • Application of relevant air quality models in prediction of dispersion of pollutants, • Plotting of isopleths of GLCs representing incremental pollution levels, on suitable maps showing both, the sources of pollution as well as the environmentally sensitive receptors. 	<i>Mallik</i>



10	NV	Mallikarjuna Murthy Guttula	<ul style="list-style-type: none"> Identifying probable impacts of noise Suggesting control measures for noise emanating from project activities. 	<i>Mallik.</i>
11	LU	VinodVerma	<ul style="list-style-type: none"> Review of data related to land use pattern Integration of land use related data/ information for assessing environmental impacts of developmental projects Assessment of land use and land cover 	<i>Vinod Verma</i>
12	RH	GinniBarotia	<ul style="list-style-type: none"> Assessment and mitigation of probable impacts. Suggesting PPE for workers. Suggesting Measures for risk assessment. 	<i>Ginni Barotia</i>

Declaration by the Head of the accredited consultant organization/authorized person

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_453/2022/EIA/206	Rev No. 01

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Project: Common Bio Medical Waste Treatment Facility (CBWTF), Sambhal at UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh

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Proponent: M/s Punahchakran Private Limited

Final EIA/EMP Report

I, VipulKhandelwal hereby confirm that the above mentioned experts prepared the Final EIA/EMP report for the :Common Bio Medical Waste Treatment Facility (CBWTF), Sambhal, located at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh promoted by M/s Punahchakran Private Limited for Environmental Clearance. I also confirm that the consultant organization shall be fully accountable for any mis – leading information mentioned in this statement.

Signature	
Name	VipulKhandelwal
Designation	Director
Name of the EIA Consultant Organization	Gaurang Environmental Solutions Pvt. Ltd.
NABET Certificate No. & Issue Date	Accreditation Certificate No.- NABET/ EIA/ 2023/ RA0192 (Rev 01) Valid upto 19.01.2023

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_453/2022/EIA/206	Rev No. 01

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ToR Compliance
(ADDRESSAL OF TOR ISSUES)

The Environmental Impact Assessment report has been prepared as per the Standard Terms of Reference (ToR) issued by SEIAA, Uttar Pradesh vide proposal No. SIA/UP/MIS/66542/2021 dated 17.08.2021 has been duly addressed during the EIA studies. Compliance is given below:

Category B, 7(da):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY COMMON BIO-MEDICAL WASTE TREATMENT FACILITY & RECYCLING FACILITY IS NOW PROPOSED TO BE SET UP BY M/S PUNAHCHAKRAN PVT. LTD. AND DETAIL INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

S.No.	ToR Points	Compliance
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 damages, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weightage criteria for short-listing selected site	The proposed project site is meeting site selection criteria of CPCB guidelines as well as the site selection criteria of TSDF's also shown in Table 5.1
2	Submit the details of the road/rail connectivity along with the likely impacts and mitigation measures	Project site is well connected SH39 (Chandausi – Gunnaur road): 0.38 Km (N), nearest railway station - Babrala Railway Station: 3.19 Km (SW), nearest Airport : Jewar Noida



		International Airport: 85 Km (W)
3	Submit the present land use and permission required for any conversion such as forest, agriculture etc	Proposed site fall in UPSIDC Industrial Area
4	Examine the details of transportation of Hazardous wastes, and its safety in handling	Details of transportation of Hazardous wastes, and its safety in handling are mentioned in Chapter 04
5	Examine and submit the details of on line monitoring	Details are given in chapter 03
6	Examine the details of monitoring of Dioxin and Furon	
7	MoU for disposal of ash through the TSDF	Details are given in Chapter 02
8	MoU for disposal of scrubbing waste water through CETP.	
9	Examine and submit details of monitoring of water quality around the landfill site	Details are given in Chapter 03
10	Examine and submit details of the odour control measures	submitted
11	Examine and submit details of impact on water body and mitigative measures during rainy season.	details of impact on water body and mitigative measures during rainy season are given in Chapter 04
12	Environmental Management Plan should be accompanied with Environment Monitoring Plan and environmental cost and benefit assessment. Regular monitoring shall be carried out for odour control	Details are given in Chapter 10
13	Water quality around the landfill site shall be monitored regularly to	It will be a zero liquid discharge unit. Waste water generated will be



	examine the impact on the ground water	treated in ETP. All the treated water will be used in the process, no untreated/treated water will be discharged. It will be zero liquid discharge project
14	The storage and handling of hazardous wastes shall be as per the Hazardous Waste Management Rules 2016	The storage and handling of hazardous wastes will be as per the Hazardous Waste Management Rules 2016
15	Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster	A comprehensive Disaster Management Plan is given in Chapter. 07
16	Public hearing to 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	The Public hearing is not applicable as per the OM dated 27 April 2018 of MoEF&CC to the project or activities located within the industrial area/park.
17	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	A detailed draft EIA/EMP report should be prepared in accordance with additional TOR and has been submitted.
18	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the	There is no any litigation pending against the project.

	Project should be given	
19	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out	Cost of the project: 281.25 lakh EMP cost: Capital Cost – 44.00 lakh Recurring Cost – 10.00 lakh
20	Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigation measure, project proponent can refer to the model ToR available on Ministry website " http://moef.nic.in/Manual/Incinerator	Noted

Project: Common Bio Medical Waste Treatment Facility (CBWTF) at Plot No. E-25 and E-26, UPSIDC Industrial Area, Bongaigaon, District – Sambhal, Uttar Pradesh		
Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

CHAPTER 1 – INTRODUCTION

1.0 Introduction

According to Bio-Medical Waste Management Rules 2016, Bio-Medical Waste (BMW) means “any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps”. Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment. Every day, significant amount of potentially infectious bio-medical waste is generated around the world. Indiscriminate disposal of bio-medical waste and exposure to such waste possess serious threat to environment and to human health and so bio-medical waste requires specific treatment and management prior to its final disposal. Bio-medical waste can be managed properly by ensuring proper segregation at the source, the use of accurate packaging (leak resistant, puncture resistant and not susceptible to degradation by cleaning agents in case the packaging is reused), appropriate colour coding, proper in-house movement of waste (minimizing employee exposure to biomedical waste in a workplace), designating waste storage areas and disposing through incineration or decontamination by heating with steam under pressure in an autoclave.

1.1 Brief about CBWTF:

As per the Bio-Medical Waste Management Rules, 2016, it is the duty of every occupier (a person having control over an institution or premises) of an institution generating biomedical waste including a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

The rules to be followed are as given below:

- Bio-medical waste shall not be mixed with other wastes.
- Bio-medical waste shall be segregated into labeled containers/bags at the point of generation prior to its storage, transportation, treatment and disposal.
- Untreated biomedical waste shall be transported only in such vehicles as may be authorized for the purpose by the competent authority as specified by the government.

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- No untreated bio-medical waste shall be kept stored beyond a period of 48hours (from incineration to disposal).
- Every occupier shall make an application to the prescribed authority for grant of authorization.
- Records shall be maintained related to generation, collection, reception, storage,
- transportation, treatment and disposal of biomedical waste
- The source of biomedical waste is categorized into two forms:

Major Sources

- Hospitals/Nursing Homes/ Dispensaries
- Primary health centers
- Medical colleges and research centers / paramedic services
- Veterinary colleges and animal research centers
- Blood banks/mortuaries/autopsy centers

Minor Sources

- Physicians/ dental clinics
- Blood donation camps
- Vaccination centers

1.2 Purpose of report

The Environmental Impact Assessment study is carried out as a part of the process to obtain Environmental Clearance for the proposed project of Bio-medical waste treatment facility developed by **M/s Punahchakran Private Limited**. Proposed project falls under category B, 7(da), Bio-Medical Waste Treatment Facility as per EIA Notification dated 14th September, 2006 and its subsequent amendments thereafter. Environmental Impact Assessment (EIA) study was carried out accordingly ToR letter granted vide proposal no. SIA/UP/MIS/66542/2021 dated 17.08.2021 issued by SEIAA. Copy of the same is attached as **Annexure – 1**. EIA report has been prepared in line with ToR and generic structure mentioned in notification. The purpose of the EIA study is to identify and assess the adverse impacts of proposed project in the planning stage itself, so that necessary mitigation

measures to prevent or minimize these adverse impacts can be planned early and cost-effectively

M/s Punahchakran Private Limited proposes establishment of a Common Bio Medical Waste Treatment Facility at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh. The project activity is listed at item 7(da) of the Schedule-Gazette Notification dated 17th April 2015 as Category “B” project and therefore requires prior Environmental Clearance.

The total capacity of the proposed CBWTF will be as under:

Table 1.1: project capacity

Particular	Capacity	Nos.
Incinerator	250 Kg/hr	1
Autoclave	1000 Kg/batch	1
Shredder	150 Kg/Hr	1
Chemical Disinfection Tank	1500 Liter	1
Effluent Treatment Plant	10 KLD	1

The management of bio-medical waste is of serious concern since biological, chemical and radioactive pollutants present in the biomedical waste causes environmental problems, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms which may ultimately lead to the transmission of diseases like typhoid, cholera, hepatitis, etc. while it could lead to AIDS and other similar diseases through injuries from contaminated syringes and needles. Emissions from Incinerators and open burning also lead to exposure to harmful gases which can cause cancer and respiratory diseases. Hence it becomes the primary responsibility of Health administrators to manage hospital waste in the most safe and ecofriendly manner.

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1.3 Brief description of project

Table 1.2: Brief description of project

S. No.	Parameters	Description
1	Proposed Project	Common Biomedical Waste Treatment Facility (CBWTF) proposed by M/s Punahchakran Pvt. Ltd. at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District Sambhal, UP
2	S. No of Schedule (as per notification 2006)	Project falls under Category “B” Projects of activity 7(da) as per EIA Notification S. O. 1142(E) dated 17 April 2015
3	Project Proponent	M/s Punahchakran Private Limited
4	Brief description of nature of the project	Biomedical waste is generated from all healthcare institutions; nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks etc. A Common Bio-medical Waste Treatment Facility is a set up where bio-medical waste, generated from a number of healthcare units, is suitably treated as per the prescribed procedure & norms laid down in the regulation. Proposed project of setting up of the Bio-medical Waste Treatment Facility at Village- Paharpur, Post- Gotha Rasoolpur, Tehsil or District- Deoria.
Salient Features of the Project		
5	Proposed plant capacity	250 Kg/hr (capacity of Incinerator)
6	Total plot area	3601 Square Meter (0.88Acre)
7	Location	Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District Sambhal, UP Site is located at 28°16'38.95"N, 78°26'0.02"E
8	Water Requirement	Water requirement for the proposed CBWTF project is 9 KLD (Industrial – 8.0KLD & Domestic- 1.0KLD).
9	Source of water	Bore wells.
10	Wastewater	Waste water will be generated during incineration, autoclaving of Biomedical waste and floors washing, Vehicle washing. The quantity will be about 7.0 KLD it will be treated in effluent treatment plant and 0.8 KLD Domestic effluent will be treated by septic tank and treated water will be recycle in process and Vehicle washing some portion of treated water will

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		be used as irrigation in Horticulture.
11	Man Power	During Construction phase, the labors and workers will be hired from nearby villages. Total 38 persons are proposed to be hired for plant operation including officers, skilled and unskilled workers.
12	Electricity/ Power requirement	<ul style="list-style-type: none"> • DG set of 32 KVA#2, 10KVA#1 is proposed for the project. • Power Supply form U.P. Power Corporation will also be taken.
13	Total Project Cost (Rs.)	281.25 Lakh
14	Nearest Railway Station/airport along with distance in Kms	<ul style="list-style-type: none"> • Babrala Railway Station: 3.2 Km (SW) • Bhakrauli Railway Station: 4.0 Km (NE)
15	Address for correspondence	<p>Shri Rajesh Kumar M/s Punahchakran Pvt. Ltd. Regd. Office: 9/34, Avas Vikas –3, Ambedkar puram, Panki Road, kalyanpur, Kanpur, UP Email : punahchakran@gmail.com Mob.: 91-7379559428</p> <p>Shri Sarvesh Kumar Sachan Address: HIG-1/50, Awas Vikas-3, Bareilly More, Shahjahanpur-242226 (U.P.) INDIA Email : punahchakran@gmail.com Mob.: 91- 9415457310</p>
16	Proposed activities	<ul style="list-style-type: none"> ○ Collection ○ Transportation ○ Storage ○ Treatment <ul style="list-style-type: none"> • Incineration • Autoclaving & Shredding ○ Final disposal (agreement with authorized vendor)

1.4 Identification of the Project and Project proponent

The applicant company “M/s PUNAHCHAKRAN PRIVATE LIMITED” is incorporated under the Companies Act, 2013, under the certificate of incorporation granted by the registrar of companies of Uttar Pradesh, Kanpur vide their Registration No. U90009UP2020PTC136326

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dated 15/10/2020. The company has been incorporated with the following main objects as its basic activity proposed.

Ministry of Environment, Forests & Climate Change (MoEF & CC), Govt. of India has notified the Bio-Medical Waste Management Rules 2016. In accordance to the rule, every occupier of a Health Care Establishment (HCE shall either set up requisite bio-medical waste treatment facilities on site or ensure requisite treatment of the bio-medical waste at an approved Common Biomedical Waste Treatment Facility. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.

Keeping in view the difficulties faced by private Hospitals, Nursing Homes and Clinics that cannot make their own arrangements due to high cost involved in Treatment facilities, there was need for centralized system for treatment.

Most of the tribal villages have very poor transportation and communication infrastructure. Most of the hospitals do not have adequate arrangement for disposal of the hospital waste. A Common Biomedical Waste Treatment Facility (CBWTF) is now proposed to be set up by where bio-medical waste, generated from a number of healthcare units, will be suitably treated to reduce adverse effects that this waste may pose. The Bio-medical Waste (Management & Handling) Rules, provides an option to the Bio-medical waste generators to get the biomedical waste treated and disposed at the secured landfills. The objective for the proposed project is to establish an Integrated Common Bio-medical Waste Treatment facility including the Incinerator, autoclave, shredder and effluent treatment unit.

Shri Rajesh Kumar

M/s Punahchakran Pvt. Ltd.

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1.5 Brief Description of nature, size, location of the project and its importance to the country, region

1.5.1 Nature of the project:

M/s Punahchakran Private Limited, is interested in setting up Common Bio-Medical Waste Treatment Facility (CBMWTF) for treating and disposing the bio-medical waste collected from nearby districts with a project cost of Rs. 281.25 lakhs.

The facility will adhere to the Bio-Medical Waste Management Rules, 2016 and subsequent amendments. The proposed facility will be developed in an area of 3601 m².

This project will collect wastes (as categorized under the Bio-medical waste management hand handling rule, 2016) generated from all health care establishments for from about three to seven districts, namely **Moradabad, Sambhal, Badaun, Aligarh, Hathras, Kasganj and Etah.**

The collected waste will be transported to the project site, treated and disposed-off as per the stipulated options provided in the Bio-medical waste management and handling rule, 2016.

1.5.2 Size of the project

The project is having an area of 3601 m². The components in the project will have one incinerator of capacity 250 Kg/hr, autoclaves having capacity of 1000kg/batch and one shredder having capacity of 150 kg/hr. The project will cater health care establishment from the district of **Moradabad, Sambhal, Badaun, Aligarh, Hathras, Kasganj and Etah.**

1.6 Location of the project

The project site having an area of 3601 m² is located at Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh of M/s Punahchakran Private Limited.

The project site is non- agricultural land no agricultural activity is being done at the project site because of it is located in Industrial area. The location of project site is shown in Figure

1.1:

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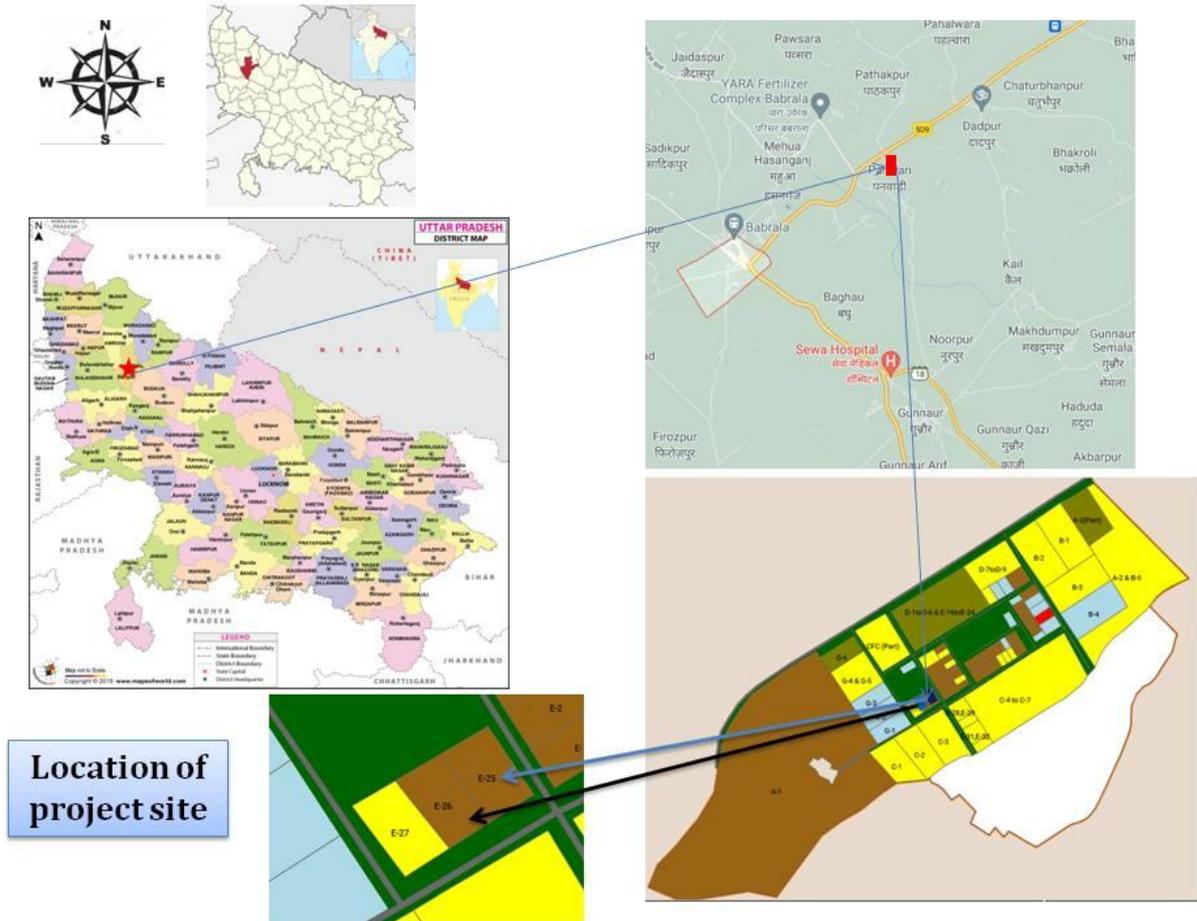


Figure 1.1: Location of the project site

1.7 Scope of the Study, Details of the Regulatory as per Terms of Reference

The scope of the study is to carry out the Environmental Impact Assessment (EIA) studies to identify, predict and evaluate potential environmental and socio-economic impacts which may result from the proposed Common Bio-Medical Waste Management Facility and to develop suitable Environment Management Plan (EMP) to mitigate the undesirable effects.

The Study is aimed at:

- Establishing the existing environmental conditions, identifying potential environmental impacts and identifying areas of significant environmental concerns due to the proposed project.
- Prediction of impacts on environment, socio-economic conditions of the people etc. due to the proposed project.
- Preparation of Environmental Management Plan (EMP).
- Development of post project environmental monitoring program.

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Generic structure of EIA report as per EIA notification dated 14th September, 2006 is maintained and includes determination of:

- Justification of the proposed activities.
- Pollution load due to proposed facility, change in pollution load due to proposed project based on proposed utilities.
- Existing baseline conditions.
- Baseline is carried out to check prevailing environment status between **October to December - 2021**, during this baseline following steps were followed:

(i) Field sampling of environmental attributes at various representative locations in the study area to establish the baseline status.

(ii) Collect & compile secondary data.

- Identification, assessment and evaluation of the beneficial and adverse impacts on surrounding environment due to proposed project activities considering the existing baseline status and secondary data, by using scientifically developed and widely accepted models.
- Identification and assessment of risks associated with the proposed project and their appropriate management through proper Risk Assessment (RA) and Disaster Management Plan (DMP).
- Making recommendations on the preventive measures to minimize the impact to acceptable levels and preparation of post project monitoring plan.
- Prepare an Environmental Management Plan (EMP) to mitigate the predicted impacts

The EIA/EMP report will be prepared as per the generic structure of environmental impact assessment document given in EIA notification dated 14th September 2006 (and its subsequent amendments), standard TOR given for EIA/EMP report for projects/ activities requiring environmental clearance under EIA notification 2006 and additional TOR given by SEIAA for this project.

Table 1.3: Applicable Legislations to the Project

Legislation	Areas / Activities Covered
Environment (Protection) Act, 1986 with Rules.	Overall Environment Protection Compliance to environmental (Air, Water, Noise) Standards issued under EPA
EIA Notification, 2006 and its amendments.	EIA Notification, 2006 falls under EPA, 1986 under this act any project which has probable The proposed project falls under Category B activity 7 (da) (as per the notification issued on 17th April, 2015 by Ministry of Environment & Forests, MoEF&CC). However, general condition is applicable, hence the project falls under category A.
Air (Prevention and Control of Pollution) Act, 1981 with Rules.	Under section 21. <ul style="list-style-type: none"> Applicable due to provision of DG Sets, Boiler & Incinerators which will be a source of air emissions to the atmosphere. Stack & Air Pollution Control Device shall be installed. Under the above-mentioned act, we shall take consent “consent to establish” & “consent to operate” from the State Pollution Control Board
Water (Prevention and Control of Pollution) Act, 1974 with Rules.	Under Section 25. <ul style="list-style-type: none"> Applicable due to discharge of waste water from the proposed facility. Under the above-mentioned act, we shall take consent “consent to establish” & “consent to operate” from the State Pollution Control Board.
Noise Pollution (Regulation and Control) Rules, 2000, 2010	The noise levels in any area shall not exceed the ambient noise quality standards in respect of noise as specified in the schedule. Compliance with Ambient Noise Standards in accordance

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Legislation	Areas / Activities Covered
	to land use of the area
Biomedical Waste (Management And Handling) Rules, 2016 And Amendments (2018) & (2019)	Applicable due to provision of Bio-medical waste treatment facility.
Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Obtaining Authorization from UPPCB for handling and storing of hazardous waste like waste oil and lubricants Following guidance for handling and storing of such hazardous waste
Motor Vehicles Act with Rules	Lay down restriction for vehicles not having Pollution Under Control Certificate (PUC) or proper labeling to enter premises
Petroleum Act with Rules 2000	Comply with guidance and safety measures for storage, and transportation of petroleum substances within premises
Solid Waste Management Rules, 2016	Management (Collection, Handling, Intermediate Storage) of domestic waste from residences.
State Town Planning Acts	Obtain permits and sanction for land Development of project in accordance with Landuse and Master plans
Siting Guidance	Follow siting guidance as far as practicable Avoid sites which are environmentally sensitive
Corporate Social Responsibility, 2013	To ensure that the promoters formulate and follow a well laid corporate Environment policy so that all PP integrate environmental concerns into their day-to-day functioning, especially the compliance with the conditions of the clearances. 2% of total project benefits shall be allocated for CSR activities.
e-waste (Management & Handling) Rule, 2016	Management & Handling of Electrical and Electronic Waste

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Legislation	Areas / Activities Covered
Plastic Waste Management Rules 2016	Management and disposal of Plastic Waste.
Construction and Demolition Waste Management Rules, 2016	Management of Construction and Demolition at site
Central Ground Water Authority (M/o Jal Shakti)	Obtain NOC from Central Ground Water Authority
Fly ash Notification, 2007	Use of ash (wholly or partly) in building construction wherever it costs same or less than the clay, limestone, sand etc and is not technically infeasible, compliance of which shall be the duty of the person/ agencies undertaking construction
Building & other Construction Workers Rule 1998	To ensure the provisions under BOCW Act.

1.8 Duties of Operator:

Duties of the operator of a common bio-medical waste treatment and disposal facility- It shall be the duty of every operator to -

- Ensure timely collection of bio-medical waste from the occupier as prescribed under these Rules;
- Establish bar coding and global positioning system for handling of bio- medical waste within one year;
- Inform the prescribed authority immediately regarding the occupiers which are not handing over the segregated bio-medical waste in accordance with these rules;
- Provide training for all its workers involved in handling of bio-medical waste at the time of induction and at least once a year thereafter;
- Assist the occupier in training conducted by them for biomedical waste management; Undertake appropriate medical examination at the time of induction and at least once in a year and immunize all its workers involved in handling of bio-medical waste

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- for protection against diseases, including Hepatitis B and Tetanus, that are likely to be transmitted while handling bio-medical waste and maintain the records for the same;
- Ensure occupational safety of all its workers involved in handling of bio-medical waste by providing appropriate and adequate personal protective equipment;
 - Report major accidents including accidents caused by fire hazards, blasts during handling of biomedical waste and the remedial action taken and the records relevant thereto, to the prescribed authority and also along with the annual report;
 - Maintain a log book for each of its treatment equipment according to weight of batch; categories of waste treated; time, date and duration of treatment cycle and total hours of operation;
 - Allow occupier, who are giving waste for treatment to the operator, to see whether the treatment is carried out as per the rules;
 - Shall display details of authorization, treatment, annual report etc on its web-site; After ensuring treatment by autoclaving or microwaving followed by mutilation or shredding, whichever is applicable, the recyclables from the treated bio-medical wastes such as plastics and glass, shall be given to recyclers having valid consent or authorization or registration from the respective State Pollution Control Board or Pollution Control Board;
 - Supply non-chlorinated plastic coloured bags to the occupier on chargeable basis, if required;
 - Common bio-medical waste treatment facility shall ensure collection of biomedical waste on holidays also;
 - Maintain all records for operation of incineration, hydro or autoclaving for a period of five years;
 - Existing Incinerators to achieve the standards for retention time in the secondary chamber and Dioxin and Furans for 2 to 3 second.
 - Online monitoring of stack emission and connectivity with UPCB/CPCB server.



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CHAPTER 2 – PROJECT DESCRIPTION

2.1 Type of project

Ministry of Environment, Forest & Climate Change (MoEF&CC) notified amendment to the EIA Notification 2006 published vide MoEF&CC Notification of S.O. 1142 (E) dated April 17, 2015. According to this notification, the Bio-medical waste treatment facility is categorized under the Item 7 (da) in the schedule, requiring ‘Environmental clearance’ from the State Environment Impact Assessment Authority (SEIAA)/ State Expert Appraisal Committee (SEAC).

M/s Punahchakran Private Limited aims to provide environment friendly solution and it proposes treatment and disposal facility for bio-medical waste through incineration, autoclaving and shredding of biomedical waste collected from various Healthcare unit, Hospitals, Pharmaceutical Industries in and around seven districts, namely Moradabad, Sambhal, Badaun, Aligarh, Hathras, Kasganj and Etah.

2.2 Need of the project

As per Annual Report of 2014 submitted by the SPCBs/PCCs, there are 192no of CBWTFs in operation and 33 no. of CBWTFs are under construction. There is still a gap in the number of CBWTFs in districts with low population density and districts which are economically weaker. Therefore, in order to have even outreach all over the country, the number of CBWTFs must have an established facility to cater such economically weaker districts.

Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India has notified the Bio-Medical Waste Management Rules 2016. In accordance to the rule, every occupier of a Health Care Establishment (HCE) shall ensure requisite treatment of the bio-medical waste at an approved Common Biomedical Waste Treatment Facility. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.

Keeping in view the difficulties faced by private Hospitals, Nursing Homes and Clinics that cannot make their own arrangements due to high cost involved in Treatment facilities, there was need for centralized system for treatment. Most of the tribal villages have very poor transportation and communication infrastructure. Most of the hospitals do not have adequate arrangement for disposal of the hospital waste.

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It may not be possible for small nursing homes, dispensaries, clinical laboratories and other small organizations or individual medical professionals to carry out treatment and disposal of bio-medical waste generated as per the methods prescribed in the rules on their own. It is not economical for even bigger hospitals to have their own treatment facilities.

A CBWTF is an ideal and perhaps only solution to all such problems considered as a very hazardous waste class. Other potential infectious risks may include the spread of drug resistant micro-organisms from health-care establishments into the environment.

2.3 Need for setting up of CBWTF

At present there are no any CBWTFs operating in Sambhal District. At present 17 CBWTF are running in Uttar Pradesh State and their total plant capacity 52.1 ton per day bio waste. The details are given in table 1.0:

Keeping in consideration of the outgoing demand and healthcare concerns M/s Punahchakran Private Limited has proposed for installation of the new common bio-medical waste treatment facility at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh.

As per the CPCB guidelines 2016, the distance of proposed M/s Punahchakran Private Limited are more than 75km from the existing CBWTF i.e. M/s Sushila Biomedical Waste Plant, Moradabad, M/s Bhagwat Saran Enterprises, Moradabad, M/s Envirad Medicare Pvt Ltd, Bareilly, M/s Medicare Env Management, Hapur, M/s Synergy waste Management (P) Ltd, Merrut and M/s Biomedical Waste Disposal Agency, Mathura. The distances are given below;

2.1 Table: List of Nearest CBWTF and its Distance

S. No	Name and Address of CBWTF	Distance (km)
1	M/s Sushila Biomedical Waste Plant, Moradabad	75
2	M/s Bhagwat Saran Enterprises, Moradabad	85
3	M/s Envirad Medicare Pvt Ltd, Bareilly	90
4	M/s Medicare Env Management, Hapur	82
5	M/s Synergy waste Management (P) Ltd, Merrut	100
6	M/s Biomedical Waste Disposal Agency, Mathura	116



The total capacity of the Common Biomedical Treatment Facility will be **5TPD**. The proposed project will help in catering the increase in biomedical waste getting generated due to recent pandemic situations in the country.

2.4 Bio-Medical Waste Inventorization for the Proposed Facility

Table 2.2: Bio-Medical Inventorization for Proposed Facility

S. No	Districts	Govt. Sector			Pvt. Sector		
		Total No of HCFs		No. of Beds	Total No of HCFs		No. of Beds
		Bedded HCFs	Non Bedded HCFs		Bedded HCFs	Non Bedded HCFs	
1	Moradabad	438	0	6699	45	18	320
2	Sambhal	93	0	1034	15	10	150
3	Badaun	68	0	1225	79	30	763
4	Aligarh	76	0	2452	398	387	7060
5	Hathras	37	0	444	111	207	1378
6	Kasganj	39	0	332	42	102	711
7	Etah	45	1	441	77	127	878
Total				12627			11260

Source: RO, UPPCB



Table 2.3: Installed capacity of common biomedical facility in UP

S.N.	Name of the CBWTF operator connect No. & Address	Total No. of HCFs Being Covered	Covered District	Treatment facility available			BMW Treatment Capacity (Kg/day)*	Number of Vehicles	Status of Authorization
				Incinerator	Auto Clave	Shredder			
1	2	3	4	5	6	7	8	9	10
1	M/s Synergy Waste Management (P) Ltd. Plot No. 36,37,72 Vill-Mohammadpur Nawabganj, Barabanki.	383	Barabanki Lucknow Sitapur Hardoi	250 kg/hr	75 kg/shift	50 kg/hr	3100	8 with GPS	Authorisation upto 31.12.2017
2	M/s Envirad Medicare Pvt. Ltd. Parsakhera, Bareilly.	650	Bareilly Pilibheet Moradaba Rampur Amroha J.P. Nagar Shajahanpur	150 kg/hr	180 ltr/shift	200 kg/hr	2100	6 with GPS & hologram	Authorisation upto 31.12.2017
3	M/s J.R.R Waste Management Pvt. Ltd (Formerly Name M/s Dutt Interprises Ltd. (Office)-29, Aikapuri Hirabag, Dayalbag, Agra-262003, (Plant)- Khasra No.- 670, Mauja-Darhera, Tahsil- Atrampur, Agra	981	Agra Hathras Firozabad Mainpuri	200 kg/hr	50 kg/shift	100 kg/hr	2500	11 with GPS	Authorisation upto 31.12.2017
4	M/s Synergy Waste Management (p) Ltd. 011-26933371 Subhari Medical College, Subhari Puram, Meerut	1537	G.B. Nagar Gaziabad Hapur Bulandshaher Bijnor Meerut Shamli Bagpat Muzaffarnagar sharenpur	300 kg/hr	300 ltr/shift	300 kg/hr	4000	20 with GPS & hologram	Authorisation upto 31.12.2017
5	M/s S.M.S.watergrase Mediwaste Management Pvt.Ltd.Mohanlalgarj Lucknow	656	Lucknow Lakheempur Unnao Sultanpur Hardoi	520 kg/hr	1000 ltr/shift	100 kg/hr	8000	10 with GPS	Authorisation upto 31.12.2017
6	M/s Spectrum Waste Solutions Pvt. Ltd. Khasra No.- 597, Jawar Nagar Mastemau, Sultanpur Road, Mohanlal Garj Lucknow	414	Lucknow, Sultanpur, Gonda, Baharich, Balrampur, Amethi, Faizabad, Lakhimpur	250 kg/hr	200 kg/shift	50 kg/hr	3400	10 (GPS not working)	Authorisation reject
7	M/s Ferro Build Hard (India) Pvt. Ltd. 83-A Maheba Purab Patti, Naini, Allahabad	347	Allahabad , Raibareilly , Pratapgarh	200 kg/hr	720 kg/day	400 kg/day	3800	9 with GPS	Authorisation upto 31.12.2017
8	M/s Willword Environmental Inc.- Chaudhrypur Mandhava, Kanpur	344	Kanpur Nagar, Farokkhabad, Mainpuri, Etawa	100 kg/hr	250 ltr/shift	50 kg/hr	1700	4 with GPS & hologram	Authorisation upto 31.12.2017
9	M/s Bio Medical Waste, Disposal Agency- Khasra No.- 622, Vill. Padrona Raya- Maat Mathura	432	Mathura, Eta Aligarh Kashganj Firozabad, Sambhal, Hathrash	200 kg/hr	50 kg/shift	100 kg/hr	2500	5 (C/S in 1 vehicle)	Authorisation Applied
10	M/s Sangam Medicare , Handiya Allahabad	158	Allahabad , Varanasi, Kaushambi, Sonbhadra, Mirzapur, Jaunpur, Pratepgarh, Chitrakot	250 kg/hr	500 ltr/shift	400 kg/day	4000	10 without GPS	Authorisation upto 31.12.2017
11	M/s MPCC Bhemlamau, Bhavti, Kanpur	887	Kanpur Nagar, Kanpur Dehat Hamirpur, Fatehpur Unnao, Kannouj	200 kg/hr	800 ltr/shift	100 kg/hr	4000	10 with GPS & hologram	Authorisation upto 31.12.2017
12	M/s MPCC, Khallabad Industrial Area, Sant Kabir Nagar	596	Sant kabeer Nagar Basti Siddharth Nagar Kusinagar Maharajganj Gorakhpur	100 kg/hr	414 kg/shift	100 kg/hr	2000	7 with GPS & hologram	Authorisation Applied
13	M/s MPCC Bijauli, Jhansi	235	Jhansi jalon Lalitpur Mahoba	100 kg/hr	500 ltr/shift	50 kg/hr	2000	5 with GPS	Authorisation upto 31.12.2017
14	M/s Center for Pollution Control, Mohansarai, Varanasi	488	Varanasi Bhadohi Jaunpur	150 kg/hr	100 ltr/shift	50 kg/hr	2000	6 with GPS	Authorisation upto 31.12.2017
15	M/s Royal pollution control services, Vill-Chaspur saduwahi, Sultanpur	184	Bhadohi Jaunpur Azamgarh Gorakhpur	150 kg/hr	500 kg/day	200 kg/day	2800	2 with GPS	Authorisation Applied
16	M/s Silicon welfare society Vill-Banka Dist- Ghazipur	130	Ghazipur Balia Devariya Azamgarh Amedkar Nagar Varanasi Mau Chandauli	100 kg/hr	200 ltr/shift	150 kg/hr	1600	7 without GPS	Authorisation upto 31.12.2017
17	M/s Semb Remky, Environmental Management Pvt. Ltd. C-21 Phas-1 Masuri Gulowthi Road, UPSIDC, Ghaziabad, Phone no.- 91203250674, Fax no- 0120 2678917	905	Gaziabad, Noida Hapur, Moradabad, Meerut, J.P. Nagar, Chandausi, Sambhal	150 kg/hr	430 ltr/shift	50 kg/hr	2600	11 (GPS in 9 vehicles)	Authorisation Applied
							52100	(Approx. 52000 kg/day)	

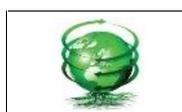




Figure 2.2: Districts covered by proposed facility (Circle)

2.5 Project Location, Boundary and Project layout

M/s Punahchakran Private Limited proposes to setup a Common Bio-Medical Waste Treatment Facility in 3601m² at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh. The Google image of the proposed site is given in Figure 2.3 and topographical map of 2km and 10km radius is shown in Figure 2.4, 2.5 and 2.6 respectively. The site photographs are presented in Figures 2.5. The Geo-coordinate of the project site is given below;

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Point	Latitude	Longitude
A	28°16'40.29"N	78°25'57.23"E
B	28°16'41.49"N	78°25'59.36"E
C	28°16'39.78"N	78°26'0.67"E
D	28°16'38.65"N	78°25'58.48"E

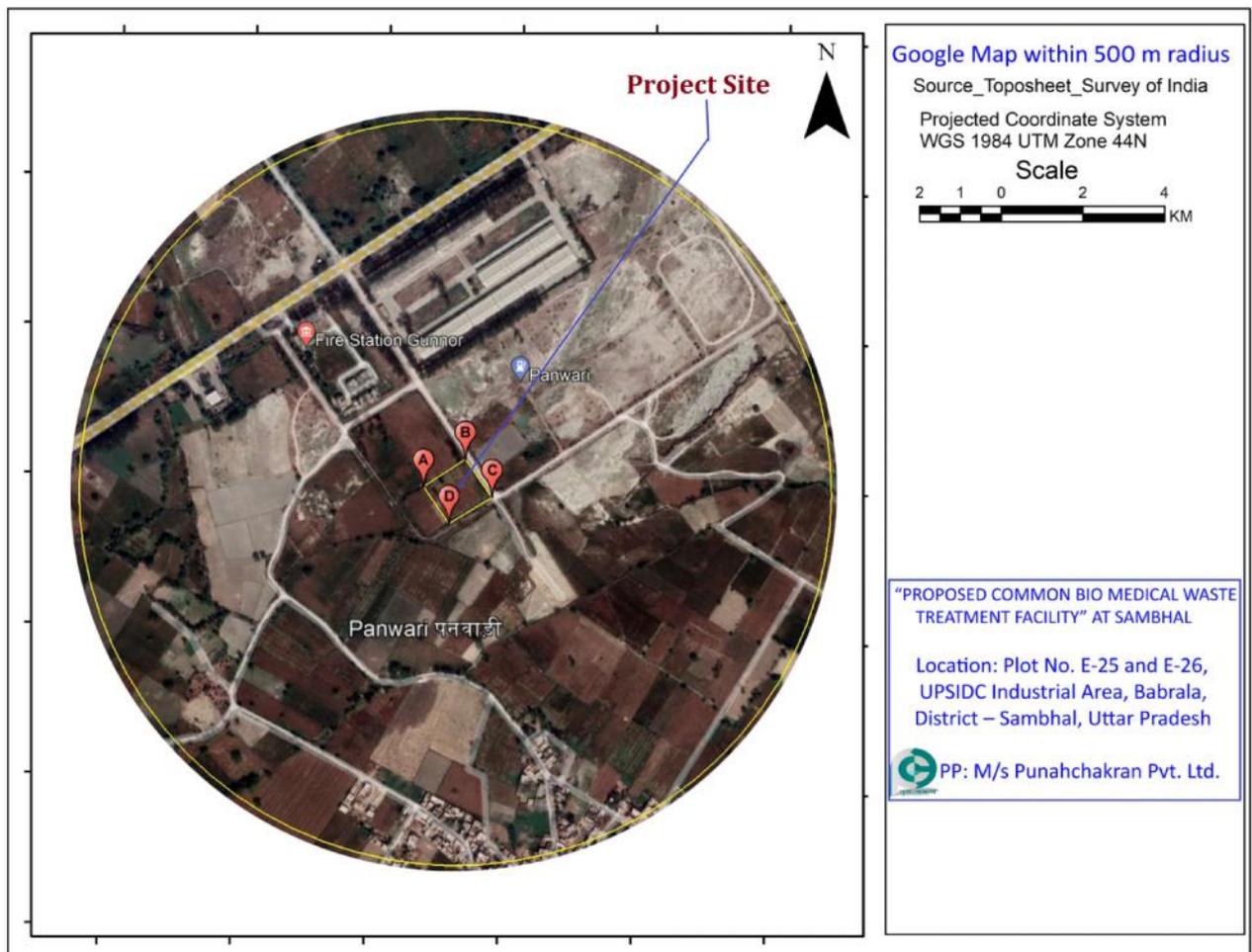


Figure 2.3: Google Image of Site with 500m Radius

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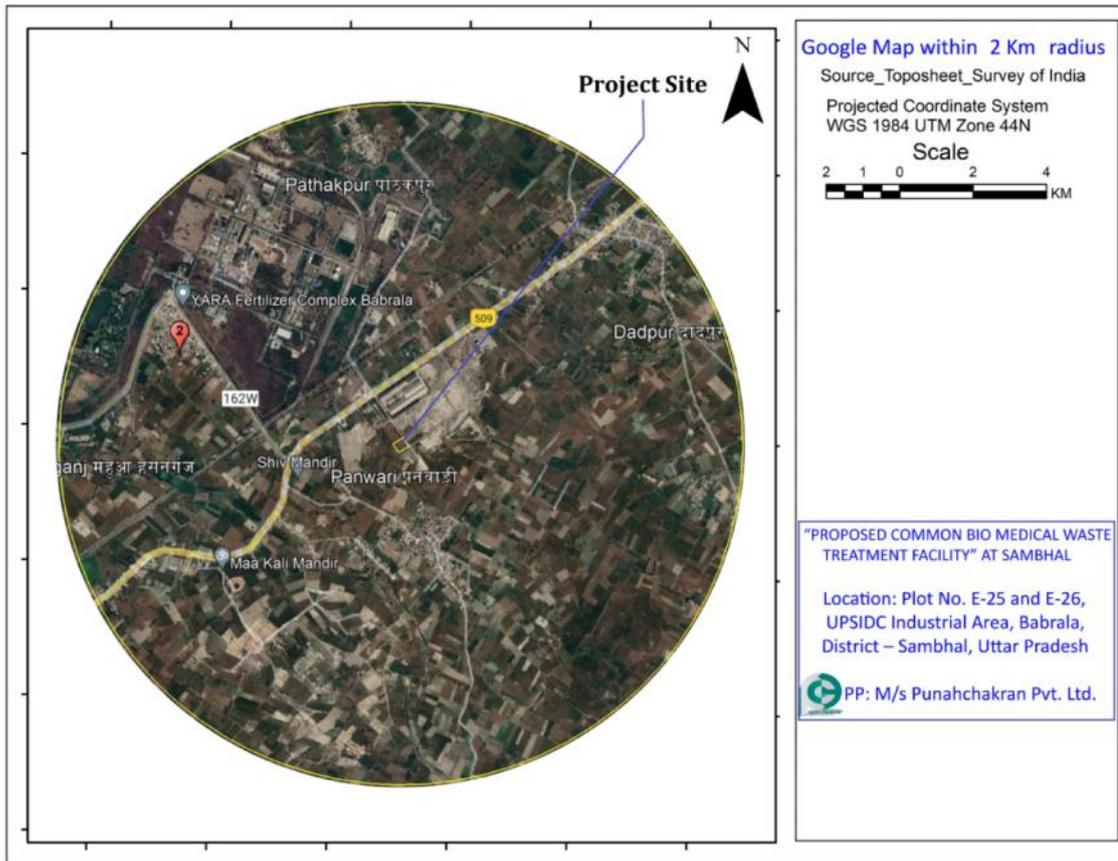


Figure 2.4: Google Image of Site with 2 km Radius

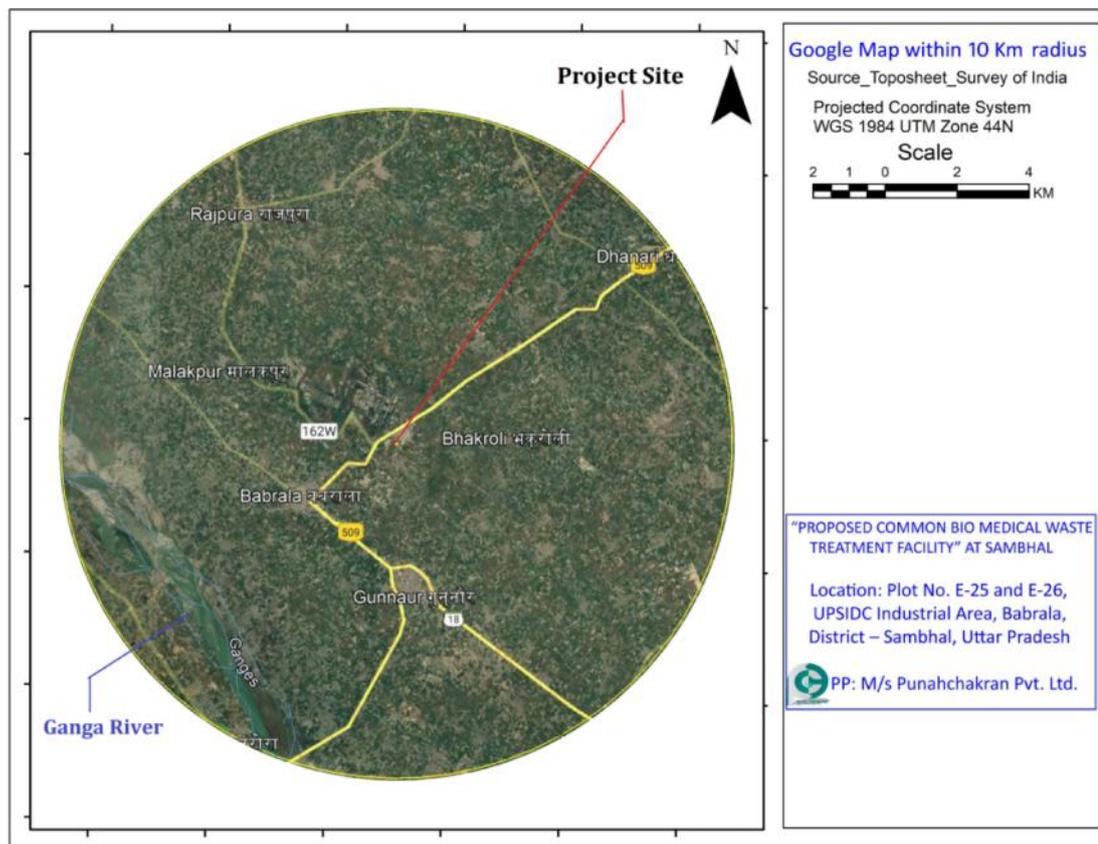


Figure 2.5: Google Image of Site with 10 km Radius



Table 2.4: Project Site and Surrounding

1	Location of Project	UPSIDC Industrial Area
	District	Sambhal
	State	Uttar Pradesh
	Latitude	28°16'38.95"N
	Longitude	78°26'0.02"E
	Elevation	181 m
2	Nearest Railway station	Babrala Railway Station: 3.19 Km (SW) Bhakrauli Railway Station: 4.01 Km (NE)
3	National Highway	NH93: 0.38 Km (N) SH 18: 3.72 Km (S)
4	Nearest Airport	Jewar Noida International Airport: 85 Km (W)
5	Tourist Places	Nil (Within 10 km of study area)
6	Archaeological important places	Nil (Within 10 km of study area)
7	Areas which are important or sensitive for ecological reasons	Nil (Within 10 km of study area)
8	Reserved Forest	Nil (Within 10 km of study area)
9	Nearest Major City/Town	Babrala: 3.01 Km (SW)
10	Villages within 2km radius surrounding the project	Village Panwari: 0.48 Km (S)
11	Nearest River	Ganga River: 7.81 Km (W) Bardman River: 1.05 Km (W)
12	Settlements in 500 meter radius of proposed project	Ware House FCI: 0.20 Km (N) Fire Station: 0.33 Km (N) Petrol Pump Indian Oil: 0.38 (NW) Village Panwari: 0.48 Km (S)
13	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Hospitals: <ul style="list-style-type: none"> • Government Hospital, Gawan: 17.30 km (NW) • Vidya ram hospital chadoshi road Babrala Sambhal: 2.36 Km (SW)

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		<p>School/College:</p> <ul style="list-style-type: none"> • Shri Sai Convent School Rajpura Road Babrala: 0.91 Km (NW) • Primary School Kail: 1.74 Km (NE) <p>Temple:</p> <p>Shiv Mandir: 0.70 Km (W) Chamunda Devi Mandir: 2.37 Km (SE)</p>
14	Soil Type	Sandy Loam
15	Seismic Zone	Seismic Zone-IV

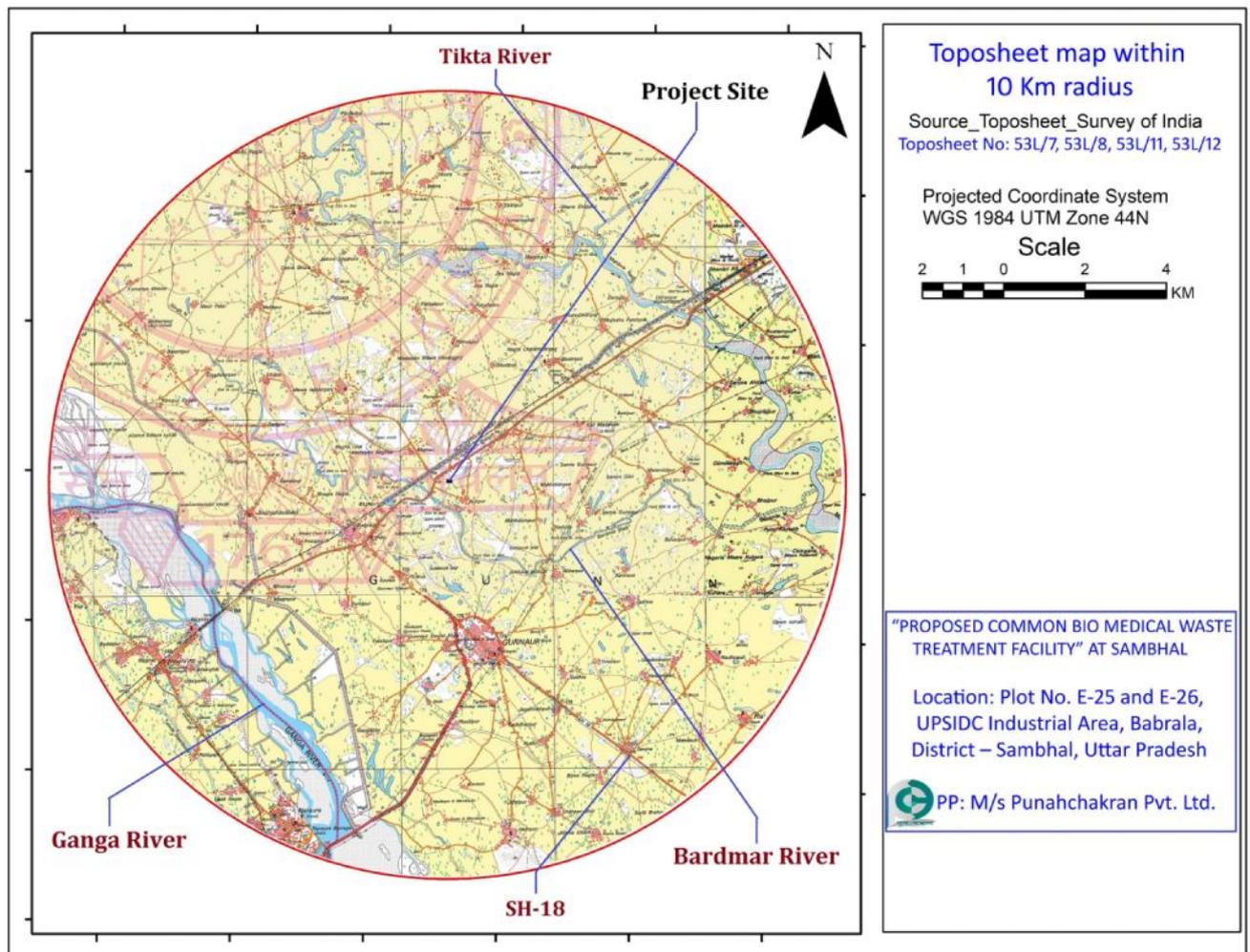


Figure 2.6: Topomap of Site with 10km Radius

<p>From right corner Chauraha</p>	<p>Road from East corner(Chauraha) towards highway and opposite plot</p>
<p>Plot Pic taken from road(North East)</p>	<p>Plot pic from East corner</p>

Figure 2.7: Site photographs

2.6 Seismicity

The area under study falls in **Zone-IV**, according to the Indian Standard Seismic Zoning Map. Suitable seismic coefficients in horizontal and vertical directions will be adopted while designing the structure.

2.7 Project description

The proposed project is “Common Bio-medical Waste Treatment Facility” in the owner's land measuring 3601 m². The project will include incineration, autoclaving, & shredding facilities within the site. The project details of the project are given in chapter 1:

2.8 Details of Land use: The land utilization for the proposed CBTWF are given in table 2.4

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Table 2.5: Land use of the Proposed CBWTF project

S.No.	Description	Area (m ²)	Percentage (%)
1	Total Covered area	2151.0	60
2	Green area/Open area	1450.0	40
	Total	3601.0	100.0

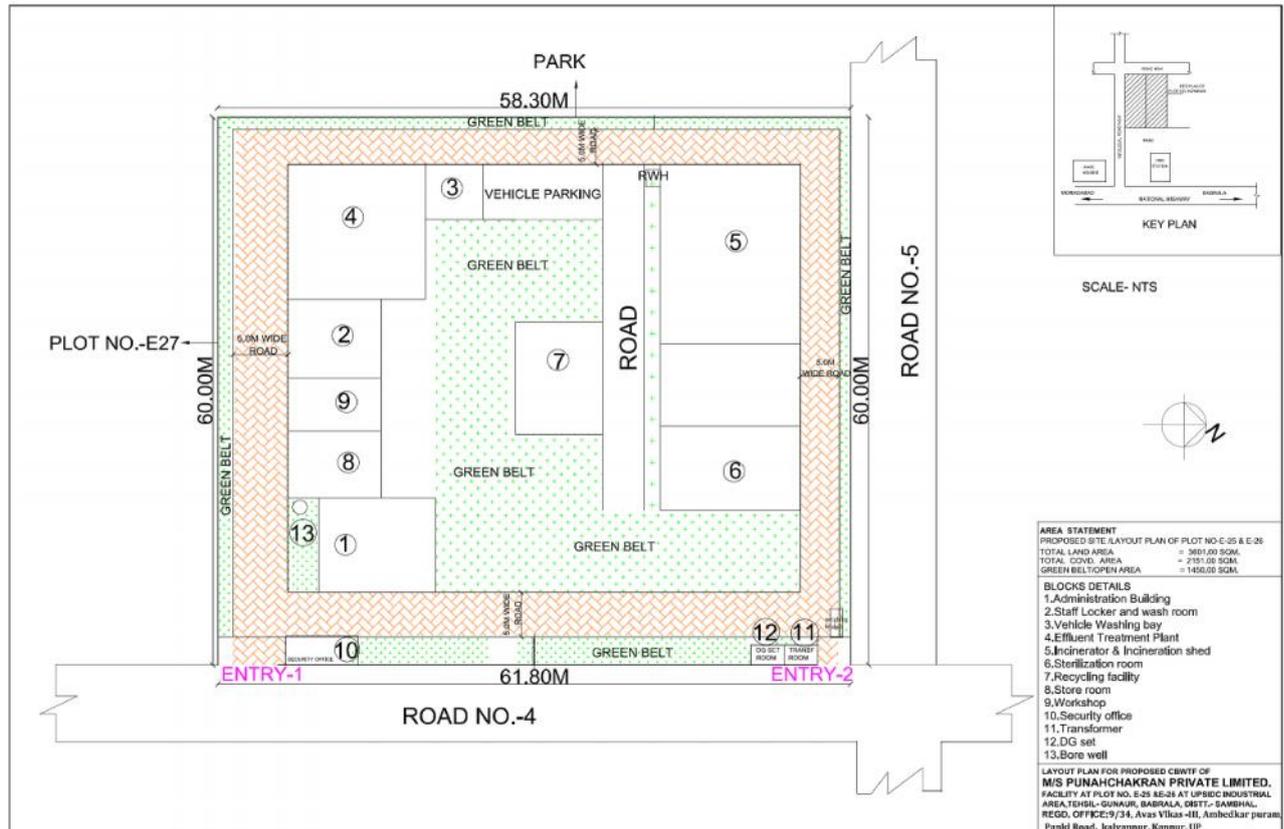


Figure 2.8: Project Layout Plan

2.9 Details of plant and machinery

The project is CBWTF, established for the effective treatment of the Bio-Medical waste from the hospitals and nursing homes from the surrounding area of Deoria district.

The components of the CBWTF are:

1. Incinerator
2. Autoclave
3. Shredder
4. Air Pollution Control Devices
5. Effluent Treatment Plant
6. Waste Storage Room

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7. Ash storage area
8. Vehicle Washing area
9. Treatment equipment room
10. Administration Building
11. Generator Set
12. Site Security
13. Fire Safety
14. First aid box
15. Greenbelt

2.9.1 Incinerator

The primary purpose of incineration is to burn the waste to ashes through a combustion process. The unit is a dual chambered incinerator.

The primary chamber’s main purpose would be combustion of the waste materials into safe end products (ash). The temperature of the primary chamber would be minimum 800°C wherein wastes are completely destroyed. The primary chamber would have an attached burner with auxiliary fuel supply to augment the fuel requirements and ensure maintenance of temperatures. The purpose of the secondary chamber would be to burn the off-gases and ensure safe end products (gaseous). The secondary chamber would operate at a temperature of 1050°C ± 50°C and above. The gases would be completely burnt and safe gases then are let out of the incinerator unit. The incinerator is completely automated with control panel and continuous recording of temperatures. The entire system is very simple and is easy to operate. The incinerator is equipped with air pollution control system including: quencher, venture scrubber and wet alkali scrubber followed by ID fan with 30 m stack.

A. Operating Standards

- 1) Combustion efficiency (CE) shall be at least 99%.
- 2) The Combustion efficiency is computed as follows:

$$C.E. = \frac{\%CO_2}{(\%CO_2 + \% CO)} \times 100$$

- 3) The temperature of the primary chamber shall be a minimum of 800 °C and the secondary chamber shall be minimum of 1050°C ± 50°C.
- 4) The secondary chamber gas residence time shall be at least two seconds.

B. Emission Standards

S.No.	Parameter	Standards	
(1)	(2)	(3)	(4)
		Limiting concentration in mg Nm₃ unless	Sampling Duration in minutes, unless stated
1.	Particulate matter	50	30 or 1NM ₃ of sample volume, whichever is more
2.	Nitrogen Oxides NO NO ₂ expressed as NO ₂ and	400	30 for online sampling or grab sample
3.	HCl	50 ppm	30 or 1NM ₃ of sample volume, whichever is more
4.	Total Dioxins and Furans	0.1ngTEQ/Nm ₃ (at 11%O ₂)	8 hours or 5NM ₃ of sample volume, whichever is more
5.	Hg and its compounds	0.05	2 hours or 1NM ₃ of sample volume, whichever is more

On-line monitoring system/flue gas analyzer will be attached with the incinerator for flue gas analysis. Parameters monitored online include SO₂, CO, CO₂, SPM. All necessary air pollution control devices are put in place to ensure compliance of emission standards as prescribed in Bio-Medical Waste Management Rules, 2016. The design details of the incinerator system is given in Table 2.5 below:

Table 2.6: Design Details of Incinerator

S.No.	Design details	Specification
1. Incinerator		
1	Brand type and model	Incinerator Model BMW- 250

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2	Type of waste	Bio medical waste
3	Capacity	250 kg. hr
4	Hearth area	>3.65m ²
5	Auxiliary fuel	Dual fuel (Furnace oil & diesel)
6	Type of burner operation	Monoblock fully automatic burners
7	Temperature Primary chamber Secondary chamber	1000°C ± 50°C 1050°C ± 50°C
8	Incinerator design type	Vertical type (both chamber will be placed on the floor for easy maintenance and service)
Primary chamber		
1	Type	Static solid health
2	Material of thickness	Mild steel , 5mm thick
3	Refractory thickness	115mm thick
4	Material	Refractory bricks
5	Temperature resistance	1400°C
6	Insulation thickness	115mm
7	Material	Insulation bricks IS -2042
8	Waste charging	Automatic feeding system hydraulic operated
9	Ash removal	Manual – extension system provided
Secondary chamber		
1	Type	Static solid health
2	Material of thickness	Mild steel , 5mm thick
3	Refractory thickness	115mm thick
4	Material	Refractory bricks
5	Temperature resistance	1400°C
6	Insulation thickness	115mm
7	Material	Insulation bricks IS -2042
8	Flue gas retention	2-3 second (Volume : 3.8 m ³)
2. Emergency stack		

1.	MOC	Mild steel, 3mm thick
3. Venturi scrubber		
1.	Type	High pressure jet type
2.	MOC	Stainless steel – 316L
3.	Temperature of the outlet	78-80°C
4.	Scrubbing media	Water with 5% caustic
4. Recirculation pump		
1	Type	Centrifugal
2	MOC	SS316/PP Chemical process pump
5. Dooplet separator & re-circulation tank (Internal)		
1	Type	Cyclonic
2	Application	To separate the water droplet from flue gas
3	MOC	Mild steel rubber lined 3mm thick
6. Combustion fan		
1	Type	Centrifugal
2	Modulation	Manual dumber control
3	MOC	Mild steel
4	Drive	Direct drive
7. Burner		
1.	No of burners	2 no for primary chamber 1no for secondary chamber
2.	Type	Monoblock fully automatic oil fired
3.	Fuel	Diesel
8. Fuel oil storage tank		
1.	MOC & capacity	High pressure M5
9. Control Panel		
1.	MOC & type	CRCA Sheet , PLC based complete with online recording and printing system for date, time chamber & secondary chamber with manual control also to run the unit in case of

		breakdown in the automobile operation
10. Common chimney of 30m height (suitable for 2 incinerators)		
1	MOC	Mild steel
2	Type	Self supporting
3	Height	30m from ground level
4	Ladder	Provided till the top
5	Other standard accessories	Aviation lamp, lightening arrestor , stack drain , inspection platform , sampling port
6	Optional – inside protection	3mm thick rubber lining from inside
7	Thickness	Bottom 10m – 8mm top 20m – 6mm base plate – 25mm
8	Diameter	Top diameter – 600mm

2.9.2 Autoclave

The primary purpose of autoclave is to sterilize/disinfect the waste with steam. Microorganisms which contribute to infection do not survive beyond 80°C. However, as a precaution MoEFCC has stipulated a temperature of 121°C with 15 psi pressure and 60 min duration to ensure distribution of temperature. At this temperature and pressure, microorganisms are completely destroyed and thus render the waste infection free. The disinfected waste is then segregated into HDPE, PP, rubber, latex, glass and metal. The segregated materials are then shredded completing the process of disinfection and ensuring non-recycling of the waste materials for medical / food grade purposes. All the process control conditions will be as per the applicable Bio-Medical rules.

2.9.2.1 Autoclave Features

A vacuum type (programmable) autoclave which can operate at all the specifications mentioned by MoEFCC with capacity of 1000 Kg/batch. The autoclave have continuous and automatic recording of temperature, pressure, date, time and batch of loading. Every batch is monitored with a strip chart recorder and once in a month the spore validation test and/or

spore monitoring is done. The key features of the autoclave are given in Table 2.6. The typical autoclave is shown in Figure 2.6.

Table 2.7: Features of Autoclave

Type	:	Vaccine type, automatic with documentation
Capacity	:	1000 Kg/batch
Temperature	:	121°C
Pressure	:	15 psi
Time	:	60 Min
Automation	:	PLC with MMI (Man Machine Interface)

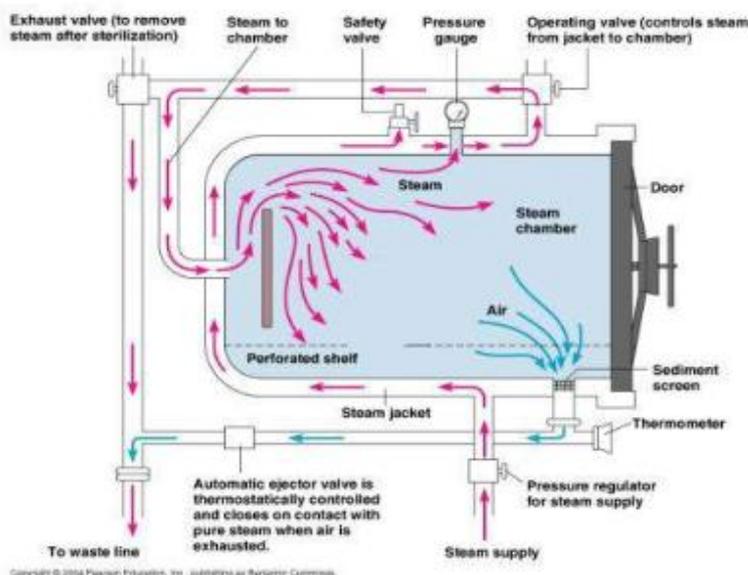


Figure 2.9: Sterilization process

2.9.3 Shredder

A mechanical shredder to make the waste unrecognizable as medical waste is installed with a required capacity of bio-medical waste. The shredder is properly designed and covered to avoid spillage and dust generation. The hopper and cutting chamber of the shredder is designed to accommodate the waste bag full of bio-medical waste. The shredder blades are highly resistant and able to shred waste sharps, syringes, scalpels, glass vials, blades, plastics, catheters, broken ampoules, intravenous sets/ bottles, blood bags, gloves, bandages etc. The shredder blades are of non-corrosive and hardened steel.

The shredder is so designed and mounted so as not to generate high noise & vibration. In hopper lid or door of collection box is opened, the shredders shall stop automatically for safety of operator. In case of shock-loading (non-shreddable material in the hopper), there will be a mechanism to automatically stop the shredder to avoid any emergency/accident. In

case of overload or jamming, the shredders will have mechanism of reverse motion of shaft to avoid any emergency/accident.

The shredder will have low rotational speed (maximum 50 rpm) to ensure better gripping and cutting of the bio-medical waste. The discharge height (from discharge point to ground level) will be sufficient (minimum 3 feet) to accommodate the containers for collection of shredded material. This avoids spillage of shredded material.

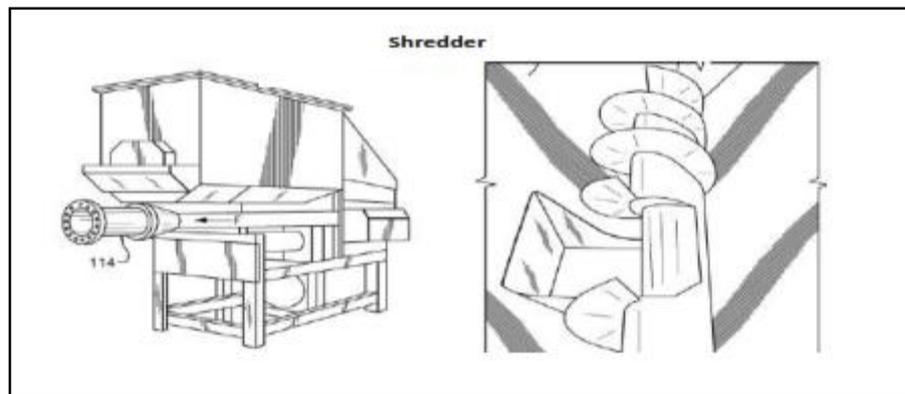


Figure 2.10: Shredder

2.9.4 Air Pollution Control System

The gases after being burnt at $1050^{\circ}\text{C} \pm 50^{\circ}\text{C}$ will run into a venturi scrubber followed by flooded scrubber with water quenching arrangement. The scrubber is an alkaline scrubber to neutralize the gases and ensure trapping of any pollutants escaping into the environment. The purpose of water quenching is to reduce the temperature of the gases which are at high temperature. The clean gases are let out into the environment. The scrubbed water is collected into a sump, where the water is neutralized, and then recirculated into the scrubber after cleaning them of their particulates by way of pressure sand filter and activated carbon filter. The system is thus a zero discharge system in terms of water discharges and is pollution free.

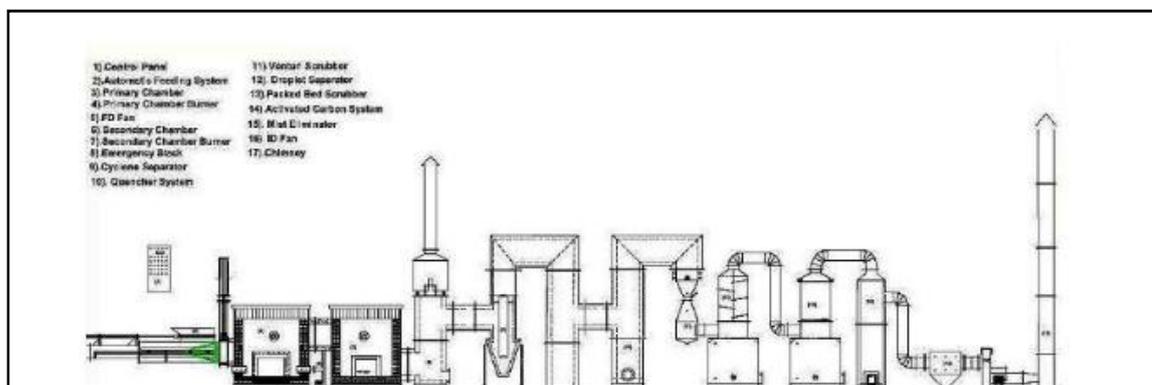


Figure 2.11: Bio-Medical Waste Incinerator with APCD

2.9.5 Stack height

Minimum stack height shall be 30 meters above the ground and shall be attached with the necessary monitoring facilities as per requirement of monitoring of ‘general parameters’ as notified under the Environment (Protection) Act, 1986 and in accordance with the Central Pollution Control Board Guidelines of Emission Regulation Part-III.

2.9.6 Effluent Treatment Plant

2.9.6.1 Design Basis

We are offering the system, which a latest technology is based on Suspended Growth Process for the treatment of wastewater.

The Suspended Growth Process reactor incorporates the advantage of fixed film technologies & combined with them the fine bubble diffused aeration techniques to get a high efficiency biological treatment Unit.

Effluent shall be collected in an underground Equalization tank through an Bar screen, Oil & Grease Trap. The Equalize effluent from Equalization tank would be transferred through a transfer pump to the aeration tank equipped with a Diffused Aeration Assembly. Over flow from the aeration tank would be transferred to a settling tank. Sludge from the settling tank would be transfer to the Sludge drying beds.

The finally treated water will meet out the norms of Pollution Control Board and can be reuse for auxiliary applications such as floor washing, toilets flushing, fire fighting, Gardening, etc.

2.9.6.2 DESIGN CRITERIA

Design Information

Feed Sewage rate: 10m³/day

Operating Hours: 24

The Treatment plant has been designed to treat 10 M³/day of Effluent/Sewage. The duration of treatment considered is 24 operating hours a day, thus arriving at a flow rate of 0.42M³/hr.

Design Feed water analysis

We are basing our design on the basis of the Raw Sewage analysis of mixed feed

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S. No	Parameter	Concentration*
1	pH	7.0-8.0
2	BOD (3 days at 27°C)	500
3	COD	700
4	Suspended Solid	400
5	Oil	40
6	Coliform	107

*All parameters except PH expressed as mg/l.

2.9.6.3 TECHNICAL DATA SHEET FOR THE 10 KLD ETP

DESIGN:

The sizes and specifications of the various units and equipments of the ETP are given below:-

1. BAR SCREEN CHAMBER

Numbers of Proposed	:	One
Material of Construction	:	BW/RCC
Tank Dimension	L	: 0.50 M
	W	: 0.80 M
	D	: 0.60 M

2. OIL & GREASE TRAP

Numbers of Proposed	:	One
Material of Construction	:	BW/RCC
Tank Dimension	L	: 1.50 M
	W	: 0.80 M
	D	: 0.60 M
Total Volume	:	0.72 M ³

3. EQUALIZATION TANK

Numbers of Proposed	:	One
Material of Construction	:	BW/RCC
Tank Dimension	L	: 2.0M
	W	: 2.0M
	D	: 2.5 M (SWD- 0.5M)
Total Volume	:	10.0 M ³
Air Flow for equalization tank		
Aeration Mechanism	:	Root blower
Air flow	:	50 m ³ /h
Tubular type fine Bubble diffuser		
Nos	:	06



MOC of membrane Size : Ø9”
: Silicon

4. PUMPS (For Raw sewage #2)

Numbers of Proposed : 02 (1W+1S)
Capacity : 10.0 M³/hr. each.
Head : 12Mtr
Tentative Motor rating : 1.0 HP
Suction x Delivery (mm) : 40 X 40
Type : Horizontal, Centrifugal, Self Priming Pump
set.
Make : Kirlosker/KSB/Eqv.

5. PRIMARY SETTLING TANK

Numbers of Proposed : One
Material of Construction : RCC
Tank Dimension L : 2.0 M
W : 2.0 M
D : 1.75 M (SWD- 0.3M)

Media for Tube Settler

Qty : 1.0 M³
MOC : PVC
Make : Cool Dec/ Eqv.

6. AERATION TANK

Numbers of Proposed : One
Material of Construction : RCC
Tank Dimension L : 2.0 M
W : 2.0 M
D : 2.5 M (SWD- 0.25M)
Total Volume : 10.0 M³

7. AERATION SYSTEM

Type : Attached Growth Process
Number of Air Blowers : 02 (1W+1S)
Air blower capacity : 100 M³/h
Air pressure : 4000mmwc
Blower RPM : ~1450
Motor Rating : 3HP
Make : Usha/Everest/Eqv.

Air Flow for aeration
Disc type Coarse Bubble diffuser
Nos : 20
Size : 150MM”
MOC of membrane : Silicon

8. SEC. SETTLING TANK

Numbers of Proposed : One
Material of Construction : RCC
Tank Dimension L : 2.0 M
W : 2.0 M

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	D	:	1.75 M (SWD- 0.3M)
Media for Tube Settler			
Qty	:	:	1.0 M ³
MOC	:	:	PVC
Make	:	:	Cool Dec/ Eqv.
9. FILTER FEED TANK			
Numbers of Proposed	:	:	One
Material of Construction	:	:	RCC
Tank Dimension	L	:	2.0 M
	W	:	2.0 M
	D	:	2.5 M(SWD- 0.25M)
10. PUMPS (For filter feed #2)			
Numbers of Proposed	:	:	02 (1W+1S)
Capacity	:	:	15.0 M ³ /hr. each.
Head	:	:	12Mtr
Tentative Motor rating	:	:	1.0 HP
Type	:	:	Horizontal, mono block Pump set.
Make	:	:	Kirlosker/KSB/Eqv.
11. CLEAR WATER TANK			
Numbers of Proposed	:	:	ONE
Material of Construction	:	:	RCC
Tank Dimension	L	:	2.0 M
	W	:	2.0 M
	D	:	2.5 M(SWD- 0.25M)
Total Volume	:	:	10.0M ³
12. SLUDGE DRYING BED			
Numbers of Proposed	:	:	Four
Material of Construction	:	:	BWM/RCC
Tank Dimension	L	:	2.0 M
	W	:	2.0 M
	D	:	1.0 M
13. MULTI GRADE FILTER			
Qty	:	:	2No.
Size	:	:	Ø1.0X1.5HT.
Flow	:	:	2.0M ³ /Hr.
MOC	:	:	MSEP

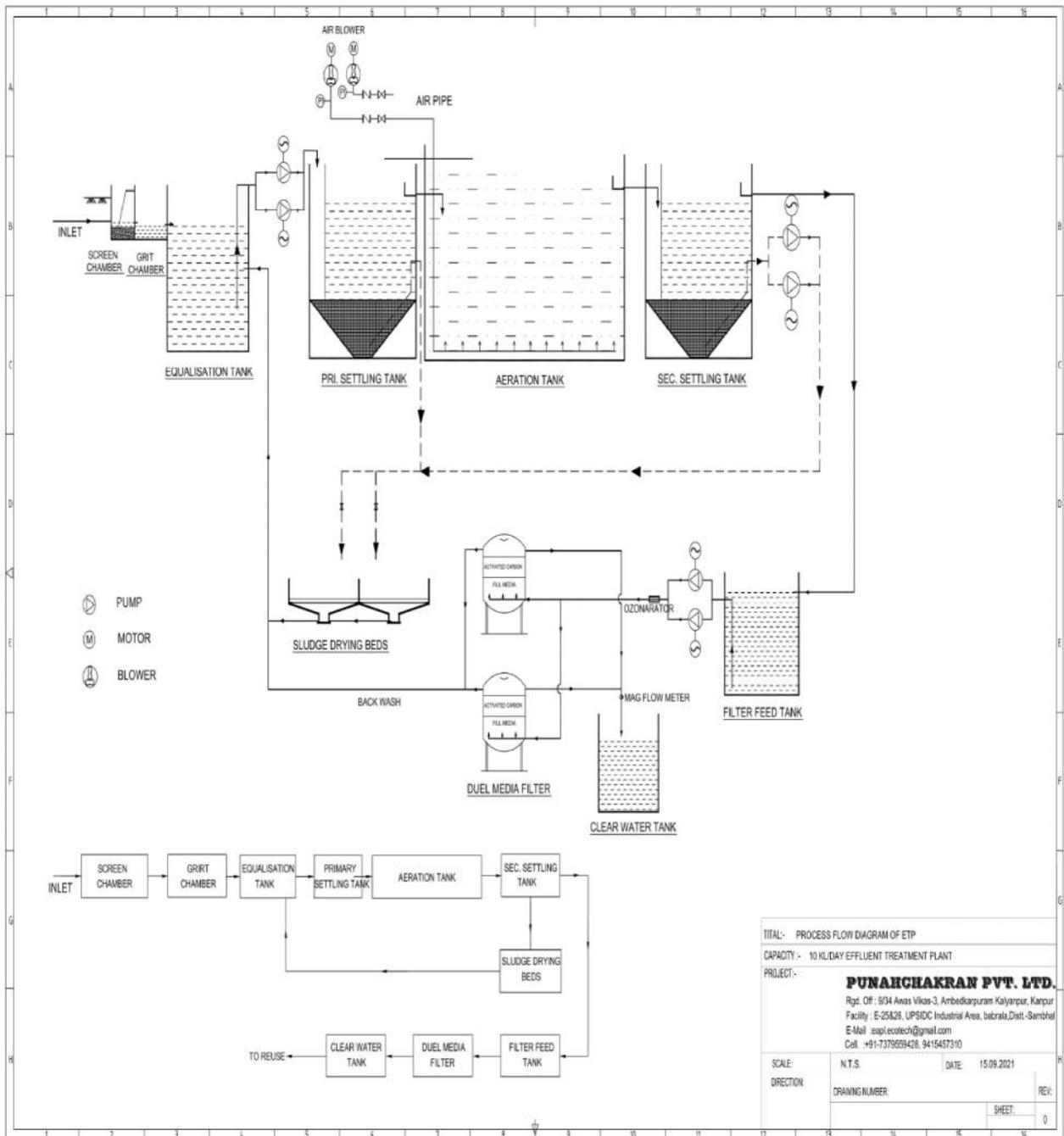


Figure 2.12: Effluent treatment process flow chart

2.9.7 Waste Storage Room

- The waste storage rooms are properly ventilated and so designed that waste can be stored in racks and washing can be done very easily.
- The waste storage room are washed and chemically disinfected daily.
- The floor and inner wall of the incinerator and storage rooms have outer covering of impervious and glazed material so as to avoid retention of moisture and for easy cleaning.

2.9.7.1 Main waste storage space

Separate space is provided near the entry point of the CBWTF to unload and store all biomedical wastes that have been transported to the CBWTF by its own transportation vehicle. The size of the room has adequate to store all wastes transported to the CBWTF. The front portion of the room shall be utilized for unloading the wastes from the vehicle and back or side portion shall be utilized for shifting the wastes to the respective treatment equipment. In the front portion of the room where transportation to each equipment room. There shall be two waste storage rooms, one for storage of untreated wastes and another for treated wastes and may be located at a distance from each other. The storage room shall have provisions similar to that of equipment room being well-ventilated with easy to wash floors & walls, smooth and fine surfaces etc. All the treatment equipment rooms and waste storage rooms should be provided with 'fly catcher/killing device'. The room has to be washed and cleaned with a suitable disinfectant every day.

2.9.8 Administrative Room

The room is utilized for general administration, record keeping, billing etc.

2.9.9 Generator set

Every CBWTF shall have generator set as standby arrangement for power, with sufficient capacity to run the treatment equipment during the failure of power. The generator set complies with the necessary requirement as per DG Set norms notified under the Environment (Protection) Rules, 1986.

2.9.10 Site Security

High walls, fencing and guarded gates are provided at the facility to prevent unauthorized access to the site by humans and livestock.

2.9.11 Fire safety

Fire safety equipment such as sand buckets and fire extinguishers are provided at all the salient points of the facility including at the diesel storage areas, diesel tanks connected with the incinerator etc. Fire alarm is also provided within the CBWTF to prompt the workers in the event of any fire hazard. Workers are provided training in First Aid administration.

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2.9.12 First Aid Box

First Aid Box with necessary provisions is provided within the facility.

2.10 Treatment process and process flow

The details of treatment process and process flow are given below:

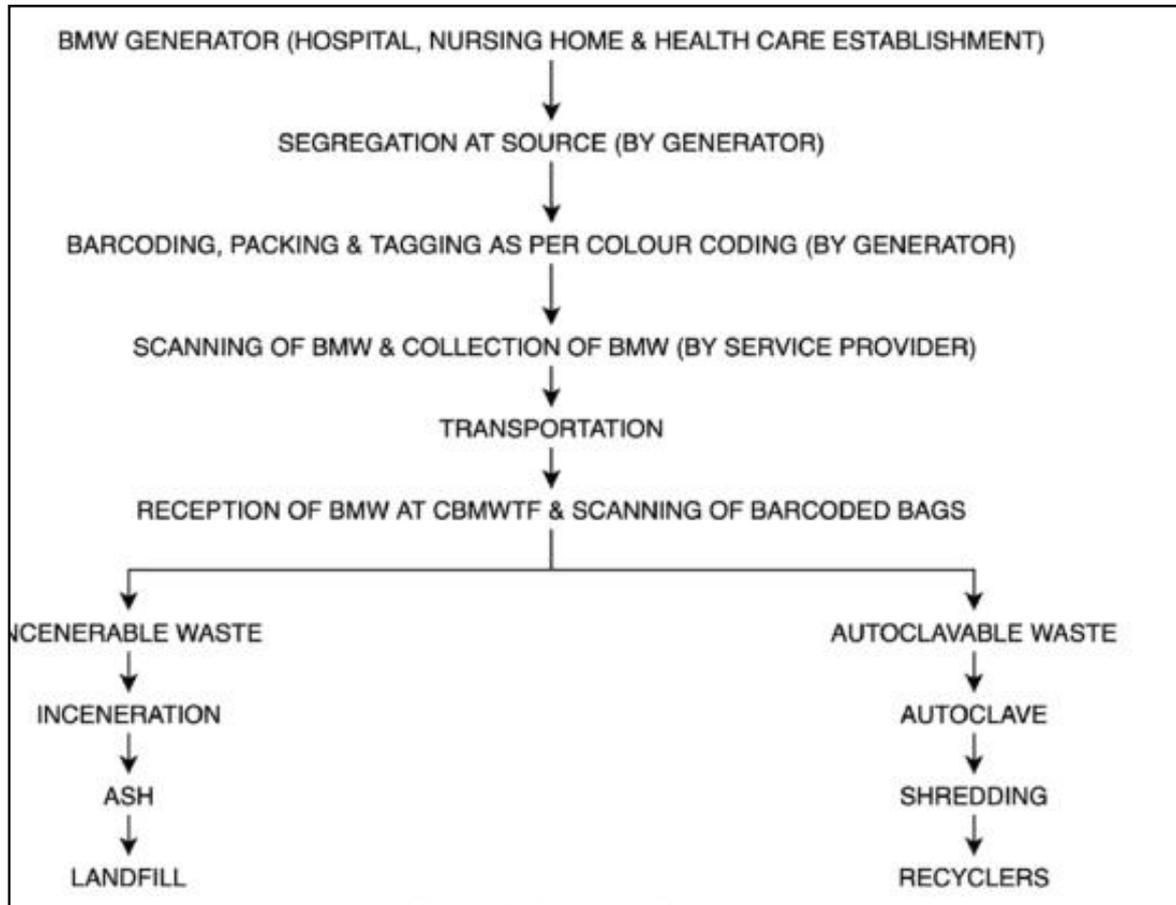


Figure 2.13: Treatment process

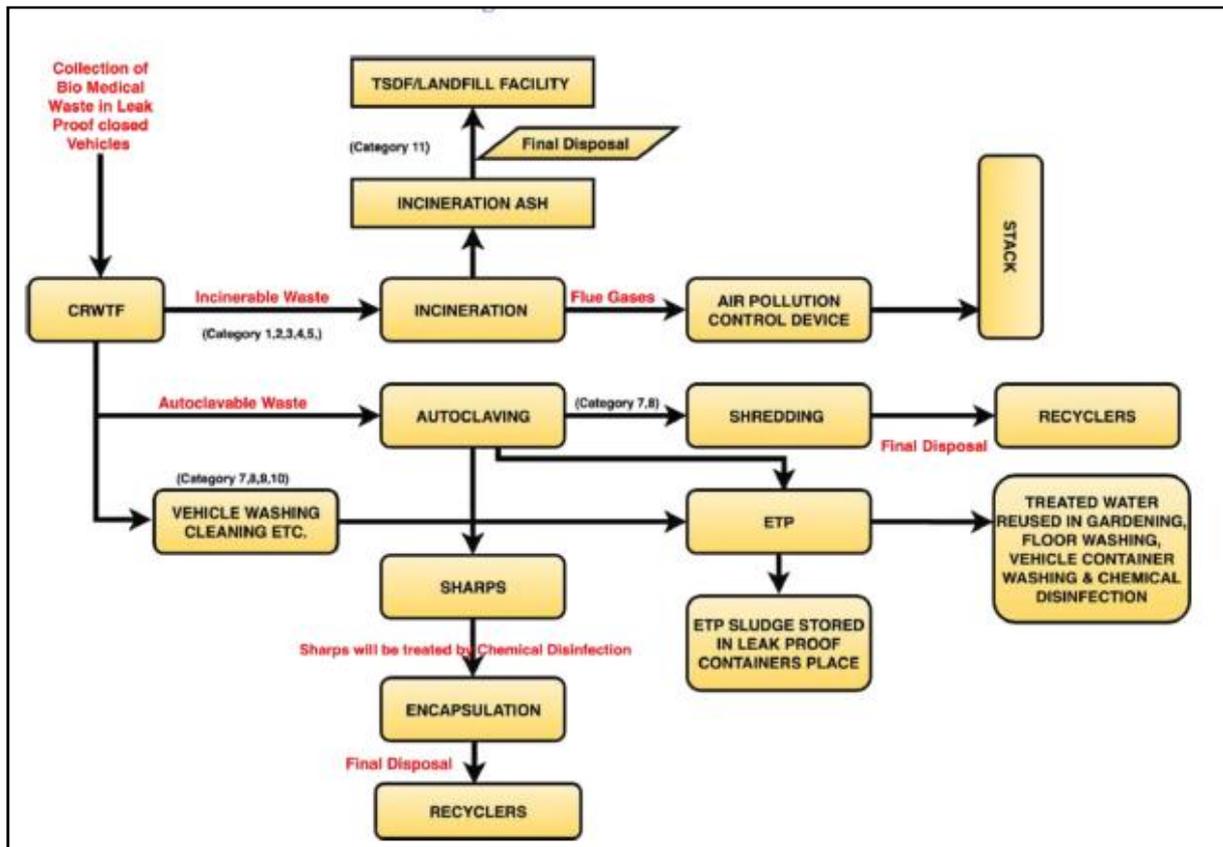


Figure 2.14: Process flow diagram

2.11 Proposed activities

The CBTWF proposed the following activity:

2.11.1 Collection

The Collection of Bio Medical Waste will be carried out in a manner so as to avoid any possible hazard to human health and environment. Following steps will be followed for collection of the waste from biomedical units:

- Segregated waste will be collected from the endpoint of healthcare units on a daily basis by the Biotic staff.
- The waste will be collected from the color coded bags in health care units to color coded containers (non chlorinated bags) in dedicated vehicles. Sharps will be collected in puncture proof containers.
- A Record Book will be maintained by the Healthcare unit in acknowledgement of waste collected.
- Non-segregated waste will not be accepted and such incidents will be reported to the prescribed authority.

- All the collection staff will be equipped with protective gears for handling common Biomedical Waste.
- Each and every care will be taken to ensure that the segregated common biomedical waste, handed over by the Health care unit, to reach Bio Medical Waste Treatment Facility without any damage, spillage and unauthorized access by public or animals etc.

2.11.2 Transportation

Waste will be transported in fully covered designated Vehicles designed as per following CPCB norms:

- Separate cabins for driver/staff and the bio medical waste.
- The base of the waste cabin will be leak proof and will be easy to wash and disinfect.
- The inner surface of the waste cabin will be made of smooth surface to minimize water retention.
- The vehicles will be properly labelled with the symbol of Biohazard as per schedule III of the Rules and will display the name, address and telephone number of the Company.
- The waste cabin will have provision for sufficient opening from the rear side so that common Biomedical Waste can be easily loaded and unloaded.
- The vehicles will be provided with the first aid kit to handle emergency situations.
- Vehicles will be equipped with communication equipment and safety gadgets & GPS systems.

2.11.3 Storage

2.11.3.1 Waste Storage Area

- The characteristics of the waste storage room will be as follows:
- The Size of the room will be adequate to store all wastes.
- The front portion of the room will be utilized for unloading the wastes from the vehicle and Back or side portion shall be utilized for shifting the wastes to the respective treatment equipment.

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- The area in front of the room will be made impermeable so that any liquid spilled during unloading does not percolate into the ground. However, the liquid waste generated (if any) during handling of waste and washing, shall be diverted to the inlet of ETP.
- The waste shall be stacked with clear distinction as per the color coding.
- The waste storage room will be well ventilated, easy to wash floors and walls and will have smooth and fine surfaces.

2.11.3.2 Treated Waste Storage Room

- A separate room will be provided for the storage of treated waste.
- The waste shall be stored in separate groups as per the disposal options.
- This room will also be provided with smooth and fine flooring and tiles on walls.
- The room will be well ventilated.

2.11.4 Treatment

The hospital waste consists of 60-65% of incinerable waste and 35% - 40% autoclavable waste. 3 types of treatment units will be provided in common biomedical waste management facility

2.11.4.1 Treatment Equipment Room

A separate housing will be provided for each treatment equipment at the Bio Medical Waste Treatment Facility.

- Each room will have a well designed roof and walls and it will be properly ventilated and easy to wash. The floor and interior finishing of the room will be such that chances of sticking/harboring of microorganisms is minimized. Smooth and fine flooring and tiles walls will be provided to a height of 2 m from the floor.
- A separate cabin will be provided to supervise the operation of the equipment and to record
- the waste handling and equipment operation data.
- Attached to each equipment room there will be two waste storage rooms, one for the storage of untreated waste and another for treated waste.

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Following separate treatment rooms will be provided:

- I. Incinerator Room
- II. Autoclave Room
- III. Shredder Room

2.11.5 Final Disposal

- The treated common biomedical waste shall be disposed off as given below:
- Plastic waste after disinfection and shredding will be given to the recycler.
- Disinfected sharps will be encapsulated on site.
- A non-leachate and covered ash pit will be provided inside the Bio Medical Waste Treatment Facility for storage of Incineration ash. Ash generated from the incinerator shall be handed over to authorized treatment and disposal facilities.
- Treated water will be used for washing & APCS.

2.12 Manpower requirement

A detail of the skilled and semiskilled manpower for the proposed project during construction and operation phase is given below:

Table 2.8: Man-power requirement

S.No.	Details	Operation
1	In plant	8
2	Admin	4
3	Marketing Executive	6
4	Driver Helper	20
	Total	38

2.13 Water Requirement

During installation phase: Total water required during installation phase will be 5 KLD which shall be taken from Tanker water supply. 2KLD of water shall be utilized for domestic purposes and 3KLD shall be used for construction purpose. Approximately 0.6 KLD domestic waste water will be generated which will be discharged to the soak pit via septic tank.

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During Operation phase: Water requirement for the proposed CBWTF project is 9 KLD (Industrial – 8.0 KLD & Domestic - 1.0KLD). The amount of total waste water generated out of the proposed Bio Medical Waste Treatment Facility is 7.0 KLD (~ considering 5% loss) which shall be treated in ETP having capacity of 10 KLD. The treated water that will be 7 KLD will be reuse in makeup of process water in air pollution control device. It will be a Zero liquid Discharge Unit.

2.14 Power Requirement

DG set of 32 KVA#2, 10KVA#1 is proposed for the project. Power Supply form U.P. Power Corporation will also be taken.



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Chapter 3 – DESCRIPTION OF ENVIRONMENT

3.0 Introduction

Baseline environmental status in and around proposed project depicts the existing environmental conditions of Air, Noise, Water, Soil, Biological and Socio-economic environment. With proposed project as the centre, a radial distance of 10km is considered as 'study area' for baseline data collection and environmental monitoring. Baseline data was collected for various environmental attributes so as to compute the impacts that are likely to arise due to proposed Common Bio-Medical Waste Treatment Facility at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh.

The main aim of the baseline study is to identify the critical environmental attributes which will be affected and have adverse impacts on the surrounding systems due to the present scenario. This study is carried out during the project planning stage itself, so that the proposed facility can be implemented in a technically, financially and environmentally sustainable long term basis.

The study depends mainly on two factors. One is estimation of impact from proposed project on the environment and the second one is assessment of the baseline environmental condition. Both are key factors to arrive at the post project scenario. The estimated impact due to the proposal can be superimposed over the existing conditions to arrive at the post project scenario. The scope of the baseline studies includes detailed characterization of the following environmental components, which are most likely to be influenced by setting up the proposed common bio-medical waste treatment facility:

-  Land Environment
-  Meteorological conditions
-  Ambient Air Quality
-  Noise Levels
-  Water Quality (Ground & Surface water)
-  Soil Quality
-  Biological Environment
-  Socio- Economic Studies

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3.1 Study period

For the purpose of carrying out the baseline study, an area of 10km radius has been identified around the project boundary. For the ease of assessment of impact, the study area is divided into three different components, viz. Core Zone – Area within the project site, Impact Zone – Area within 2 km radius from the project boundary and Study area – 5km radius from the project boundary.

- ✚ The study period was of three months i.e. from October 2021 to December 2021.
- ✚ The laboratory engaged is **ULTRA TESTING & RESEARCH LABORATORY**. It is NABL recognized laboratory located in Noida.

3.2 Physical environment (Land Environment)

Accurate determination of baseline conditions of natural and physical environmental components at project site is vital for robust impact assessment. The components of the environment for which the information has been collected are described in the following subsections.

3.2.1 Geology

Sambhal district is in the State of Uttar Pradesh which is characterized by rock formations ranging in age from the Archean (the Bundelkhand Granitic gneisses) to the Recent (the Ganga alluvium). The Ganga plain which dominates the landscape and nearly covers three fourth of the geographical area of the State, lies between the rocky Himalayan belt in the north and the southern hilly tract comprised of mainly Pre-Cambrian rocks. Flexing of the Indian lithosphere in response to the compressive forces due to collision, and thrust fold loading produced the Ganga Plain foreland basin. It is filled with recent alluvial sediments which are at places more than 1,000 m. thick and an amalgam of sand, silt, clay in varying proportions. The southern hilly tract is roughly parallel to the Ganga-Yamuna lineament. This plain is delimited from Amroha plain by 200-metre contour and lies in Chandausi, Bilari and Sambhal tahsils. It has a very gentle slope towards south-east. River Sot is the main source of water in this area. There are a few tributaries in this region, which are the insignificant. A patch of sand dunes may also be seen on the left corner along the district boundary of Budaun. It is a fertile plain. Geologically the region belongs to Alluvium, Dun gravels (Recent).

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3.2.2 Geomorphology & Soil of the study area:

Geo-morphologically, the area of the district can be divided into two broad geological units namely

1. Younger Alluvium

2. Older Alluvium

1. YOUNGER ALLUVIUM:

The area occupied by younger alluvium can be delineated along Ramganga and Dhela rivers draining the district. The younger alluvium is confined dominantly within the flood plain of these rivers.

The flood plain can be further differentiated into two geomorphic units –

- (i) Flood Plain,
- (ii) Older Flood Plain

(i) Flood Plain:

The river channel and its adjacent areas forming terraces, which are subjected to periodic flooding consisting of sand, silt and silty sand with minor clays from the flood plain of river. This is a narrow zone along river channel and gets flooded regularly during rainy season.

(ii) Older Flood Plain:

Older flood plain of river Ramganga can be delineated extending to few kilometers. Locally it is known as Khadar. The zone is characterised by presence of fluvial land from such as meander scars, cut off meanders forming water bodies and paleochannels. The sediments are fine grained sand and silt with thin clay horizons. The zone can be separated from older alluvium by presence of natural levee, sand dunes and abrupt change in slope.

2. OLDER ALLUVIUM:

It occupies the entire upland or interfluvial area between the major drainage Ramganga and Kosi and Sot & Ramganga. The soils are silty, clayey and sandy in varying proportions. The older alluvium can be differentiated into following geomorphic units:

- (i) Sandy Tract and
- (ii) Central Upland Plain of Interfluvial Area.

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(i) Sandy Tract: These are occurring very close to old flood plain of Ramganga. This unit correspond to Bhur of physiographic unit. This unit is characterised by absence of drainage ways, indication of high permeability as coarse sand exists.

(ii) Central Upland Plain or Interfluves Area: The unit occupies the central part as well as eastern part of the district and is characterised by presence of well drainage ways namely Ganga & Sot. The soils are clayey through at place these are sandy. Back swamp deposits can also be seen in this zone. Geomorphological map within 10.0 km radius is given in Fig ;3.2.

3.2.3 Soil of the Study Area

The Indo-Gangetic Plains are formed by the periodic deposition of silt brought by rivers abound in alluvial soil. Formation of soil in the Indo-Gangetic Plain can be ascribed to different erosional and depositional conditions. The soils in this plain have developed by the deposition of alluvium brought by river Ganga and its tributaries. The soil ranges from pure sand to stiff clays including all combinations of the two extreme litho units. The pure sand is called Bhur and clay is called Matiar. When both clay and sand are mixed, the soil is called Loam (or Dumat). Depending upon the content of clay and sand, Dumat is classified into different sub divisions. The word Kallar is used to denote bald land patches where nothing grows and may be ingested with saline soil or Reh at places. Alluvial soils occurring in the flood plain of river are called Kamp and yield good crops. The soils of the area are mainly of three types: Loam, sand and silty loam. Along the river system the tract is mainly composed of loose sandy soils underlain by clays. The soils of the study area are also classified as Entisols and Inceptisols. Entisols are recent alluvium or young soils whereas inceptisols are those in which one or more horizons are developed and have appreciable amount of organic matter.

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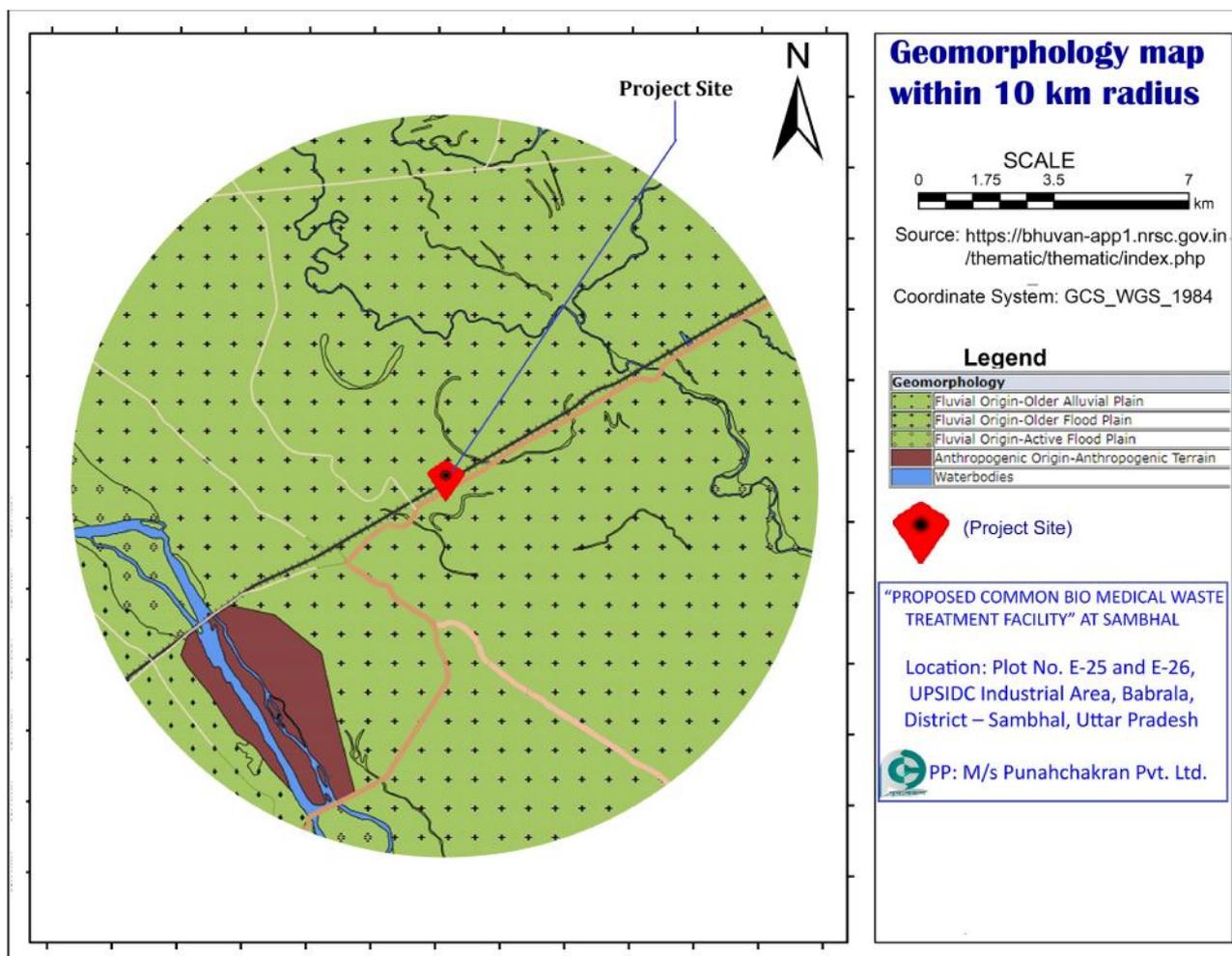


Figure 3.1: Geo - Morphology map of the study area

3.2.4 Physiography and Drainage

Moradabad district occupies the interfluvial region between rivers Ramganga and Ganga. The area is almost a monotonous plain with no distinct features except some sandy ridges, river valleys and shallow depressions. There is a distinct slope from north to south. The altitude ranges from 190 to 197 m above the mean sea level (m amsl) with an average of 190 m amsl. The area is drained by river Ramganga, a tributary of Ganga on the northeastern margin and river Gagan, a tributary of Ramganga, on the northwestern margin. Ramganga flows in south easterly direction and forms a wide valley with the flood plain mainly confined to its eastern bank.

Ramganga is a foothills-fed river rising in the Himalayan foothills. It shows very limited braiding and is highly sinuous in some reaches. The Ramganga has a relatively narrower

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active floodplain along its both banks. River Ganga is a left bank tributary of river Ramganga that rises in the Bijnor district and flows in south-easterly direction. After a course of 18 km, it is joined by Karula, on its left bank. In its upper course, the bed of the river has both clay and sand which is replaced downstream by the clay-dominated bed

3.2.5 Geo - Hydrogeology of study area

3.2.5.1 Ground Water Condition

The district is underlain by alluvial sediments having thickness of around 1000m (ONCG) comprising clay, silt and various grades of sand. Limited drilling carried out for ground water exploration down to a depth of 450 mbgl reveals the presence of potential aquifers with a marked change in sedimentation below 390mbgl.

The sediments down to 390 m can be broadly divided into two aquifer groups. The upper aquifer group down to 180m being exploited extensively by state & private tube wells. The second potential aquifer group present below 180m depth, still remains to be fully harnessed for optimum utilization. For proper management of ground water resources, it is recommended to tap this aquifer in future. Deep drilling below 400 m is the need of the area for proper understanding of deeper aquifers. Ground water occurs under unconfined to semi-confined to confined conditions

3.2.5.2 Ground Water Condition in the study area

Central Ground Water Board, Northern Region under its exploratory drilling programme has drilled 9 numbers of boreholes at Azad Nagar (Moradabad block), Bahjoi (Bahjoi block), Bhataua (Sambhol block), Budh Nagar & Dilari (Dilari block) and Maseri Rasoolpur (Boria Khera block), Budh Nagar (Thakurdwara block) down to a depth varying 50.00 to 350.00 mbgl with an objective of mapping of sub-surface sediments and aquifer system.

The cumulative thickness of screened granular zones in these aquifer groups varies from 36 to 112 m. The average yield varies from 1445 to 5220 lpm for drawdown ranging from 1.85 m to 8.7 m. The specific capacity of tube wells varies from 222 to 1263 lit/min/m of drawdown.

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Depth to water level in the area during pre-monsoon period varies from 10.1 to 12.3 mbgl and in post-monsoon period varies from 9.4 to 11.9 mbgl. The water level occurs comparatively at deeper in the southern west blocks of river Ramganga fallen in Tehsil Sambhal.

3.2.6 Land Use/Land Cover of Study Area

Satellite Image (multispectral) of latest available dates has been used for preparation of Land use/ Land cover thematic map of study area. Satellite image has been procured from National Remote Sensing Centre, Hyderabad.

Technical details

Prepared by : Environmental & Technical Research Centre

- Satellite Image - Multispectral(FCC) of latest available dates
- Satellite Data Source - NRSA, Hyderabad
- Software Used - Earth Resources Data Analysis System
- Arcgis 10.3

A hybrid technique has been used i.e. visual interpretation and digital image processing to generate output Land use / Land cover map of 10.0 km study area on 1: 50000 scale. Statistical data observed and results obtained from satellite image are given below

3.2.6.1 Land Use/Land Cover details of Buffer Zone

The whole study area of 10 km radius mainly comprises of crop land with 82.90%, fallow land with 0.12 %, and human settlement (including both urban and rural) 14.48 %. Thus other classes occupy 2.5 % only of the area. The land use land cover details of 10 km radius area are given in Table – 3.3 below:

Table 3.1: Land Use / Land Cover details of study area

S. No	LU/LC Class	Area in (km ²)	Area in (ha)	% area
1	Water Bodies	0.01	1.256	0.004
2	Fallow	0.38	37.68	0.12
3	Inland Wetland	0.64	64.056	0.204
4	Deciduos	2.26	226.08	0.72
5	Plantation	2.51	251.2	0.80
6	Crop Land	254.03	25402.6	82.90
7	Scrub Land	2.86	285.74	0.91
8	Grass/Grazing	3.77	376.8	1.20

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9	Rural	4.33	433.32	1.38
10	Urban	37.99	3799.4	13.10
11	River/Stream/Canal	6.44	643.7	2.05
	Total Area	314	31402	100.0

Source: LU/LC Map for Study Area from NRSC (Gov. Data)

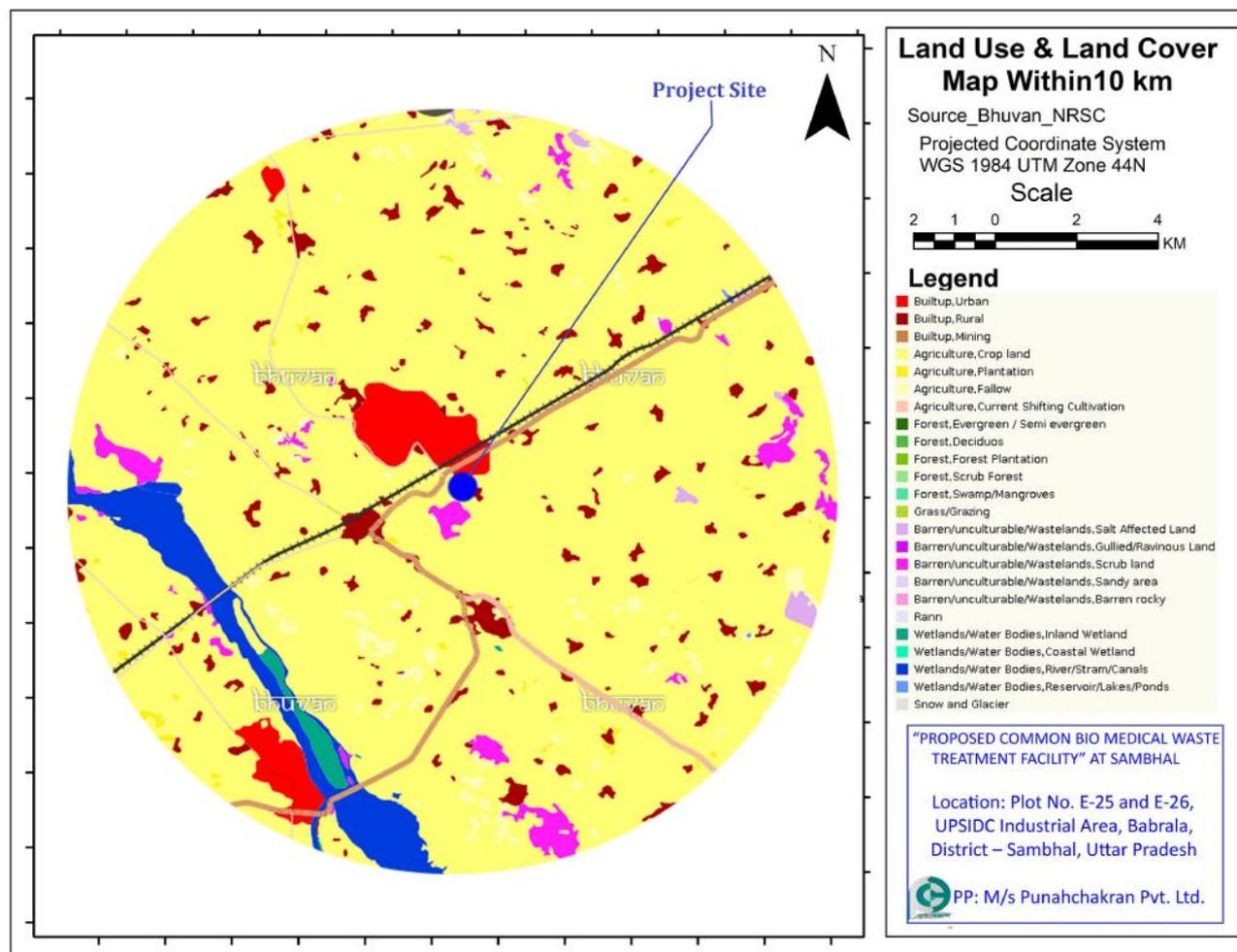


Figure 3.2: Land use and land cover of the project site

3.2.7 Digital Elevation Model

Digital Elevation Models are data files that contain the elevation of the terrain over a specified area, usually at a fixed grid interval over the "Bare Earth". The intervals between each of the grid points will always be referenced to some geographical coordinate system.

This is usually either latitude-longitude or UTM (Universal Transverse Mercator) coordinate systems. The closer together the grid points are located, the more detailed the information will be in the file. The details of the peaks and valleys in the terrain will be better modeled with small grid spacing than when the grid intervals are very large. Elevations other than at the

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specific grid point locations are not contained in the file. As a result peak points and valley points not coincident with the grid will not be recorded in the file. For practical purpose this "Bare Earth" DEM is generally synonymous with a Digital Terrain Model (DTM). DEM has been prepared for CBWTF of M/s Punahchakran Pvt Ltd for 10 km radius study area.

(A) Data Used

DEM Data: Shuttle Radar Topographic Mission (SRTM) data

Data Source: <http://srtm.csi.cgiar.org>

Software Used: Arc GIS 10.3

(B) Methodology

Shuttle Radar Topographic Mission (SRTM) data has been used for creation of Digital Elevation Model of the study area. The SRTM data has vertical accuracy of 16m and the spatial resolution is of 90m.

1st Stage:

The first processing stage involves importing and merging the 1-degree tiles into continuous elevation surfaces in Arc GRID format.

2nd Stage:

Re sampling the data at 23m is done and a contour interval of 10m through the usual process of interpolation is created.

3rd Stage:

SRTM data is converted in grid format through Arc GIS 10.3 to obtain elevation information of study area. Contours are then generated at 10 m interval through 3D analyst of Arc GIS and then are interpolating with raster data.

4th Stage:

Integration of DEM with contour map showing 3D view for analysis of surface is done.

Shown in figure 3.4.

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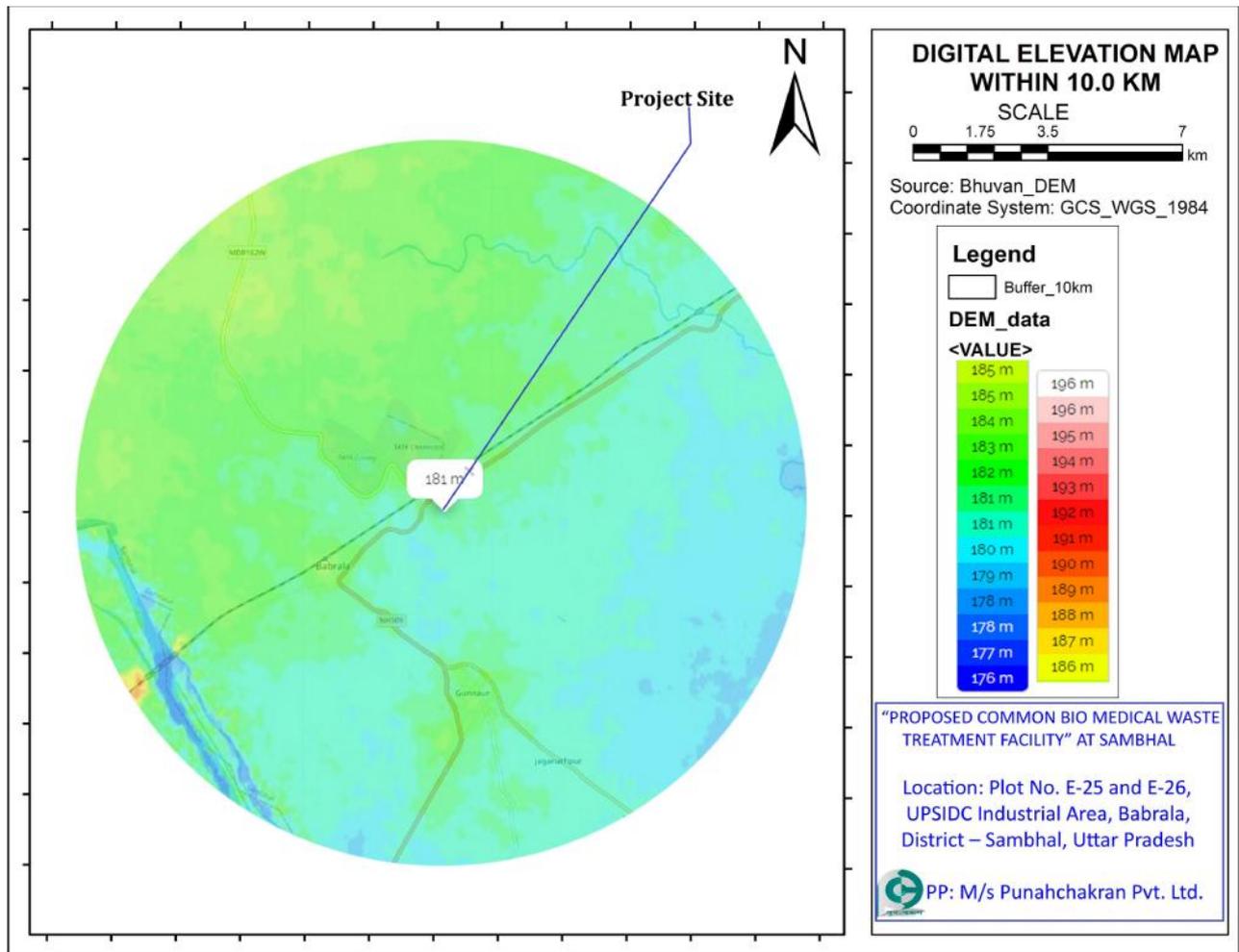


Figure 3.3: DEM of Study area

(C) Interpretation

It is very clear from the DEM that the elevation varies from 181.0 m to 182.0 m within the 10.0km of project site. General slope in the study area is from North west to south east. Lowest elevation is observed in south region of the study area, ranges from 181.0 m amsl. Highest elevation observes in North part of the study area is 184.0 m amsl.

3.2.8 Seismicity of Area

Many parts of the Indian subcontinent have historically high seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. Approx. 59 % of the land area of India is liable to seismic hazard damage. In India, seismic zones are divided into four zones i.e. V, IV, III and II. Details of the seismic zone are given in Table below.

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Table – 3.2, Seismic Zones in India

S. No	Seismic Zone	Risk	Intensity of Earthquake
1	Zone -V	Very Risk Zone	IX and Above
2	Zone -IV	High Risk Zone	VIII - IX
3	Zone -III	Moderate Risk Zone	VII – VIII
4	Zone -I	Low Risk Zone	VI & Below

SOURCE: IMD AND NIMD

Most of the state of Uttar Pradesh lies in the Gangetic Plain. This is a fore-deep, a down warp of the Himalayan foreland, of variable depth, converted into flat plains by long-vigorous sedimentation. This is known as a geosyncline and the Gangetic Plain is the Indo Gangetic Geosyncline. This has shown considerable amounts of flexure and dislocation at the northern end and is bounded on the north by the Himalayan Frontal Thrust. The floor of the Gangetic trough (if see without all the sediments) is not an even plain, but shows corrugated inequalities and buried ridges (shelf faults). Beneath Uttar Pradesh, run the Delhi-Haridwar Ridge (DHR), trending NNE-SSW along New Delhi to the Gharwal region. The Delhi-Ghazipur Ridge (DMR), which trends east to west, running from New Delhi to Kathgodam, in Nepal.

The last ridge is the Faizabad ridge (FR), which runs in a curved manner, first east to west from Allahabad to Kanpur and then starts to bend towards the north-east towards Lucknow and carries on in this direction towards the Himalayas in Nepal. The depression that forms between the DMR and the FR, forms the West Uttar Pradesh shelf in the west and the Sharda Depression in the east. The region to the south of the FR, forms the East Uttar Pradesh shelf.

There are several faults in the region, among them the Moradabad Fault which trends NESW and the Bhairwan Fault in the vicinity of Allahabad.

Apart from these there are east-west running tear faults in the region that control the courses of the main rivers. Earthquakes have occurred in mostly all parts of Uttar Pradesh. Major earthquakes in the neighboring states of New Delhi, Uttaranchal, Bihar and from across the Indo-Nepal border have also shaken many parts of Uttar Pradesh. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to

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areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.

Location of project: Proposed project falls in Seismic zone – IV (High risk Zone). Seismic Zoning Map of India showing the project site is given in Figure 3.5 below:

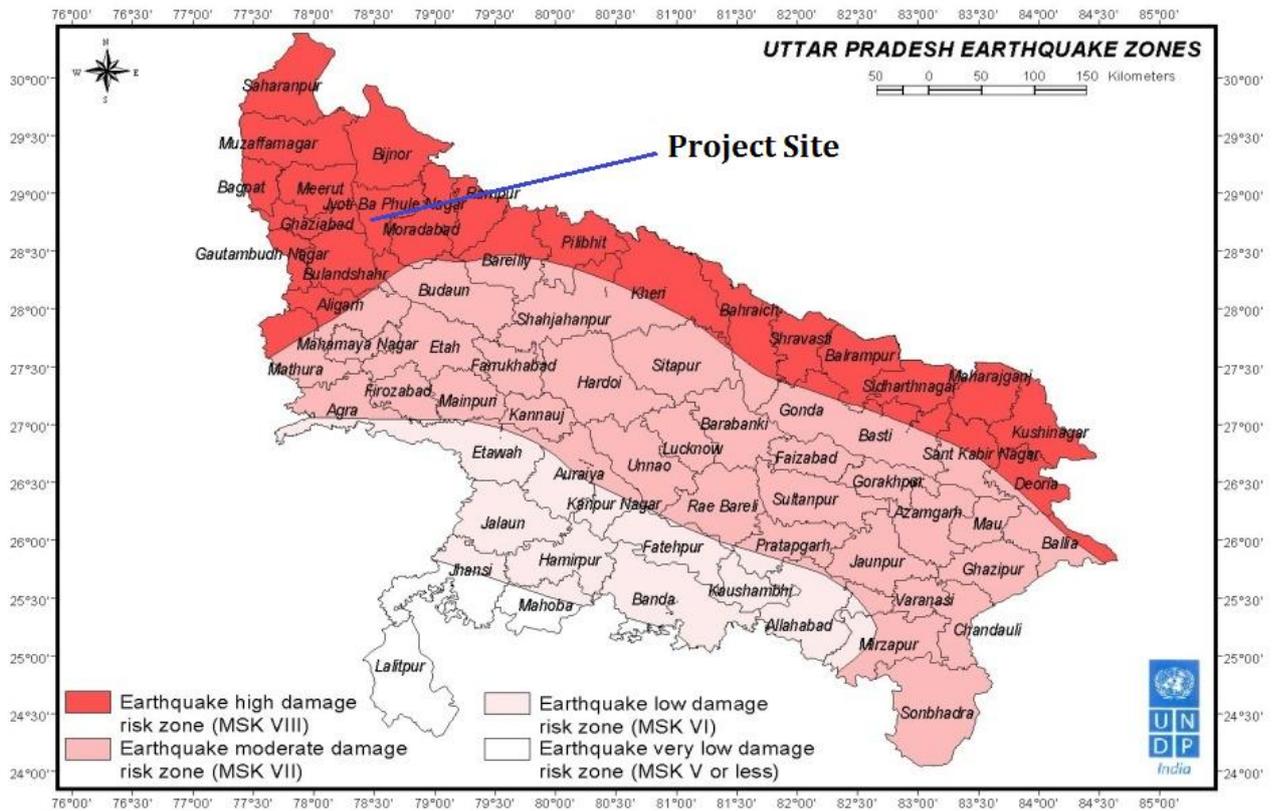


Figure 3.4: Seismic Zone of the project area

3.2.9 Flood Hazard Zonation of the Area

As per the “Vulnerability Atlas - 2nd Edition; Peer Group, MoH and UPA; based on digitized data of SOI, GOI; Flood Atlas, Task Force Report, C.W.C., GOI” the plant site is not falls under “area liable to flood”. Sot Nadi is approx: 0.59 km in south direction. Flood Hazard Zonation Map showing the plant site is given in Figure: 3.6

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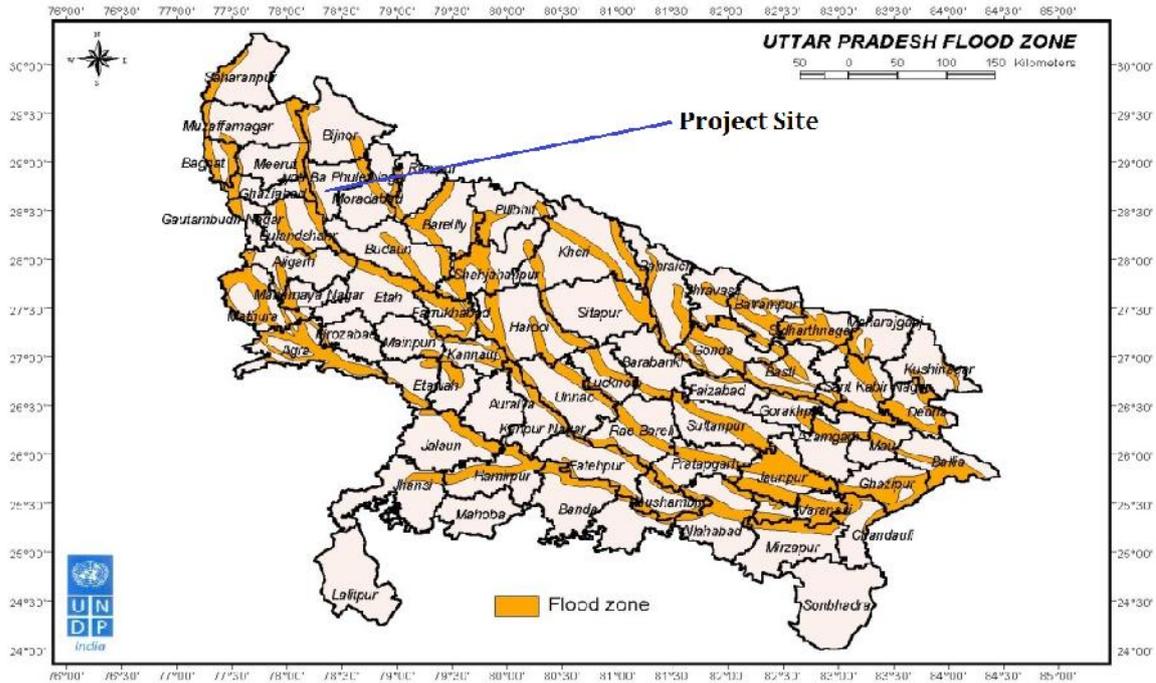


Figure 3.5:Flood Hazard Zonation Map

3.2.10 Climate and Meteorology

The area falls in the sub tropical region; thus its climate is classified as tropical to sub tropical type. The climate is characterized by a hot summer and bracing cold winter associated with general dryness, except during the south-west monsoon when humidity is high. The rainy season extends from end of June to September or part of October. About 86% of rainfall takes place from June to September. During monsoon, surplus water is available for deep percolation to ground water. The average annual rainfall is 967 mm.

May and early part of June form the hottest part of the year. In May, the mean daily maximum temperature is about 40°C and mean daily minimum temperature is about 25°C while maximum temperature rises to as high as 45°C. With the advancement of the monsoon in June, there is an appreciable drop in day temperature. January is generally the coldest month with mean daily maximum temperature of about 21°C and the mean daily minimum temperature of about 8°C.



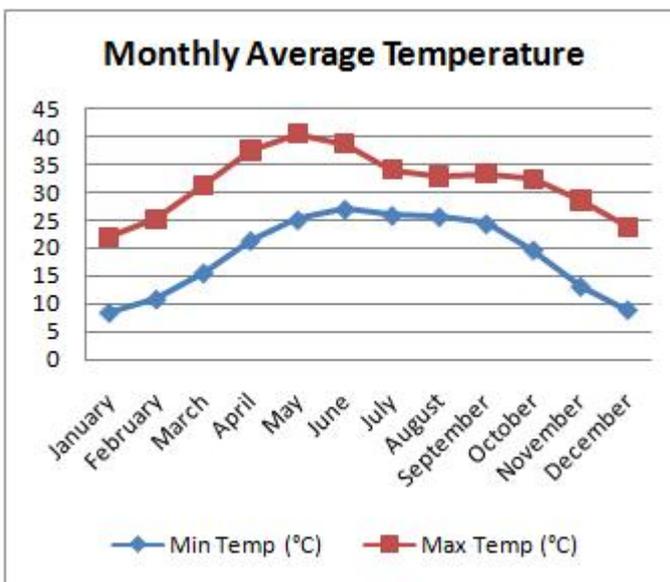
Project: Common Bio Medical Waste Treatment Facility (CBWTF) at Plot No. E-25 and E-26, UPSIDC Industrial Area, Baramba, District – Sambhal, Uttar Pradesh		
Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

3.3 Meteorological Data

Bareilly is the nearest IMD meteorological center to the proposed site. The study area experiences moderate subtropical to humid climate. The summary of the 20 years meteorological data of Bareilly IMD Station is given in sections below;

3.3.1 Temperature

The annual mean maximum and minimum temperature recorded at IMD Bareilly have been given in Table 3.4 and Figure 3.8. The highest average monthly maximum temperature recorded is about 40.5°C in May while the lowest average monthly temperature recorded is 8.5°C in January. Average temperature ranges from 8.5°C to 40.5°C during the study period.

Table : 3.3: Monthly Average Temperature			Figure 3.6: Average Maximum and Minimum Temperature
Month	Temperature (°C)		
	Min	Max	
January	8.5	21.9	
February	10.9	25.2	
March	15.6	31.2	
April	21.4	37.5	
May	25.1	40.5	
June	27.0	38.7	
July	25.9	34.0	
August	25.7	32.8	
September	24.4	33.3	
October	19.7	32.4	
November	13.2	28.5	
December	9.0	23.6	

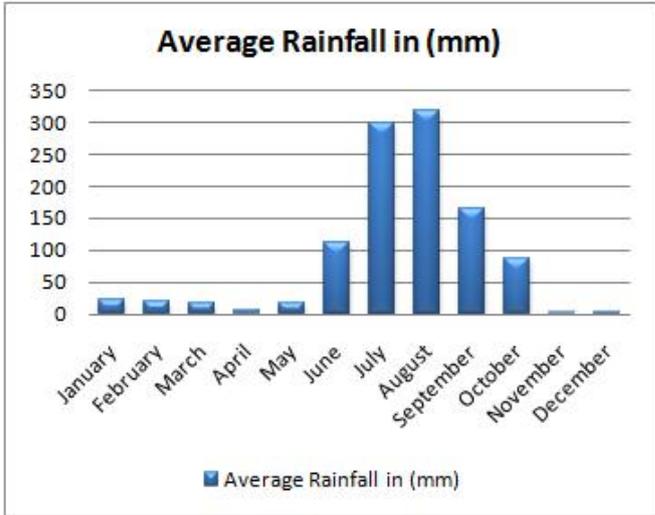
Source: Climatological Table, IMD

3.3.2 Rainfall

Monsoon season starts in July and goes on until October. The region experiences a total rainfall of about 1071.9 mm with 47.0 numbers of rainy days. The intensity of the rainfall in monsoon is observed much higher than the rainfall occurs in other part of the year. The average monthly rainfall data and number of rainy days in a month are furnished in Table 3.5 and Figure 3.9

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Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

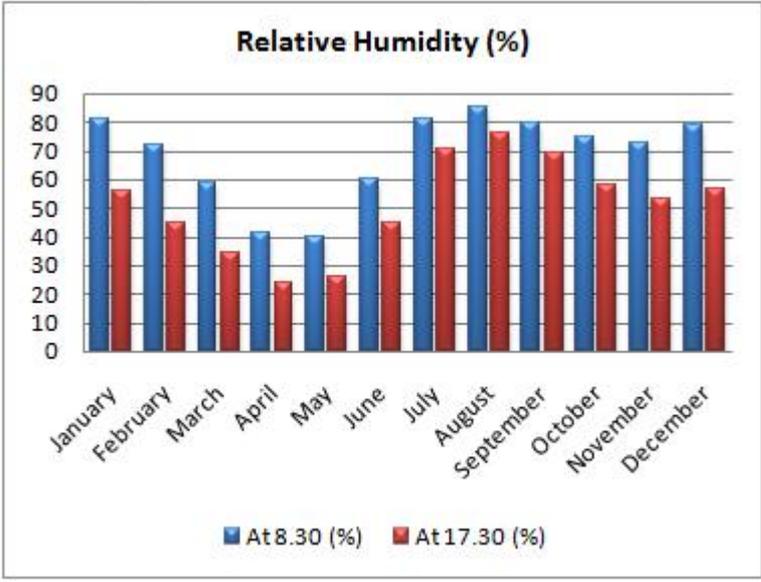
Table : 3.4: Monthly Average Rainfall		Figure 3.7: Average Rainfall in mm
Month	Average Rainfall in (mm)	
January	22.1	
February	20.3	
March	17.6	
April	6.2	
May	18.2	
June	111.8	
July	299.7	
August	317.0	
September	166.0	
October	85.8	
November	3.1	
December	4.1	
Annual	1071.9	

Source: Climatological Table, IMD

3.3.3 Relative Humidity

The summer season is the driest part of the year when humidity levels go below 24 to 26% at night during April and May. July and August being the rainiest months experience highest humidity level of 71% and 85% respectively in the morning. The annual mean relative humidity of 20 years is furnished in Table 3.6 and depicted in figure 3.10. Graphical presentation of relative humidity given in Fig; 3.10.

Table 3.5: Relativity Humidity of study area

Month	Relativity Humidity of study area		
	At 8.30 (%)	At 17.30 (%)	
January	81	56	
February	72	45	
March	59	34	
April	41	24	
May	40	26	
June	60	45	
July	81	71	
August	85	76	
September	80	69	
October	75	58	
November	73	53	
December	79	57	



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3.3.4 Wind Pattern & Speed

Table 3.6, it is evident that the average wind speed of the region is between the range of 2.3-7.3 m/s. The wind speed was found to be highest during the months of May and June. The predominant wind direction is from West, North West followed by East, South East throughout the year. It is only during the monsoon season that the pattern varies and the predominant direction became East.

Table: 3.6, Wind pattern & wind

Month	Mean Wind Speed (Km/Hr)	Pre - Dominant wind Direction (Directions)
January	3.9	W, NW & E, SE
February	5.6	W, NW & E, SE
March	6.6	W, NW & E, SE
April	6.8	W, NW & E, SE
May	7.3	W, NW & E, SE
June	7.3	W, NW & E, SE
July	6.1	W, NW & E, SE
August	5.0	W, NW & E, SE
September	4.6	W, NW & E, SE
October	2.9	W, NW & E, SE
November	2.3	W, NW & E, SE
December	2.9	W, NW & E, SE
Mean	5.1	W, NW & E, SE

Source: Climatological Table, IMD

3.3.5 On Site Micro - Meteorology at site

Meteorological station was set-up at site, to record surface meteorological data; during the Post Monsoon season October to December 2021. Wind speed and wind direction data recorded during the study period has enabled identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions were calculated and plotted as wind roses for study area. Maximum and minimum temperatures including percentage relative humidity were also recorded simultaneously.

It was observed that the predominant over all wind patterns for the study period was from west, North West direction. Wind Rose diagram showing the wind pattern during the study period is shown in Figure 3.11(a) & (b).

Summary of the micro-meteorology at site is given in Table 3.8. The wind recorded during the survey period at the site is more or less according to the trend indicated in IMD data Bareilly.

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Table 3.7 Site-specific meteorological data for the proposed establishment for the period from October to December 2021

Month	Temp (°C) Average		Relative Humidity (%)	Wind Speed (km/h)	Predominant Wind direction (blowing from)
	Min	Max			
01 October 2021 to 31 October 2021	19.7	32.4	58 – 75	2.9	W, NW & E, SE
01 November 2021 to 31 November 2021	13.2	28.5	53 – 73	2.3	W, NW & E, SE
01 December 2021 to 31 December 2021	9.0	23.6	57 – 79	2.9	W, NW & E, SE

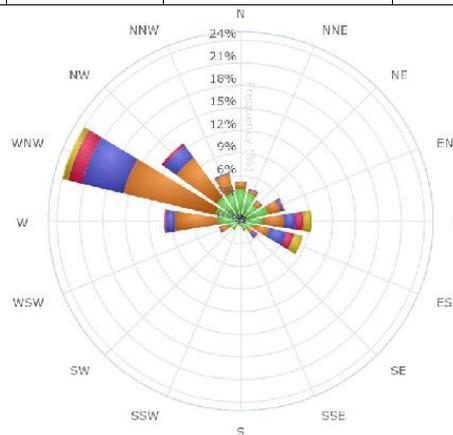


Fig : 3.9(a) , Wind Rose diagram of study period



Fig : 3.9 (b) , Superimposed wind rose diagram on project site

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This table shows the frequency and speed of wind blowing from each direction in Sambhal

Table 3.8: Table of Frequencies (%)

Direction	< 0.5	0.5-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	> 5.0	Total
N	0.18	0.82	3.33	0.91	0.05	0.00	0.00	5.29
NNE	0.18	0.68	2.97	0.46	0.14	0.05	0.00	4.48
NE	0.27	0.55	1.87	0.68	0.09	0.05	0.00	3.51
ENE	0.32	0.59	2.83	1.55	0.41	0.14	0.05	5.89
E	0.32	0.41	2.19	2.74	1.46	1.05	1.05	9.22
ESE	0.18	0.41	1.28	2.05	2.19	1.05	1.19	8.35
SE	0.05	0.23	0.87	0.91	0.55	0.18	0.05	2.84
SSE	0.14	0.27	0.87	0.09	0.00	0.00	0.00	1.37
S	0.00	0.18	0.46	0.05	0.00	0.00	0.00	0.69
SSW	0.00	0.27	0.27	0.09	0.00	0.00	0.00	0.63
SW	0.05	0.37	0.78	0.23	0.00	0.00	0.00	1.43
WSW	0.14	0.18	1.46	1.00	0.14	0.00	0.00	2.92
W	0.14	0.55	2.28	5.66	1.14	0.23	0.00	10.00
WNW	0.00	0.41	3.01	12.33	5.57	1.87	0.73	23.92
NW	0.18	0.64	3.06	6.53	1.96	0.41	0.00	12.78
NNW	0.27	0.68	2.92	2.60	0.18	0.00	0.00	6.65
Total	2.42	7.24	30.45	37.88	13.88	5.03	3.07	100

Windrose of Sambhal shows that dominant wind blow from the WNW much of the time - about 23.92% of all hourly wind directions. Approximately 6.53% (max) of the time the wind blows from the WNW at speeds between 2 and 3 m/s. Further, at Bareilly much of the time winds blow at speeds between 2 and 3 m/s - which is 37.88% of the time. About 2.42% of time winds were CALM i.e. wind speeds less then 0.5m/s.

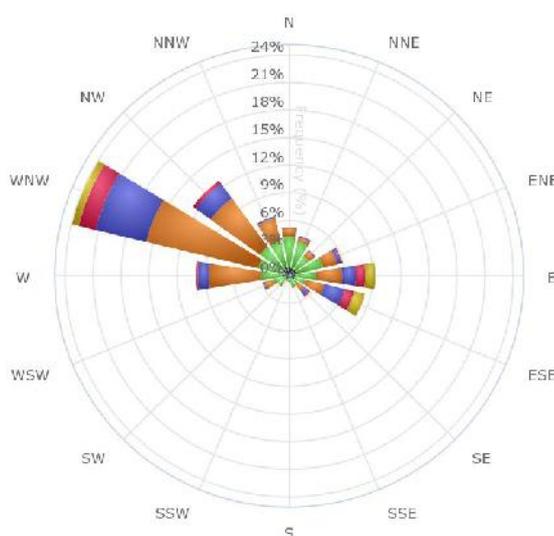


Figure 3.10: Wind Rose Diagram Seasonal (October 2021- December 2021)

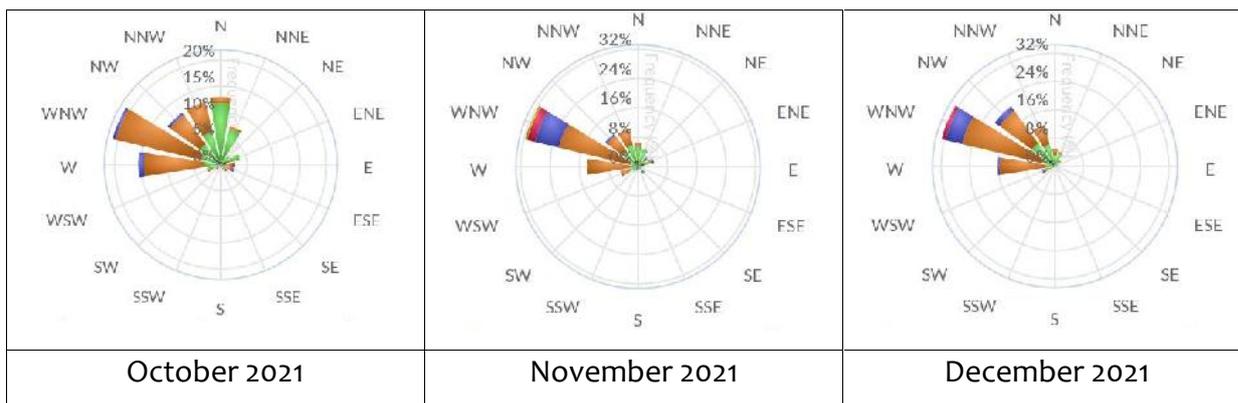


Figure 3.11: Wind Rose Diagram for the Study Month

3.4 Ambient Air Quality

The ambient air quality was monitored in the impact study area as per MoEF&CC guidelines. The prime objective of the baseline air quality study is to assess the existing ambient air quality of the area with reference to conventional air pollutants.

3.4.1 Methodology Adopted for the Study

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality network. The design of monitoring network in the air quality surveillance programme has been made based on the following considerations:

- Topography of the study area
- Representation of regional background
- Populated and sensitive areas
- Screening of maximum ground level concentrations and distances of their likely occurrences as per climatologically normal
- Representation of valid cross sectional distribution in downwind direction

3.4.2 Frequency and Parameters for Sampling

The ambient air quality along with their frequency of sampling is given below:-

Table 3.9: Monitored Parameters and Frequency of Sampling

Parameters	Sampling Frequency
PM ₁₀	24 hourly sample twice a week
PM _{2.5}	24 hourly sample twice a week
Sulphur Dioxide (SO ₂)	8 hourly for 24 hrs sample twice a week
Oxides of Nitrogen(NO _x)	8 hourly for 24 hrs sample twice a week
Carbon Monoxide	8 hourly for 24 hrs sample twice a week



3.4.3 Ambient Air Quality Monitoring:

Fine Particulate Samplers (FPS) has been used for PM_{2.5} Sampling. Respirable Dust Samplers (RDS) with gaseous attachment have been used for PM₁₀ Sampling. RDS with Gaseous attachment assembly is used for the collection of gaseous pollutants such as SO₂ & NO₂.

Table 3.10: Testing Method to be followed for Ambient Air Quality

Particular		Testing Method to be Followed
Ambient Air Monitoring Parameters		
A	PM ₁₀	IS-5182 (part – 23) 2006
B	PM _{2.5}	RTI(Research Triangle Institute) (Gravimetric Ana Revision-07 Aug14-2003)
C	SO ₂ (Sulfur Dioxide)	IS 5182 (Part – II) 2001, with Improved West & Geake Method
D	NO ₂ (Oxides of Nitrogen)	Modified Jacobs – Hochheiser Method / Arsenite Method (IS 5182 Part IV)2011
E	Carbon Monoxide	NDIR Spectroscopy method

Ambient Air Quality Monitoring (AAQ) stations were installed at 8 different locations with due consideration to the above mentioned points. AAQ locations were selected in **downwind, cross wind and upwind direction** of the proposed project location. The details of the monitoring stations are given in Table 3.11: The Ambient Air Quality Sampling location map is given in Figure 3.5.

Ambient air quality monitoring stations were selected on the basis of surface influence, demographic influence & meteorological influence. At each sampling station monitoring was carried out for a frequency of 2 days per week for 12 weeks during study period. The common air pollutants namely Particulate Matter (PM<2.5µm, PM<10µm), Sulfur dioxide (SO₂), Oxides of Nitrogen (NO_x), Carbon Monoxide (CO) were sampled on 8/24 hourly and results were averaged to 24 hours to meet the requirements of the MoEFCC and compared with the standards stipulated by CPCB. All the parameters were well within the standards.

Table 3.11: Ambient air quality sampling locations

Station Code	Coordinates	Area Category	Distance (Km) and Direction	Upwind/downwind	Rationale
	Latitude/Longitude	As per CPCB Notification			
AQ – 1 Project site	28°16'42.67"N 78°25'54.28"E	Industrial	Base	--	Select as Base station
AQ – 2 Madaiya Bagahu (Bagao Ki Madhiya)	28°16'59.02"N 78°25'11.36"E	Residential, Rural	1.45 Km (NW)	Upwind	Nearest habitation selected to check possible GLC in that area in the vicinity of industries
AQ – 3 Jaidaspur	28°18'8.43"N 78°23'58.37"E	Residential, Rural	4.2 Km (NW)	Upwind	Rural settlement
AQ – 4 Babralla	28°16'3.16"N 78°24'39.76"E	Residential, Rural	2.4 Km (SE)	Downwind	Near Bagao Colony (Near Vidya Ram Hospital, Chandosi Road)
AQ – 5 Gunnaur	28°14'39.86"N 78°25'58.03"E	Residential, Rural	3.0 Km (SE)	Downwind	Semi urban location within study area having dense population
AQ – 6 Akbarpur	28°15'26.47"N 78°27'21.93"E	Residential, Rural	3.7 Km (S)	Crosswind	Rural Area near Akbar pur Jahveer Mandir
AQ – 7 Gunnaur Semla	28°14'52.33"N 78°28'40.94"E	Residential, Rural	5.4 Km (SE)	Downwind	Rural settlement surrounded by agriculture fields
AQ – 8 Bhakroli	28°16'40.80"N 78°28'2.70"E	Residential, Rural	3.37 Km (E)	Crosswind	Rural settlement surrounded by agriculture fields

The existing values of air pollutants of concern as mentioned above are presented in Table 3.12. Statistical parameters like minimum, maximum and 98th percentile have been computed from the observed raw data for all sampling stations. These are compared with the standards as prescribed by MoEFCC for industrial, residential and rural zone.

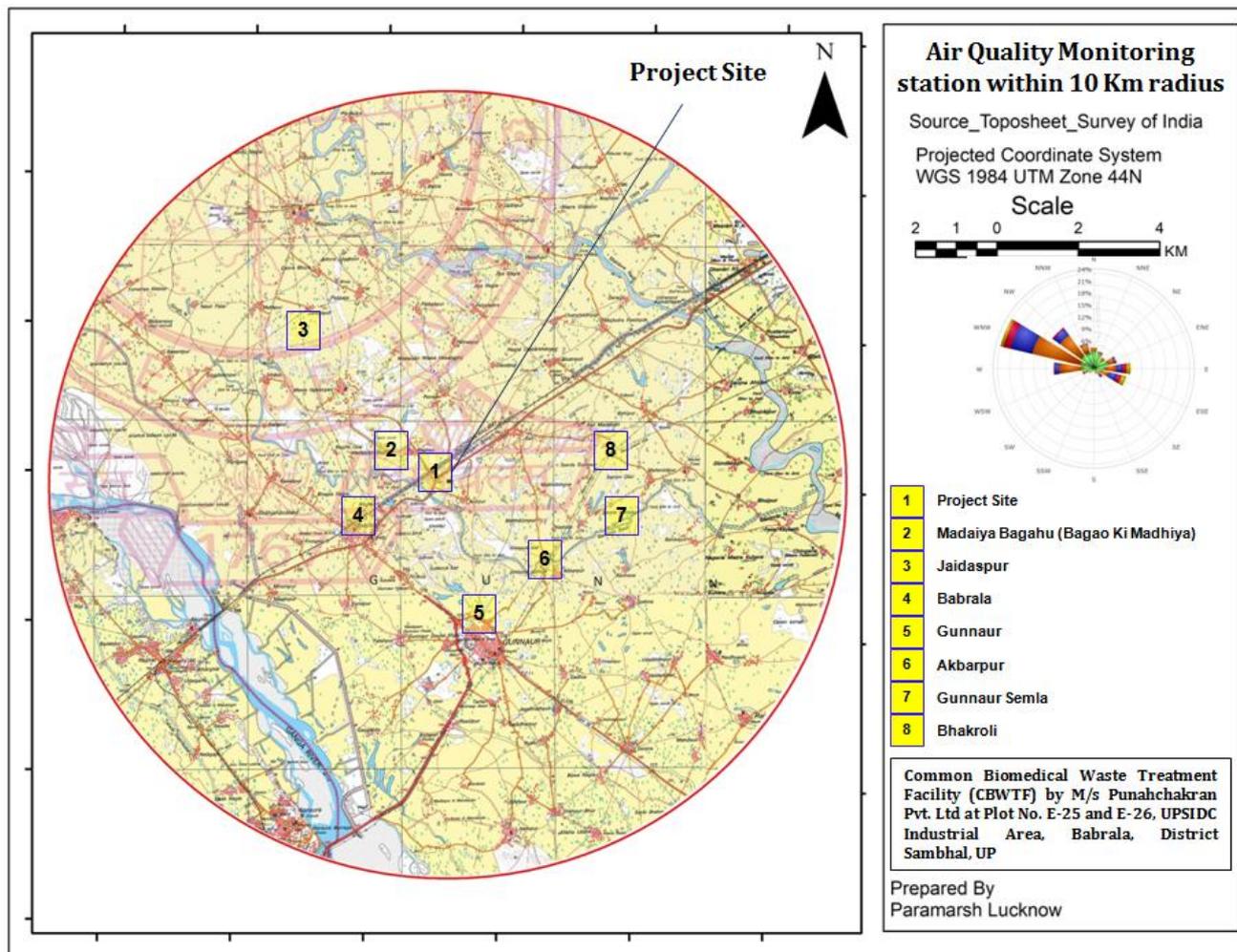


Fig 3.12: Map showing location of the monitoring stations within 10 km radius of the project site.

3.4.4 Method of Monitoring:

Particulate Matter (PM_{2.5}): (USEPA Quality Assurance Hand Book (Vol.II) Part II, Quality Assurance Guideline Document, 2.12): Particulate Matter (PM_{2.5}) was analyzed by Gravimetric Method. Particulate matter was collected on the 37 mm diameter glass micro fiber Filter Paper. PM_{2.5} value is determined from the values of volume of air passes through Ambient Fine Dust Sampler.

Particulate Matter (PM₁₀) (IS: 5182 Part 23:2006): Particulate Matter (PM₁₀) was carried out by Respirable Dust sampler as per IS: 5182(Part 23):2006. Particulate matter was collected on the GF/A Filter Paper. Particles with aerodynamics 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 weight prior to and after sampling.

Sulphur dioxide (SO₂) (IS: 5182; Part – II – 2001): Sulphur dioxide is absorbed by aspirating a measured air sample through a solution of Potassium or sodium tetrachloro mercurate, TCM. This procedure results in the formation of a dichlorosulphite mercurate complex. The Sulphite Ion produced during sampling is reacted with sulphamic acid, formaldehyde and pararosaniline to form an azo dye and then determined colorimetrically.

Nitrogen Oxides (IS: 5182; Part – VI – 2006): Nitrogen dioxide is collected by bubbling air through a sodium hydroxide- sodium arsenite solution to form a stable solution of sodium Nitrite. The Nitrite Ion Produced during sampling is reacted with hydrogen peroxide, Sulphanilamide and NEDA to form an azodye and then determined calorimetrically.

Carbon Monoxide (IS: 5182; Part-X) - V- CO (Non Dispersive Infrared Spectroscopy) - Sample collected in teddler bags from site and analyzed by analyzer in laboratory.

Monitoring Results for the eight locations is provided in the table 3.12 below:



Table 3.12: Ambient air quality monitoring result

Parameters		AAQ1	AAQ2	AAQ3	AAQ4	AAQ5	AAQ6	AAQ7	AAQ8		
		Project Site	Madaiya Bagahu	Jaidaspur	Babrala	Gunnaur	Akbarpur	Gunnaur Semla	Bhakroli	24 hrs	Annual Avg.
PM ₁₀ , µg/m ³	Min	115.15	80.64	80.35	80.42	80.15	80.41	80.41	81.24	100	60
	Max	127.91	90.15	90.84	90.25	90.41	89.22	90.89	90.66		
	Avg	119.54	85.15	84.89	85.25	84.25	85.04	84.98	84.73		
	98 Percentile	126.71	89.82	90.10	89.46	89.37	89.14	90.10	89.58		
PM _{2.5} , µg/m ³	Min	70.64	42.07	42.52	42.02	41.72	41.14	42.40	42.25	60	40
	Max	80.44	51.31	51.29	51.78	51.55	50.88	51.80	51.61		
	Avg	75.17	45.94	45.28	45.41	44.67	45.13	45.54	45.58		
	98 Percentile	79.98	50.90	50.75	50.51	51.07	50.41	51.26	50.89		
SO ₂ , µg/m ³	Min	14.02	10.84	10.93	10.32	10.91	11.19	10.92	11.03	80	50
	Max	18.68	14.38	14.89	14.10	14.20	14.94	14.26	14.34		
	Avg	16.11	12.63	12.32	12.55	12.51	12.76	12.29	12.32		
	98 Percentile	18.51	14.31	14.53	14.08	14.13	14.63	14.16	14.27		
NO _x , µg/m ³	Min	27.90	23.04	23.28	23.22	22.84	23.16	23.28	23.16	80	40
	Max	33.83	28.46	28.74	28.26	28.10	28.90	28.18	28.26		
	Avg	30.66	25.85	25.81	25.70	25.54	25.67	25.57	25.36		
	98 Percentile	33.70	28.33	28.52	28.24	28.06	28.50	28.17	28.25		
CO Mg/m ³	Min	0.70	0.59	0.59	0.59	0.59	0.59	0.59	0.59	4	4
	Max	0.81	0.69	0.69	0.69	0.69	0.69	0.69	0.69		
	Avg	0.75	0.64	0.64	0.64	0.64	0.64	0.64	0.65		
	98 Percentile	0.81	0.69	0.69	0.69	0.69	0.69	0.69	0.69		



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Inference: PM_{2.5} and PM₁₀ at the project site is higher than the prescribed limit. As the project site is located in industrial area and also affected by SH-39 busy transport route, the reason for high level of particulate matter is due to such condition. The high level of pollution of particulate matter is not anthropogenic.

3.4.5 Result and Discussion

a) Concentrations of PM₁₀ and PM_{2.5} for all 8 AAQM locations were found to be in the range of 80.15 – 127.91 µg/m³ and 41.14 – 80.44 µg/m³ respectively. As far as the gaseous pollutants of SO₂ and NO₂ are concerned, SO₂ concentrations are found to be in the range of 10.32 – 18.68 µg/m³ and NO₂ concentrations were in the range of 23.04 – 33.83 µg/m³. The concentration of all parameters was found to be within the limit except project site, because of project site is located in industrial area and also affected by SH-39 busy transport route, the reason for high level of particulate matter is due to such condition. Detailed Ambient Air results for all the location with an average and 98 % Percentile value are given in **table**.

Proposed project is a CBWTF project and main pollution source is Incineration. It is suggested to provide all Air Pollution Control Equipment to be attached with Incineration as per New Guidelines of CPCB for Establishment of CBWTF project..

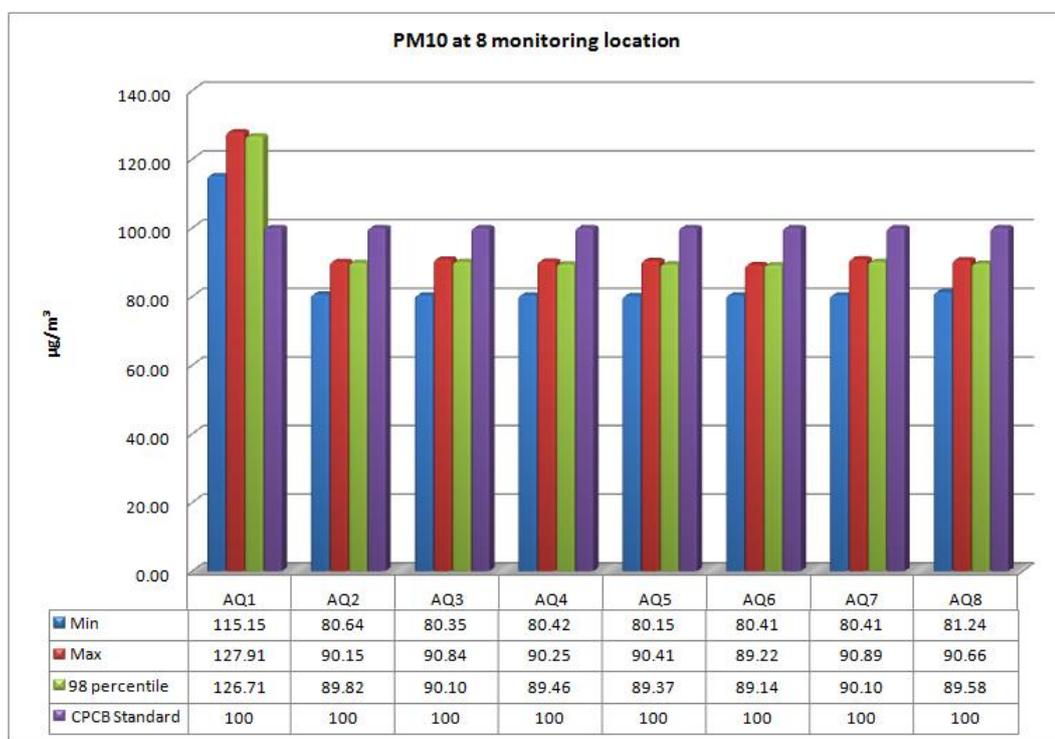


Figure3.13: Graphical Representation of PM₁₀ value at 8 monitoring locations



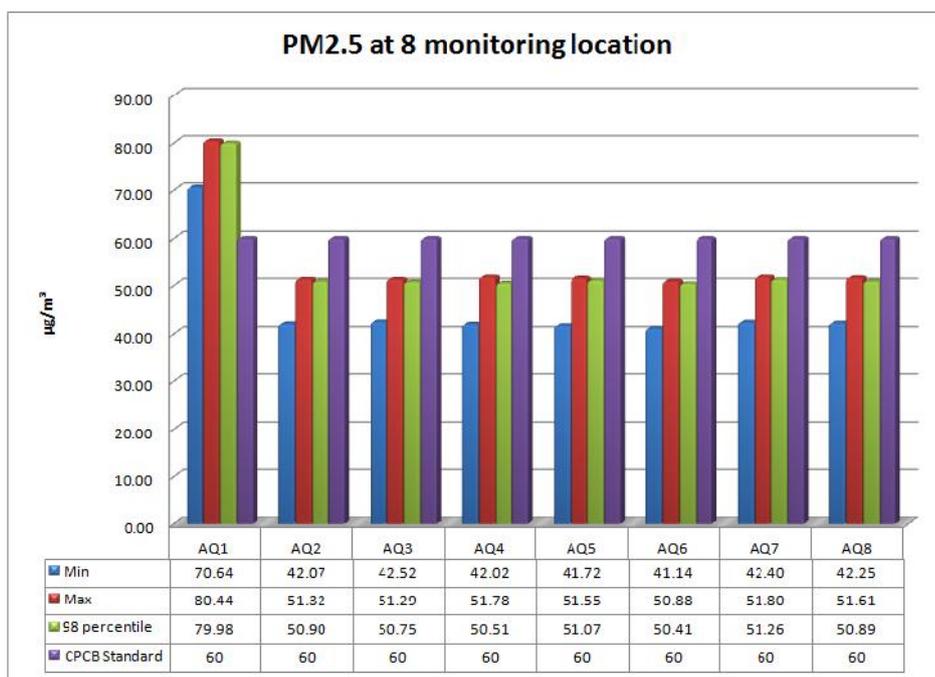


Figure 3.14: Graphical Representation of PM_{2.5} value at 8 monitoring locations

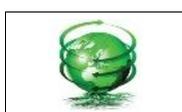
b) Sulfur Dioxide

Sulfur dioxide gas is an inorganic gaseous pollutant. Sulfur dioxide emissions are expected to be emitted wherever combustion of any fuel containing sulfur takes place. The sulfur in the fuel will combine with oxygen to form sulfur dioxide. Sulfur trioxide and sulfuric acid mist are the other important pollutants in the sulfur group. In general some of the important sources of sulfur dioxide are Power stations, sulfuric acid plants, oil refining, boilers in utilities in any industry and domestic use of coal. The following sources of Sulfur dioxide in the study area are identified:

- ◆ Emissions from domestic fuel (coal, diesel, etc.)
- ◆ Emissions from DG sets used by industries and local residents

Sulfur dioxide in atmosphere is significant because of its toxicity. Sulfur dioxide is capable of producing illness and lung injury. Further it can combine with water in the air to form toxic acid. Aerosols can corrode metal surfaces, fabrics and the leaves of plants. Sulfur dioxide is irritating to the eyes and respiratory system. Excessive exposure to sulfur dioxide causes bronchial asthma and other breathing related diseases as it affects the lungs.

The 98th percentile of SO₂ recorded within the study area was in the range of 14.08 – 18.51 µg/m³. The 24 hourly average values of SO₂ were compared with the national ambient air quality standards and it was found that all sampling locations recorded values much lower than the applicable limit of 80 µg/m³ for residential and rural areas.



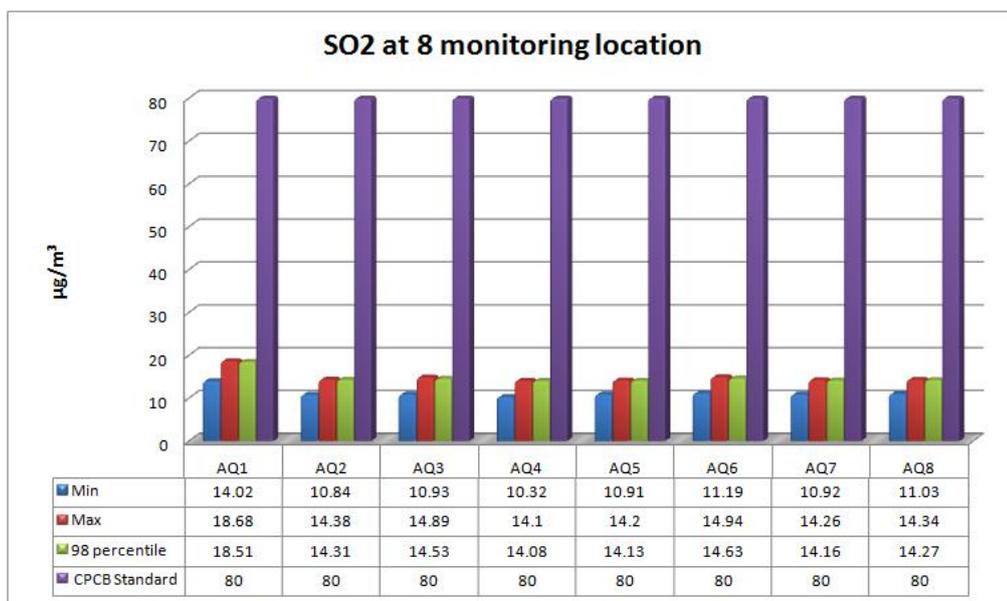


Figure 3.15: Graphical Representation of SO₂ value at 8 monitoring locations

c) Oxides of Nitrogen

Oxides of Nitrogen are also an inorganic gaseous pollutant like Sulfur dioxide. Oxides of Nitrogen emissions are expected to be emitted wherever combustion at high temperatures takes place. Nitrous oxide and Nitric Acid Mist are the other important pollutants in the inorganic nitrogen group. In general some of the important sources of oxides of Nitrogen are Boilers (utilities) in any industry and Auto exhaust. In a metropolitan town NO_x levels are predominantly due to automobile emissions. The following sources of oxides of nitrogen in the study area are identified:

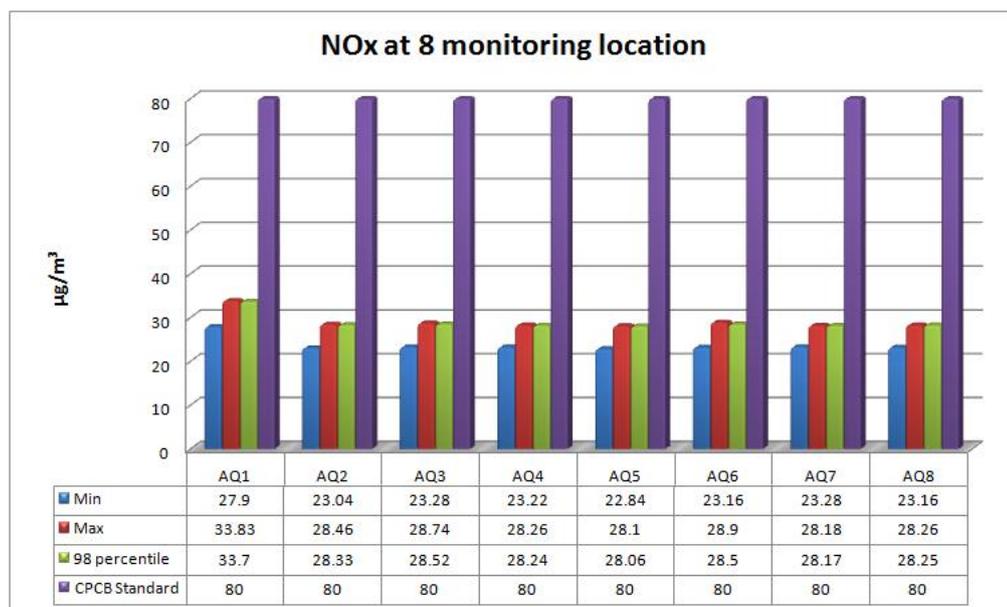


Figure 3.16: Graphical Representation of NO_x value at 8 monitoring locations



1. Emissions from industrial and domestic burning of coal.
2. Emissions from automobiles.

Oxides of nitrogen have far greater significance in photochemical smog reaction than any of the other inorganic gaseous contaminants. NO_x in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. NO_x has inherent ability to produce deleterious effects by themselves like toxicity. It acts as an asphyxiate when in concentrations great enough to reduce the normal oxygen supply from the air.

The 98th percentile of NO_x recorded within the study area was in the range of 28.06 to 33.70 µg/m³. The 24 hourly average values of NO_x were compared with the national ambient air quality standards and it was found that all the sampling locations recorded values much lower than the applicable limit of 80 µg/m³ for residential and rural areas.

d) Carbon Monoxide (CO)

The value for CO observed was below detectable limits. The 8 hours applicable limit for Industrial, Residential Rural and other areas is 2000 µg/m³.

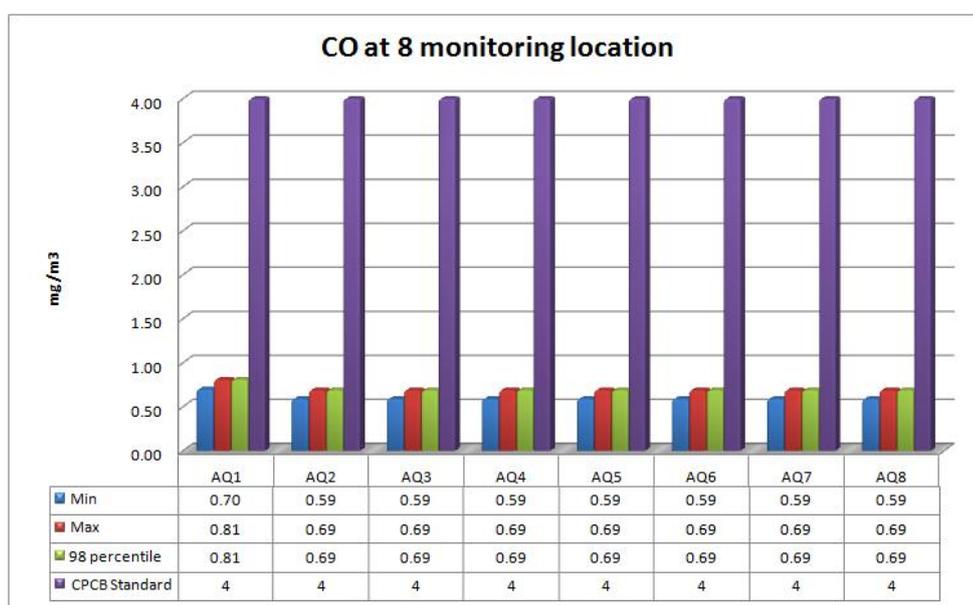
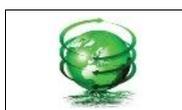


Figure 3.17: Graphical Representation of CO value at 8 monitoring locations



Project: Common Bio Medical Waste Treatment Facility (CBWTF) at Plot No. E-25 and E-26, UPSIDC Industrial Area, Bijnor District – Sambhal, Uttar Pradesh		
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3.5 Noise Environment

Noise can be defined as unwanted sound or sound in the wrong place at the wrong time. It can also be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing or is otherwise annoying. The definition noise as unwanted sound implies that it has an adverse effect on human beings and their environment including land, structures and domestic animals. Noise can also disturb natural wildlife and ecological systems.

Sound can be transmitted through gases, liquids, and solids. Noise impacts can be of concern during the construction and the operational phases of projects. Noise should also be considered in relation to present and future land use zoning and policies.

Construction noise can be a significant source of community noise. The impacts of concern on people near the construction site, who are totally unrelated to construction activities (e.g. area residents, office workers, school children, staff, etc.). Factors which are important in determining noise levels that will potentially impact such populations include distance from the noise source, natural or man-made barriers between the source and the impacted population, weather conditions which could potentially absorb, reflect or focus sound (such as wind speed, direction, temperature inversions), the scale and intensity of the particular construction phase (excavation, erection, or finishing). The Environment/ health impacts of noise can vary from Noise Induced Hearing Loss (NIHL) to annoyance depending on loudness of noise levels and tolerance levels of individual.

3.5.1 Noise Levels in the Study Area

Noise levels have been monitored at 8 locations within the study zone, using a noise measurement device. Random noise level measurement locations were identified for assessment of existing noise level status, keeping in view of the land use pattern, residential areas in villages, schools, bus stands, etc., the day levels of noise have been monitored during 6 AM to 10 PM and the night levels during 10 PM to 6 AM. The noise monitoring stations are shown in Table 3.13 and Figure 3.6. The results are presented in Table 3.13

Ambient noise level has been monitoring hourly basis for 24 hours within a range of 5 kms from the project site and seven surrounding villages. The day levels of noise have been monitored during 6 AM to 10 PM and the night levels during 10 PM to 6 AM.

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Table 3.13: Ambient noise level sampling locations

Location Code	Station Name	Distance and Direction from the lease area	Latitude	Longitude
NQ1	Project site	Base	28°16'42.67"N	78°25'54.28"E
NQ2	Madaiya Bagahu (Bagao Ki Madhiya)	1.45 Km (NW)	8°16'59.02"N	78°25'11.36"E
NQ3	Jaidaspur	4.2 Km (NW)	28°18'8.43"N	78°23'58.37"E
NQ4	Babrara	2.4 Km (SE)	28°16'3.16"N	78°24'39.76"E
NQ5	Gunnaur	3.0 Km (SE)	28°14'39.86"N	78°25'58.03"E
NQ6	Akbarpur	3.7 Km (S)	8°15'26.47"N	78°27'21.93"E
NQ7	Gunnaur Semla	5.4 Km (SE)	8°14'52.33"N	78°28'40.94"E
NQ8	Bhakroli	3.37 Km (E)	8°16'40.80"N	78°28'2.70"E

Table 3.14: Noise quality monitoring result

Station		Observed Value		LIMIT as per CPCB Guidelines Leq, dB(A)	
		Day (dB)	Night (dB)	Day	Night
NQ1	Minimum	61.2	51.4	55 (6.00AM TO 10.00PM)	45 (10.00PM TO 6.00AM)
	Maximum	67.4	58.7		
	Average	64.8	55.1		
NQ2	Minimum	48.5	37.4		
	Maximum	53.4	43.5		
	Average	51.1	40.6		
NQ3	Minimum	48.4	37.8		
	Maximum	53.7	43.3		
	Average	51.1	40.7		
NQ4	Minimum	48.4	37.4		
	Maximum	53.9	42.8		
	Average	50.9	40.5		
NQ5	Minimum	48.2	37.9		
	Maximum	53.6	43.6		
	Average	51.2	41.0		
NQ6	Minimum	47.9	37.2		
	Maximum	53.1	42.6		
	Average	50.6	39.8		
NQ7	Minimum	48.6	38.7		
	Maximum	53.8	43.8		
	Average	51.2	40.9		



Station		Observed Value		LIMIT as per CPCB Guidelines Leq, dB(A)	
		Day (dB)	Night (dB)	Day	Night
NQ8	Minimum	48.2	37.4		
	Maximum	53.7	43.1		
	Average	50.8	40.5		

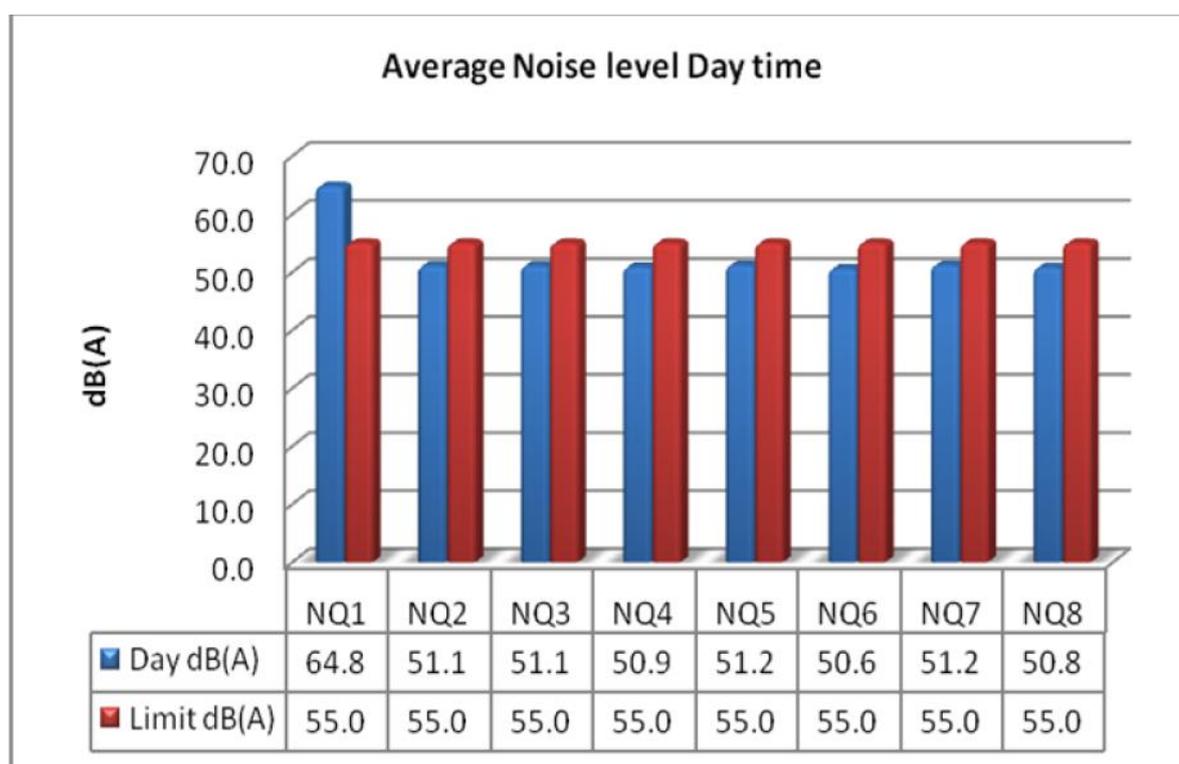
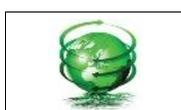


Figure 3.18: Graphical Representation of Day time Noise level

Inference: Apart from the project site, rest of the locations are villages and are under residential zone. Noise generated in these areas is mostly due to vehicular movement and allied human activities. There was no construction or industrial activity in these villages.

3.5.2 Regional Scenario

During the baseline study it was seen that in day time noise level varies from 47.9 to 67.4 Leq.dB (A) in day time and in night time 37.2 to 58.7 Leq dB (A). The noise levels are the well within the prescribed limits at seven stations except project site. SH –39 adjacent to the project site where traffic is found during night and project site located in industrial area. There will be minimal impact of the proposed project on the site after adopting the noise control measures. The proposed project does not have any negative impact on the site.



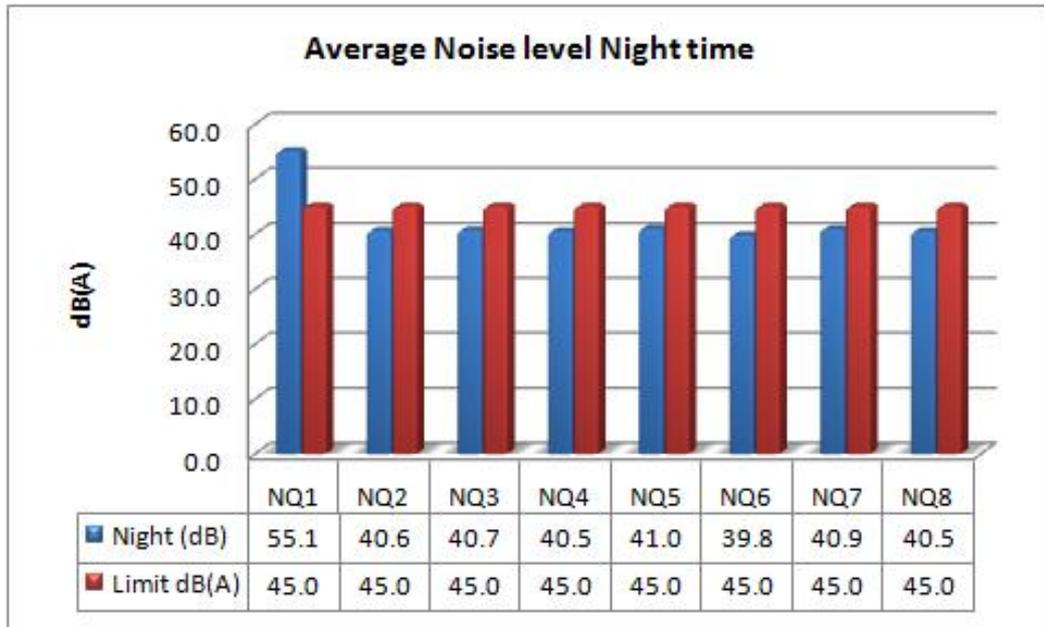


Figure 3.19: Graphical Representation of Night time Noise level

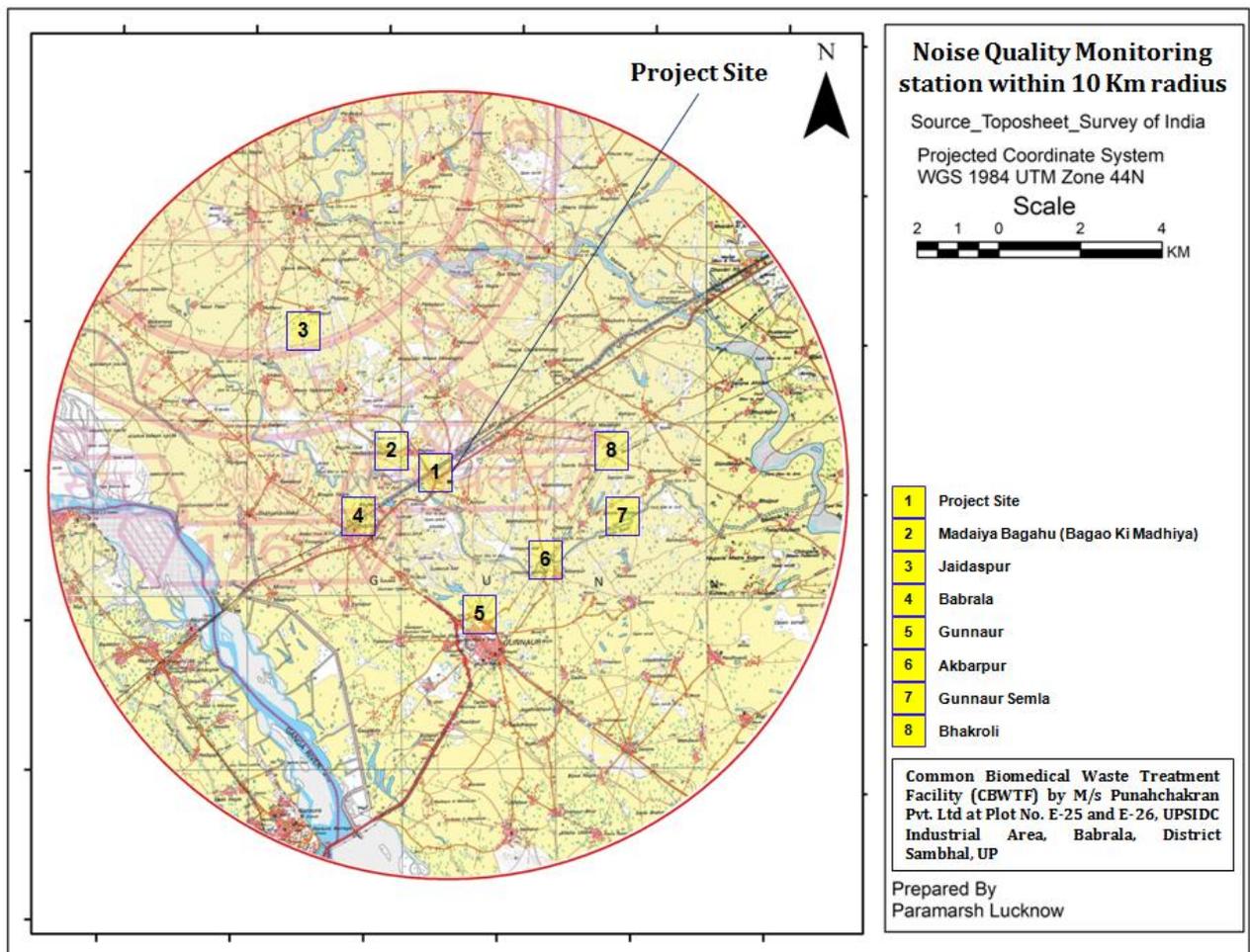
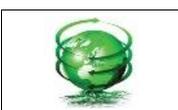


Figure 3.20: Map showing location of the monitoring stations for noise within 5 km radius of the project site.



3.6 Water Quality (Ground and surface water)

Surface water and ground water samples were collected from different sources within the study area and some important physical & chemical parameters including heavy metals were considered for depicting the baseline status of the study area.

3.6.1 Water quality assessment

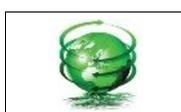
A total of 8 ground water samples and 2 surface water samples were collected from the study area to assess the water quality during the study period. The ground water samples were drawn from the hand pumps and bore wells used by the villagers for their domestic needs. Surface water sampling was carried out from the Bardmar River and Ganga River in the study area. The details of the locations are given in Table 3.15 and Figure 3.7 and 3.8

Table 3.15: Ground water sampling locations

Location Code	Station Name	Distance and Direction from the lease area	Latitude	Longitude
GWQ1	Project site	Base	28°16'42.67"N	78°25'54.28"E
GWQ2	Madaiya Bagahu (Bagao Ki Madhiya)	1.45 Km (NW)	28°16'59.02"N	78°25'11.36"E
GWQ3	Jaidaspur	4.2 Km (NW)	28°18'8.43"N	78°23'58.37"E
GWQ4	Babrala	2.4 Km (SE)	28°16'3.16"N	8°24'39.76"E
GWQ5	Gunnaur	3.0 Km (SE)	28°14'39.86"N	78°25'58.03"E
GWQ6	Akbarpur	3.7 Km (S)	8°15'26.47"N	78°27'21.93"E
GWQ7	Gunnaur Semla	5.4 Km (SE)	8°14'52.33"N	78°28'40.94"E
GWQ8	Bhakroli	3.37 Km (E)	8°16'40.80"N	78°28'2.70"E

Table 3.16: Surface water sampling locations

Location	Station Name	Distance and Direction from the lease area (Km)	Latitude Longitude
SW1	Bardmar River	1.2 Km (W)	28°16'35.61"N 78°25'9.30"E
SW2	Ganga River (Near Babrala Ganga Ghat)	7.0 Km (SW)	28°14'44.50"N 78°22'9.57"E



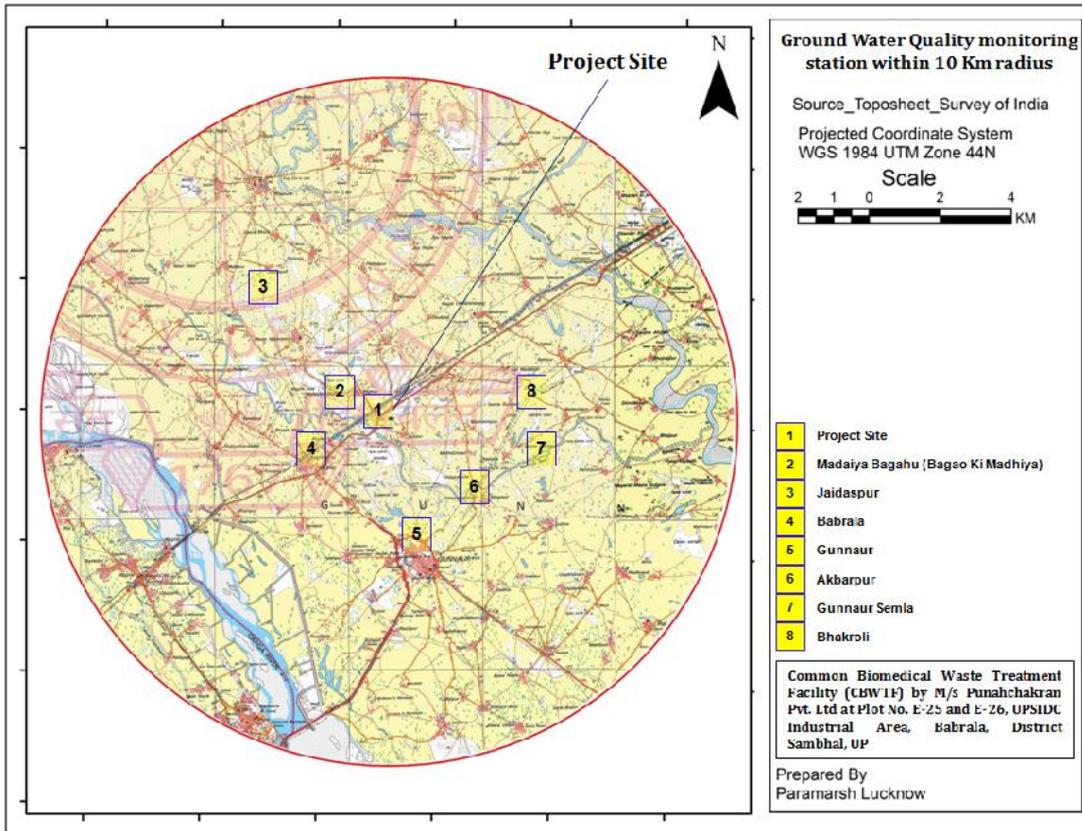


Figure 3.21: Groundwater sampling locations map

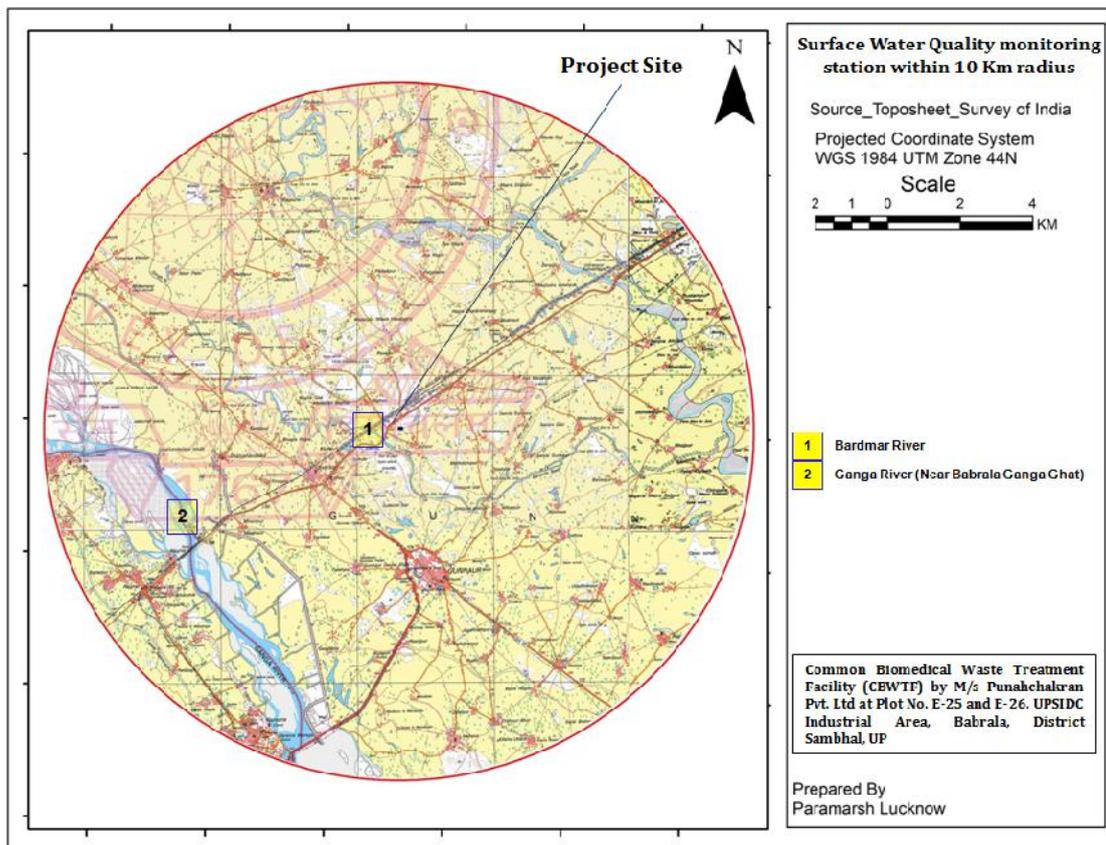
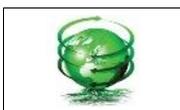


Figure 3.22: Surface water sampling locations map





The water samples collected from the above mentioned locations and were analyzed for important water quality parameters and the analytical results of the water samples were compared with IS: 10500-2012 drinking water standards. The results are shown in Table 3.17

3.6.2 Ground water monitoring result:

The ground water monitoring result is given in table 3.17.

Note: A review of the above chemical analysis reveals that there is not much variation in chemical composition of water tapped from hand pumps and tube wells. The ground water from all sources still remains suitable for drinking purposes as all the constituents are within the permissible limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500: 2012.



Table 3.17: Ground water quality monitoring result

S.No	Parameter	Test Method	Results				Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
			Location						
			GW-1	GW-2	GW-3	GW-4			
1	pH	IS:3025(Part-11)	7.44	7.30	7.82	7.52	-	6.5-8.5	-
2	Colour	IS:3025(Part-04)	<5.0	<5.0	<5.0	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-07)	Agreeable	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<0.5	<0.5	<0.5	<0.5	NTU	1	5
6	Total Hardness (as CaCO ₃)	IS:3025(Part-21)	224	180	252	224	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	44.80	36.00	50.40	35.84	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	27.22	21.87	30.62	32.66	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	91.97	80.23	152.63	95.89	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.105	0.063	0.125	0.105	mg/l	0.3	No Relaxation
11	Fluoride(as F)	IS:3025(Part-60)	0.69	0.57	0.85	0.74	mg/l	1	1.5
12	Free Residual chlorine	IS:3025(Part-26)	<0.1	<0.1	<0.1	<0.1	mg/l	0.2	1
13	Total Dissolved Solid	IS:3025(Part-16)	595	494	791	624	mg/l	500	2000
14	Phenolic Compound (as C ₆ H ₅ OH)	IS: 3025 (Part-43)	<0.001	<0.001	<0.001	<0.001	mg/l	0.001max	0.002 Max
15	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	<0.1	<0.1	<0.1	mg/l	0.2	1.0
16	Sulphate (as SO ₄)	IS:3025(Part-24)	75.31	65.07	107.25	96.15	mg/l	200	400
17	Nitrate (as NO ₃)	IS: 3025 (Part-34)	7.05	5.14	8.42	7.10	mg/l	45	No Relaxation
18	Alkalinity(as CaCO ₃)	IS:3025(Part-23)	240	192	268	240	mg/l	200	600
19	Chloramines (as Cl ₂)	IS:3025(Part-26)	< 1.0	< 1.0	< 1.0	< 1.0	mg/l	4	No Relaxation
20	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	<0.001	<0.001	<0.001	mg/l	0.003	No Relaxation



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S.No	Parameter	Test Method	Results				Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
			Location						
			GW-1	GW-2	GW-3	GW-4			
21	Lead (as Pb)	IS:3025(Part-47)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
22	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
23	Copper (as Cu)	IS:3025(Part-42)	<0.01	<0.01	<0.01	<0.01	mg/l	0.05	1.5
24	Total Ammonia	IS: 3025 (Part-34)	<0.5	<0.5	<0.5	<0.5	mg/l	0.5	No Relaxation
25	Sulphide (as H ₂ S)	IS:3025(Part-29)	<0.05	<0.05	<0.05	<0.05	mg/l	0.05	No Relaxation
26	Zinc (as Zn)	IS:3025(Part-49)	0.14	<0.1	0.30	0.23	mg/l	5	15
27	Manganese (as Mn)	IS:3025(Part-59)	<0.1	<0.1	<0.1	<0.1	mg/l	0.1	0.3
28	Boron (as B)	IS:3025(Part-57)	<0.1	<0.1	<0.1	<0.1	mg/l	0.5	1
29	Selenium (Se)	IS:3025(Part-56)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
30	Arsenic (as As)	IS:3025(Part-37)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	0.05

S.No	Parameter	Test Method	Results				Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
			Location						
			GW-5	GW-6	GW-7	GW-8			
1	pH	IS:3025(Part-11)	7.26	6.98	7.71	7.32	-	6.5-8.5	-
2	Colour	IS:3025(Part-04)	<5.0	<5.0	<5.0	<5.0	Hazen	5	15
3	Odour	IS-3025(Part-05)	Agreeable	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part-07)	Agreeable	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part-10)	<0.5	<0.5	<0.5	<0.5	NTU	1	5



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S.No	Parameter	Test Method	Results				Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
			Location						
			GW-5	GW-6	GW-7	GW-8			
6	Total Hardness (as CaCO ₃)	IS:3025(Part-21)	196	172	264	188	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part-40)	31.36	34.40	42.24	37.60	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part-46)	28.58	20.90	38.49	22.84	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part-32)	80.23	72.40	117.41	84.14	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part-53)	0.099	0.063	0.110	0.073	mg/l	0.3	No Relaxation
11	Fluoride(as F)	IS:3025(Part-60)	0.57	0.19	0.66	0.42	mg/l	1	1.5
12	Free Residual chlorine	IS:3025(Part-26)	<0.1	<0.1	<0.1	<0.1	mg/l	0.2	1
13	Total Dissolved Solid	IS:3025(Part-16)	473	433	686	489	mg/l	500	2000
14	Phenolic Compound (as C ₆ H ₅ OH)	IS: 3025 (Part-43)	<0.001	<0.001	<0.001	<0.001	mg/l	0.001max	0.002 Max
15	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	<0.1	<0.1	<0.1	mg/l	0.2	1.0
16	Sulphate (as SO ₄)	IS:3025(Part-24)	34.54	30.06	70.33	34.22	mg/l	200	400
17	Nitrate (as NO ₃)	IS: 3025 (Part-34)	3.79	4.68	4.08	4.75	mg/l	45	No Relaxation
18	Alkalinity(as CaCO ₃)	IS:3025(Part-23)	200	188	276	208	mg/l	200	600
19	Chloramines (as Cl ₂)	IS:3025(Part-26)	< 1.0	< 1.0	<1.0	<1.0	mg/l	4	No Relaxation
20	Cadmium (as Cd)	IS-3025(Part-41)	<0.001	<0.001	<0.001	<0.001	mg/l	0.003	No Relaxation
21	Lead (as Pb)	IS:3025(Part-47)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
22	Total Chromium (as Cr)	IS:3025(Part-52)	<0.01	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
23	Copper (as Cu)	IS:3025(Part-42)	<0.01	<0.01	<0.01	<0.01	mg/l	0.05	1.5
24	Total Ammonia	IS: 3025 (Part-34)	<0.5	<0.5	<0.5	<0.5	mg/l	0.5	No Relaxation
25	Sulphide (as H ₂ S)	IS:3025(Part-29)	<0.05	<0.05	<0.05	<0.05	mg/l	0.05	No Relaxation
26	Zinc (as Zn)	IS:3025(Part-49)	0.18	<0.1	0.2	<0.1	mg/l	5	15
27	Manganese (as Mn)	IS:3025(Part-59)	<0.1	<0.1	<0.1	<0.1	mg/l	0.1	0.3





S.No	Parameter	Test Method	Results				Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
			Location						
			GW-5	GW-6	GW-7	GW-8			
28	Boron (as B)	IS:3025(Part-57)	<0.1	<0.1	<0.1	<0.1	mg/l	0.5	1
29	Selenium (Se)	IS:3025(Part-56)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
30	Arsenic (as As)	IS:3025(Part-37)	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	0.05

RESULTS As per IS 10500:2012

S.No	Parameter	Test Method	Results								Units	Requirements
			GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8		
1	E.coli	IS-1622	Not Detected (<2)	E.Coli/100 ml	Shall not be detectable in 100 ml sample							
2	Total Coliform	IS-1622	Absent	MPN/100 ml	Shall not be detectable in 100 ml sample							



Project: Common Bio Medical Waste Treatment Facility (CBWTF) coming up at Plot No. E-25 and E-26, UPSIDC Industrial Area, Fabra, District – Sambhal, Uttar Pradesh		
Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

3.6.3 Surface water quality

Bardmar River is flowing at a distance of about 1.2km in the W side of the project site and Ganga River at a distance of 7.0 Km in the SW. Another river is Mahawa River, But it is dry at that time and when going for sampling we found that there is agriculture field used by the farmer. The surface water quality of is given below:

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Table 3.18: surface water quality result

S.No	Parameter	Test Method	Results		Units	Tolerance Limit as per IS:2296				
			SW1	SW2		Class A	Class B	Class C	Class D	Class E
1	pH	IS:3025(Part-11)	7.48	7.63	-	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
2	Temperature	IS:3025(Part-09)	20.8	20.3	°C	-	-	-	-	-
3	Turbidity	IS:3025(Part-10)	16.3	9.6	NTU	-	-	-	-	-
4	Conductivity @25°C	IS:3025(Part-14)	411.1	354.5	µs/cm.	-	-	-	1000	2250
5	Total Suspended Solid	IS:3025(Part-17)	42	34	mg/l	-	-	-	-	-
6	Total Alkalinity (as CaCO ₃)	IS:3025(Part-23)	140	120	mg/l	-	-	-	-	-
7	Biological Oxygen Demand (Max.) (at 27°C for 3 days)	IS:3025(Part-44)	8.50	4.50	mg/l	2	3	3	-	-
8	Dissolved Oxygen (as O ₂) Min.	IS:3025(Part-38)	6.8	7.9	mg/l	6	5	4	4	-
9	Calcium(as Ca)	IS:3025(Part-40)	24.32	20.48	mg/l	80	-	-	-	-
10	Magnesium(as Mg)	IS:3025(Part-46)	22.16	18.66	mg/l	24	-	-	-	-
11	Chloride(as Cl),Max	IS:3025(Part-32)	30.86	23.14	mg/l	250	-	-	-	600
12	Iron(as Fe),Max	IS:3025(Part-53)	0.225	0.125	mg/l	0.3	-	50	-	-
13	Fluoride(as F),Max	IS:3025(Part-60)	0.24	0.20	mg/l	1.5	1.5	1.5	-	-
14	Total Dissolved Solid	IS:3025(Part-16)	267	230	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO ₃)	IS:3025(Part-21)	152.00	128.00	mg/l	300	-	-	-	-
16	Sulphate (as SO ₄)Max	IS:3025(Part-24)	7.34	14.86	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part-31)	6.01	4.58	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part-45)	15.43	11.57	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part-59)	<0.1	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromiun (as Cr)	IS:3025(Part-52)	<0.05	<0.05	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part-49)	0.89	0.45	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part-45)	3.09	2.31	mg/l	-	-	-	-	-
23	Nitrate (as NO ₃),Max	IS: 3025 (Part-34)	8.89	7.03	mg/l	20	-	50	-	-



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S.No	Parameter	Test Method	Results		Units	Tolerance Limit as per IS:2296				
			SW1	SW2		Class A	Class B	Class C	Class D	Class E
			24	Cadmium (as Cd)		IS-3025(Part-41)	<0.01	<0.01	mg/l	0.01
25	Lead (as Pb)	IS:3025(Part-47)	<0.01	<0.01	mg/l	0.1	-	0.1	-	-
26	Copper (as Cu)	IS:3025(Part-42)	<0.01	<0.01	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO ₂)	IS-3025(Part-58)	28.80	24.00	mg/l	-	-	-	-	-
28	Arsenic (as As)	IS:3025(Part-37)	<0.01	<0.01	mg/l	0.05	0.2	0.2	-	-

S.No	Parameter	Test Method	Results		Units	Tolerance Limit as per IS:2296				
			SW1	SW2		Class A	Class B	Class C	Class D	Class E
			1	Total Coli Form		IS:1622	2812	2497	MPN/100ml	50

*BDL- Below Detection Limit

Remarks:-

Class A - Drinking water without conventional treatment but after disinfection.

Class B - Water for outdoor bathing.

Class C - Drinking water with conventional treatment followed by disinfection.

Class D - Water for fish culture and wild life propagation.

Class E - Water for irrigation, industrial cooling and control waste disposal.

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3.6.4 Regional Scenario:

a) Groundwater

- The pH limit fixed for drinking water samples as per IS: 10500-2012 standard is 7.3 to 7.6 beyond this range the water will affect the mucus membrane and or water supply system. In the study area, the pH was varying from 6.98-7.82 showing that they are within the acceptable range.
- The acceptable limit for total dissolved solids as per IS: 10500-2012 Standard is 500 mg/l whereas the permissible limits in absence of alternate source are 2000 mg/l, beyond this palatability decreases and may cause gastro intestinal irritation. In ground water samples collected from the study area, the total dissolved solids are varying from 433 mg/l to 791 mg/l. The TDS of one sample is above the acceptable limit but within the permissible limit, rest all samples are below the acceptable limit.
- The acceptable limit for chloride is 250mg/l as per IS: 10500-2012 Standards whereas the permissible limit of the same is 1000 mg/l beyond this limit taste, corrosion and palatability are affected. The Chloride levels in the ground water samples collected in the study area were ranging from 72.4 mg/l to a maximum of 152.63 mg/l. All the samples are within the acceptable limit.
- The acceptable limit as per IS:10500-2012 Standards for hardness as CaCO₃ is 200 mg/l whereas the permissible limit for the same is 600 mg/l beyond this limit encrustation in water supply structure and adverse effects on domestic use will be observed. In the ground water samples collected from the study area, the hardness is varying from 172mg/l to 264mg/l. Hardness as CaCO₃ in four samples are above acceptable limit but within permissible limit, whereas rest all the samples were within the acceptable limit.
- Fluoride is the other important parameter, which has the acceptable limit of 1 mg/l and permissible limit of 1.5 mg/l. However the optimum content of fluoride in the drinking water is <0.5 to 0.7 mg/l. If the fluoride content is less than 0.6 mg/l it causes dental carries, above 1.5 mg/l it causes staining of tooth enamel, higher concentration in range of 3 - 10 mg/l causes fluorosis. In the ground water samples of study area the fluoride value were in the range of 0.19 to 0.85 mg/l. All samples are within the acceptable limit.

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b) Surface Water

- The pH values for all the samples collected in the study area during study period were found to be within the limits.
- The fluorides in the above samples vary between 0.20 to 0.24 mg/l which are within the limits of Class 'A' norms.
- The samples were analyzed and all the parameters were falling under Class 'A'. However, BOD values were in the range of 4.5-8.5mg/l which are above the norms of Class 'A' and fall in Class 'B and C'.

3.7 Soil Quality

The present study on soil quality establishes the baseline characteristics in the study area surrounding the project site. The study has been addressed with the following objectives.

- To determine the base line characteristics
- To determine the soil characteristics of proposed project site.
- To determine the impact of industrialization/ urbanization on soil characteristics
- To determine the impacts on soils from agricultural productivity point of view

For studying soil characteristics, sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features. The homogenized soil samples collected at different locations were packed in a polyethylene plastic bag and sealed. The sealed samples are sent to laboratory analysis. The important physical, chemical parameter concentrations were determined from all samples. The location of the soil samples collected is given in Table 3.19 and their analytical results of the soil samples are given in Table 3.20.

Table 3.19: Location of the soil samples collected

Location Code	Station Name	Distance and Direction from the lease area	Latitude	Longitude
SQ1	Project site	Base	8°16'42.67"N	78°25'54.28"E
SQ2	Madaiya Bagahu (Bagao Ki Madhiya)	1.45 Km (NW)	8°16'59.02"N	78°25'11.36"E
SQ3	Jaidaspur	4.2 Km (NW)	28°18'8.43"N	78°23'58.37"E

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Location Code	Station Name	Distance and Direction from the lease area	Latitude	Longitude
SQ4	Babrala	2.4 Km (SE)	28°16'3.16"N	78°24'39.76"E
SQ5	Gunnaur	3.0 Km (SE)	28°14'39.86"N	78°25'58.03"E
SQ6	Akbarpur	3.7 Km (S)	8°15'26.47"N	78°27'21.93"E
SQ7	Gunnaur Semla	5.4 Km (SE)	8°14'52.33"N	78°28'40.94"E
SQ8	Bhakroli	3.37 Km (E)	28°16'40.80"N	78°28'2.70"E

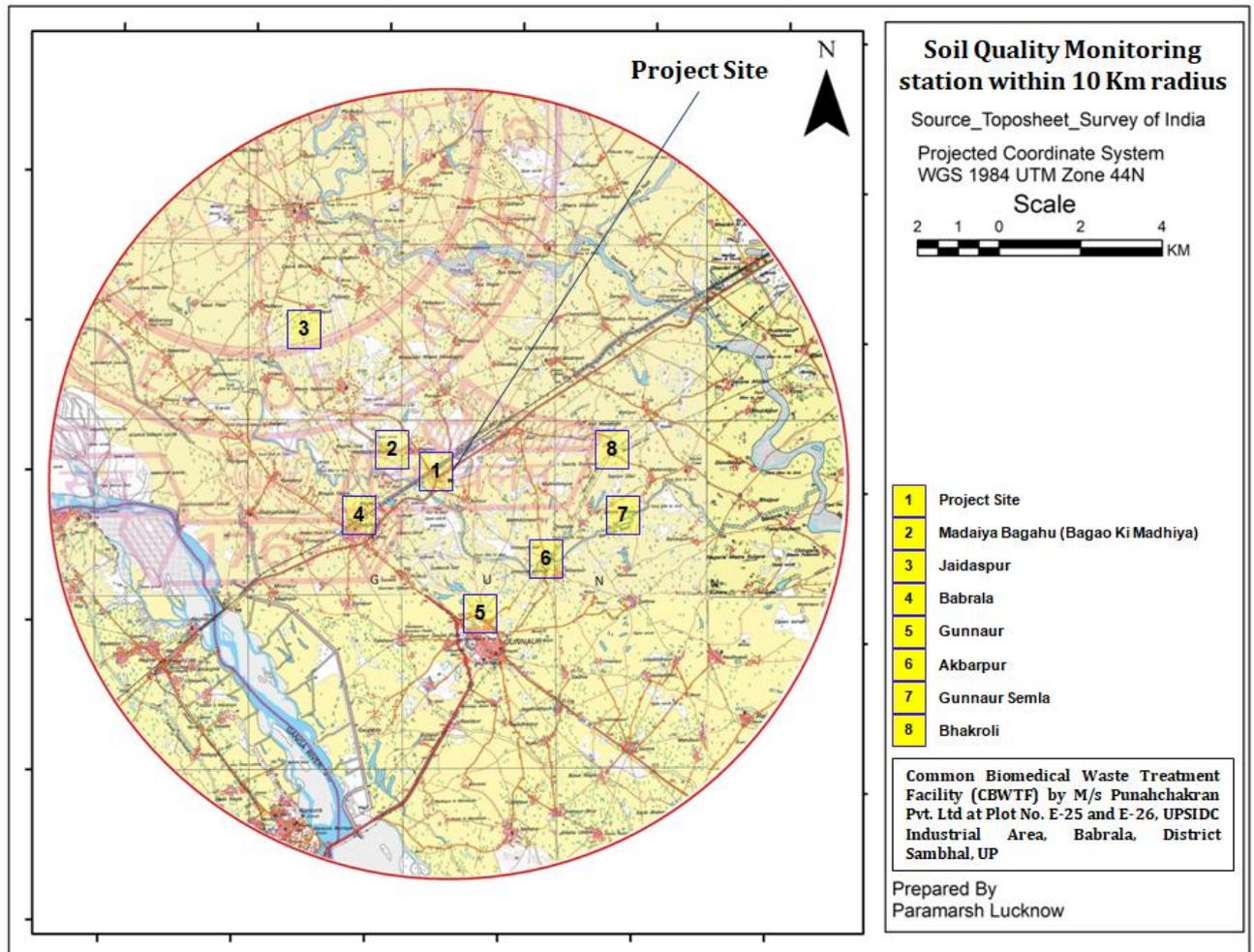


Figure 3.23: Soil sampling locations Map

3.7.1 Soil Analysis Report

Results given in table 3.20.



Table 3.20: Result of soil samples collected

S.No	Parameter	Units	Result				Test Method
			Location				
			SQ-1	SQ-2	SQ-3	SQ-4	
1	Texture	-	Sandy Clay Loam	Sandy Clay	Sandy Clay Loam	Sandy Clay Loam	UTRL/LAB/SOIL/SOP/05
	Sand	%	48.15	46.32	49.82	48.39	UTRL/LAB/SOIL/SOP/05
	Clay	%	33.45	37.78	32.92	30.70	UTRL/LAB/SOIL/SOP/05
	Silt	%	18.40	15.90	17.26	20.91	UTRL/LAB/SOIL/SOP/05
2	pH(1:2.5 Suspension)	-	7.82	7.54	8.13	6.87	IS: 2720 (Part-26),1987
3	Electrical Conductivity	µmhos/cm	292.5	273.5	315.6	226.3	IS: 14767
4	Potassium (as K)	mg/kg	109.92	119.29	130.12	160.37	UTRL/LAB/SOIL/SOP/07
5	Sodium (as Na)	mg/kg	182.15	234.28	175.69	223.15	UTRL/LAB/SOIL/SOP/06
6	Calcium (as Ca)	mg/kg	3738.09	4593.61	4049.95	4794.92	UTRL/LAB/SOIL/SOP/08
7	Magnesium (as Mg)	mg/kg	579.69	465.41	836.14	698.60	UTRL/LAB/SOIL/SOP/08
8	Sodium Absorption Ratio	-	0.73	0.88	0.66	0.80	UTRL/LAB/SOIL/SOP/14
9	Water Holding Capacity	%	28.30	29.42	32.33	31.97	UTRL/LAB/SOIL/SOP/11
10	Total Kjeldahl Nitrogen	%	0.071	0.072	0.065	0.091	UTRL/LAB/SOIL/SOP/15
11	Phosphorous	mg/kg	74.89	71.23	75.02	88.16	UTRL/LAB/SOIL/SOP/09
12	Bulk Density	gm/cc	1.23	1.24	1.29	1.22	UTRL/LAB/SOIL/SOP/10
13	Organic Matter	%	1.05	1.19	1.02	1.45	IS: 2720 (Part-22)
14	Porosity	%	44.93	43.30	42.54	44.79	UTRL/LAB/SOIL/SOP/17

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S.No	Parameter	Units	Result				Test Method
			Location				
			SQ-5	SQ-6	SQ-7	SQ-8	
1	Texture	-	Sandy Clay Loam	Clay Loam	Sandy Clay	Clay Loam	UTRL/LAB/SOIL/SOP/05
	Sand	%	48.31	45.39	46.84	36.38	UTRL/LAB/SOIL/SOP/05
	Clay	%	25.98	32.59	35.41	32.37	UTRL/LAB/SOIL/SOP/05
	Silt	%	25.71	22.02	17.75	31.25	UTRL/LAB/SOIL/SOP/05
2	pH(1:2.5 Suspension)	-	7.91	7.72	6.98	7.65	IS: 2720 (Part-26),1987
3	Electrical Conductivity	µmhos/cm	392.5	281.6	331.2	295.8	IS: 14767
4	Potassium (as K)	mg/kg	239.19	221.24	246.25	224.83	UTRL/LAB/SOIL/SOP/07
5	Sodium (as Na)	mg/kg	289.48	302.31	122.33	106.36	UTRL/LAB/SOIL/SOP/06
6	Calcium (as Ca)	mg/kg	4150.83	3601.33	3621.49	4022.51	UTRL/LAB/SOIL/SOP/08
7	Magnesium (as Mg)	mg/kg	699.23	486.50	701.58	575.36	UTRL/LAB/SOIL/SOP/08
8	Sodium Absorption Ratio	-	1.09	1.25	0.49	0.42	UTRL/LAB/SOIL/SOP/14
9	Water Holding Capacity	%	28.32	34.75	30.07	35.25	UTRL/LAB/SOIL/SOP/11
10	Total Kjeldahl Nitrogen	%	0.070	0.079	0.057	0.075	UTRL/LAB/SOIL/SOP/15
11	Phosphorous	mg/kg	82.97	83.17	63.69	95.38	UTRL/LAB/SOIL/SOP/09
12	Bulk Density	gm/cc	1.20	1.27	1.29	1.28	UTRL/LAB/SOIL/SOP/10
13	Organic Matter	%	1.25	1.52	1.29	1.10	IS: 2720 (Part-22)
14	Porosity	%	46.61	41.28	42.47	40.16	UTRL/LAB/SOIL/SOP/17



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3.7.2 Interpretation of soil analysis

The soil quality in the study area is mostly Sandy Loam, with high nutrient contents of NPK. Therefore the soil is considered as fertile.

3.8 Biological Environment

3.8.1 Introduction

An ecological study of the ecosystem is essential to understand the impact of industrialization and urbanization on existing flora and fauna of the study area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact, if any.

The biological study was undertaken as a part of the EIA study report to understand the present status of ecosystem prevailing in the study area, to compare it with past condition with the help of available data, to predict changes in the biological environment as a result of present activities and to suggest measures for maintaining its health.

A baseline study / survey were conducted to study the floristic and faunal diversity of the terrestrial and aquatic environment of the study area within 10 km radius of the plant site.

Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region.

Survey of the wild plants as well as cultivated crop plants was made and all the available information was recorded. Night survey was also conducted with the help of spotlight to record nocturnal animals, birds and reptiles.

Secondary data on flora and fauna, cropping patterns etc. were also collected from available literatures, internet, forest department and revenue department.

3.8.2 Ecological Sensitive Area

No National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger / Elephant Reserve, Wildlife Corridor, Protected Forest, Reserved Forests etc. exists within 10 km radius of the plant site.

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3.8.3 Flora

Flora of an area depends on climatic conditions, topography, rainfall, soil type, land use and demography of an area. These factors highly affect the floral cover and quality of an area. A floral survey was carried out in the core as well as buffer zone of the plant site. Due to absence of major forest in the area, no patches of thick vegetation are found. The floral-diversity in the area is of common type and is devoid of medicinal and rare plant species.

During major part of the year, the vegetation is active and remains dormant only for a few months starting from November and Extending to May. This type of vegetation is common in open waste land and cultivated fields. After the first shower of monsoon in July, the ground which is barren becomes covered by green grass. As the monsoon advances, the ground vegetation becomes dominant and completely covered till late in December.

The climate conditions of the study area are well suited for a moderate natural vegetation cover. The area has a very hot summer, a moderate rainy season and a dry winter. The monsoon has good annual rainfall.

Details of different types of species of shrubs, climbers and grasses were obtained from District forest office, Kanpur Dehat are given in Table 3.24.

3.8.4 Common Crop Plants

Common agricultural crop in the study area include *Oryza sativa* (Dhan), *Triticum spp.* (Wheat), *Lens culinaris* (Masur), *Zea mays* (Makai), *Paspalum scrobiculatum* (Kodon), *Cajanus cajan*(Arhar), *Dinumu Itatissinum* (Alsi), *Phaseolus radiates* (Moong), sun flower, potato etc.

3.8.5 Trees around Agricultural Fields

The borders of crop fields are extensively used for the plantation of various tree species. The agricultural fields all along the boundaries and bunds are planted by species like *Acacia Arabica* (Babul), *Mangifera indica* (Aam), *Madhuca indica* (Mahua), *Azadirachata indica* (Neem), *Terminalia Arjuna* (Kahawa), *Bachanania lanzan* (Char) and *Dalbergia latifolia* (Shisham).

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3.8.6 Fruit Trees

Fruits tree species commonly observed in the study area are *Mangifera indica* (Aam), *Eugenia jambolana* (Jamun), *Zizyphus jujube* (Ber), *Carica papaya* (Papeeta), *Emblca officinalis* (Amla), *Morus alba* (Shehtus), *Litchi chinensis* (Litchi), and *Madhuca indica* (Mahua)

3.8.7 Vegetation in Settlements

Human settlements have tree species catering to the needs of habitants. The plants in the settlements areas are sparsely distributed in heterogeneous manner. Rural habitation zone has fruit tree species like *Mangifera indica* (Aam), *Morus alba* (Shehtus), *Zizyphus jujube* (Ber), *Carica papaya* (Papeeta), *Litchi chinensis* (Litchi), *Psidium guajava* (Amrud), *Emblca officinalis* (Amla), and *Madhuca indica* (Mahua), *Dalbergia latifolia* (Shisham), *Butea monosperma* (Palas), *Eucalyptus spectabilis* (Safeda), *Azadirachata indica* (Neem), and *Acacia arabica* (Babul), are grown for timber used for making huts and houses. Some naturally occurring sacred tree species are *Ficus religiosa* (Peepal) and *Aegle maemelos* (Bel). Many other tree species like *Ficus benghalensis* (Bargad). *Tamarindus indidica* (Imli) and *Acacia leucopholea* (Gandirava/kikar) are also present.

3.8.8 Ecological Stresses

Grazing: Herds of animals like cows, goats and buffalo graze in the area which eliminates herbs, shrubs and tree saplings. Group of people from different part of the state normally visit the study area with large number of animal herds i.e. Goats and sheeps, once or twice a year. They move from place to place with overnight halts in fields in and around the study area. Each group possesses about 200-300 animals.

Table 3.21: Flora and Fauna of Study Area

S.No.	Scientific Name	Local name	Family	Origin	Habit	Core	Buffer
1	<i>Azadirachta indica</i>	Neem	<i>Meliaceae</i>	Native	Tree	-	+
2	<i>Albizia lebbek</i>	Siras	<i>Fabaceae</i>	Native	Tree	-	+
3	<i>Aegle marmelos</i>	Bel	<i>Rutaceae</i>	Native	Tree	+	-
4	<i>Anageissus latifolia</i>	Bakli, Dhaura	<i>Combretaceae</i>	Native	Tree	-	+
5	<i>Acacia catechu</i>	Khair	<i>Leguminosae</i>	Native	Tree	-	+
6	<i>Acacia nilotica</i>	Kikar	<i>Leguminosae</i>	Native	Tree	-	+
7	<i>Acacia</i>	Babul	<i>Leguminosae</i>	Exotic	Tree	+	-



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S.No.	Scientific Name	Local name	Family	Origin	Habit	Core	Buffer
	leucophobea						
8	Anisomeles ovata	Jangli tulsi	Lamiaceae	Native	Herb	+	-
9	Butea frondosa	Dhak	Leguminosae	Native	Tree	-	+
10	Butea monosperma	Palas	Leguminosae	Native	Tree	-	+
11	Buchanania lanzon	Chirongi	Anacardiaceae	Native	Tree	-	+
12	Cacia fistula	Amaltas	Leguminosae	Native	Tree	-	+
13	Cuscuta reflexa	Amarbel	Convolvulaceae	Native	Climber	+	-
14	Dalbergia sissoo	Sheesham	Fabaceae	Native	Tree	-	+
15	Delonix regia	Gulmohar	Fabaceae	Exotic	Tree	-	+
16	Datura alba	Datura	Solanaceae	Native	Shrub	+	-
17	Eucalyptus hybrid	Safeda	Myrtaceae	Exotic	Tree	+	-
18	Emblica officinalis	Amla	Euphorbiaceae	Native	Tree	-	+
19	Ficus religiosa	Peepal	Moraceae	Native	Tree	-	+
20	F. auriculata	Timla	Moraceae	Exotic	Tree	-	+
21	F. semicordata	Khainu	Moraceae	Native	Tree	-	+
22	Ficus infectoria	Phikhan	Moraceae	Native	Tree	-	+
23	F. benghalensis	Bargad	Moraceae	Native	Tree	-	+
24	Ficus virens	Pakad	Moraceae	Native	Tree	-	+
25	Holoptelea intgrifolia	Papri	Ulmaceae	Native	Tree	-	+
26	Holdina cordifolia	Haldu	Rubiaceae	Native	Tree	-	+
27	Lannea	Jigma, Jhingan	Anacardiaceae	Native	Tree	-	+
28	Mitragyna parviflora	Kaim or Tekui	Rubiaceae	Native	Tree	-	+
29	Mallotus philippensis	Rohini	Euphorbiaceae	Native	Tree	-	+
30	Morus alba	Shahtoot	Moraceae	Native	Tree	+	-
31	Mimosa pudica	Chuimui	Fabaceae	Exotic	Creeping	-	+
32	Nerium odorum	Kaner	Apocynaceae	Exotic	shrub	+	-
33	Opuntia dillenii	Nagphani	Cactaceae	Exotic	Cladode	-	+
34	Pongamia glabrs	Karanj	Fabaceae	Native	Tree	-	+
35	Polythia longifolia	Ashok	Annonaceae	Native	Tree	-	+
36	Phoenix sylvastris	Khajur	Arecaceae	Native	Tree	+	-
37	Populus sp.	Poplar	Salicaceae	Exotic	Tree	-	+
38	Syzygium cumini	Jamun	Myrtaceae	Exotic	Tree	-	+
39	Shorea robusta	Sal	Dipterocarpaceae	Native	Tree	-	+
40	Streblus asper	Sehore	Moraceae	Exotic	Tree	-	+
41							
42							
43	Tectona randis	Teak	Lamiaceae	Native	Tree	-	+
44							



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S.No.	Scientific Name	Local name	Family	Origin	Habit	Core	Buffer
45	Zizyphus numularia	Jahrberi	Rhamnaceae	Native	Tree	-	+
46	Murraya exotica	Gandela, Kathneem	Rutaceae	Exotic	Shrub	+	-
47	Holarrhena	Kachr	Apocynaceae	Exotic	Shrub	-	+
48	Lantana camara	Raimunia	Verbenaceae	Exotic	Shrub	-	+
49	Zizyphus mauritiana	Ber	Rhamnaceae	Native	Shrub	+	-
50	Z. oenoplia	Makoi	Rhamnaceae	Exotic	Shrub	-	+
51	Colebrookea	Makoi	Lamiaceae	Native	Shrub	+	-
52	Glycosmis arborea	Gutahru	Rutaceae	Native	Shrub	-	+
53	Ardisia solanaceae	Jalkaima	Solanaceae	Native	Shrub	-	+
54	Grewia hirsuta	Seetachabeni	Malvaceae	Native	Shrub	-	+
55	G. subinaequalis	Pharsa	Malvaceae	Native	Shrub	-	+
56	Crotolaria jumcea	Bansa	Fabaceae	Native	Shrub	+	-
57	Adhatoda vasica	Vasaka	Acanthaceae	Native	Shrub	-	+
58	Jatropha gossypifolia	Lal arand	Euphorbiaceae	Exotic	Tree	-	+
59	Zanthoxylum	Timur	Rutaceae	Exotic	Shrub	-	+
60	Rubus ellipticus	Hisalu	Rosaceae	Exotic	Shrub	-	+
61	Berberis	Kingor	Berberidaceae	Exotic	Shrub	-	+
62	Cuscuta reflexa	Amarbel	Convolvulacea	Native	Climber	+	-
63	Mimosa himalayana	Aal	Fabaceae	Native	Herb	-	+
64	Capparis sepiara	Aadi or Kkraur	Capparaceae	Exotic	Shrub	-	+
65	Combretum	Kali bel	Combretaceae	Exotic	Shrub	-	+
66							
67	Cocculus hirsutus	Chrendi	Menispermaceae	Native	Shrub	-	+
68	Butea superb	Drain or Bdrasin	Fabaceae	Exotic	Shrub	-	+
69	Cryptolepis	Dudhi	Asclepiadaceae	Native	Climber	+	-
70	Mearua arenaria	Chrhri or bel or	Capparaceae	Native	Shrub	-	+
71	Ichnocarpus	Duddhi or Dudhiya	Apocynaceae	Native	Shrub	-	+
72	Vallis solanacea	Dudhi bel	Apocynaceae	Native	Shrub	-	+
73	Cissus repanda	Pani bel	Vitaceae	Native	Herb	-	+
74							
75							
76	Celastrus paniculatus	Mlknngni	Celastraceae	Native	Climber	-	+
77	Smilax prolifera	Ram datum	Smilacaceae	Native	Climber	-	+



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S.No.	Scientific Name	Local name	Family	Origin	Habit	Core	Buffer
78	Cenchrus ciliaris	Anjna	Poaceae	Exotic	Grass	-	+
79	Saccharum	Kaans	Poaceae	Native	Grass	+	-
80	Chrysopogon fulyus	Khus	Poaceae	Exotic	Grass	-	+
81	Themeda	Gunair	Poaceae	Exotic	Grass	-	+
82	Andropogon pumilus	Ggairua	Poaceae	Exotic	Grass	-	+
83	Vetiveria zizanioides	Khas	Poaceae	Native	Grass	+	-
84	Chrysopogon	Ckva or Guriya	Poaceae	Exotic	Grass	-	+
85	Heteropogon	Kala Ippa	Poaceae	Exotic	Grass	-	+
86	Dichanthium	Jaineva or Jma	Poaceae	Exotic	Grass	-	+
87	Bothriochloa pertusa	Chhoti Giri	Poaceae	Native	Grass	-	+
88	Cynodon dactylon	Dub	Poaceae	Native	Grass	+	-
89	Desmostachya	Dab	Poaceae	Native	Grass	-	+
90	Setaria glauca	Vindra	Poaceae	Exotic	Grass	-	+
91	Arundo donax	Naltura	Poaceae	Exotic	Grass	-	+
92	Eulaliopsis binnata	Bmay or Bavd	Poaceae	Native	Grass	-	+
93	Apluda mutica	Bhanjura	Poaceae	Native	Grass	-	+
94	Iselema laxum	Musail	Poaceae	Exotic	Grass	-	+
95	Cymbopogon martini	Rupa or Retare	Poaceae	Native	Grass	-	+
96	Saccharum munjo	Munj	Poaceae	Native	Grass	+	-
97	Eremopogon	Murjhena	Poaceae	Native	Grass	-	+
98	Emperata cylindrica	Siru	Poaceae	Native	Grass	-	+
99	Chloris	Santoor	Poaceae	Exotic	Grass	+	-
100	Sehima nervosum	Sendha or Sain	Poaceae	Exotic	Grass	-	+
101	Marginatus	Usri Ghas	Poaceae	Exotic	Grass	+	-
102	Dendrocalamus	Bans	Poaceae	Native	Grass	+	-
103	Bambusa	Kathbans	Poaceae	Native	Grass	-	+

3.8.9 Fauna in the Study Area

A faunal survey was carried out in the core as well as buffer zone of the plant site. Wild animals are not observed in the study area as there is no thick forest vegetation. Among the smaller animals like as rats are numerous. The natural distribution of animals is largely determined by vegetation. Nilgai, Hare, Hens and Pigeon are noticed in the study area. Amphibians like frogs and toads are commonly found. The common annelids in the study area are earthworms. Most



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common animals observed in study area are buffalo, cow, poultry and goat, whereas number of Sheep, Pig, Mules and Donkey is low.

Live stock plays an important role in rural area in sustaining the income of small farmers Cows and buffaloes are the main source of milk. A size able number of households earn subsidiary income by selling milk. The list of domestic fauna found in study area is given in Table 3.25.

Table 3.22: list of domestic fauna

S. No	Scientific Name	Common Name	Status according to IWPA 1972
1.	Bos indicus	Cow	Sch IV
2.	Bubalus indicus	Buffalo	Sch IV
3.	Canis familiaris	Dog	Sch. IV
4.	Capra hircus	Goat	Sch. IV
5.	Equus caballus	Horse	Sch. IV
6.	Equus hemionus	Ass	Sch. IV
7.	Felis domestica	Cat	Sch. IV
8.	Ovis montanus	Sheep	Sch. IV
9.	Sus scrofa	Pig	Sch. IV
10.	Suborder ruminantia	Camel	Sch. IV
11.	Macaca mulatta	Monkey	Sch. IV
12.	Lepus sylvaticus	Hares	Sch. IV
13.	Vulpes bengalensis	Indian fox	Sch. IV

3.8.10 Fishes

Fisheries data has been collected through consultation with local fisherman fish occurrences were determined by collecting samples using different fishes gears like cast net, scoop net, hand net, hook line, pot and open local devices methods. Also visual observations in different habitats were made. Fishes were identified up to the species level with the help of keys of Jayaram (1987) and Talwar and Jhingram (1997). IUCN red data list (2006) was compared to assess threatened, endangered and vulnerable species in the study area.

The fauna of study area is mentioned below;

Table no: 3.23: List of Fishes in the Study Area

S. No	Scientific Name	Common Name	Local Name
1	Amphiprion cutchiae	-	Kuchia
2	Cirrhinus rhabda		Pohala
3	Labeo rohita	Rohu	Rohu
4	Labeo calbasu	Calbasu	Calbasu

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5	Clarius batrachus	Walking cat fish	Mangor
6	Barbus ambasis	-	Keraridi
7	Labio bata	-	Cyprinidae
8	Labio calbasu	-	Cyprinidae
9	Catla catla	-	Bhakar
10	Cirrhinus mrigala	-	Naini
11	Heteropnestres fossilis	-	Singi
12	Mystus vittatus	-	Tengara
13	Mystus aor	-	Todi
14	Notopterus notopterus	-	Phalli
15	Notopterus chitala	-	Moh
16	Rita rita	-	-
17	Siludila Gangetic	-	Silond
18	Wallago attu	-	-

No Schedule I species was found in the core as well as buffer zone. No endangered or endemic species (as notified in IUCN Red Data Book) are located within the study area. No migratory birds breed in the study area. No Tiger Reserve / Elephant Corridor / Turtle breeding place is located within 10 km radius of the study area.

Tab-3.24: Inventory of faunal diversity (amphibians and reptiles)

S. No	Scientific Name	Common Name	Status according to IWPA 1972
Reptiles			
1	Calotes versicolor	Garden lizard	
2	Varanus Salvador	Monitor lizards	
3	Bangarus caearuslus	Karait	
Amphibian			
1	Bufo malanostidus	Toad	
2	Rrana cynophlyctis	Frog	
3	Rana tigrina	Frog	
Rodent			
1	Bandicota indica	Bandicoot rat	Sch. V
2	Myneus muscatus	Mouse	Sch. V
3	Rattus rattus	House rat	Sch. V
4	Funambulus pennanti	Squarrel	

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Table-3.25: Inventory of Butter fly Diversity in the core & buffer zone

S. No	Scientific Name	Common Name	Local Name
1.	Papilio polytes	Common Mormon	Sch. IV
2.	Papilio polymnestor	Blue Mormon	Sch. IV
3.	Papilio demoleus	Lime butterfly	Sch. IV
4.	Junonia lemonias	Lemon Pansy	Sch. IV
5.	Euploea core	Common Crow	Sch. IV
6.	Danaus chrysippus	Plain Tiger	Sch. IV

Table - 3.26: Avifaunal diversity in the Study Area

S. No	Scientific Name	Common Name	Local Name
1	Saxicola caprata	Pied Bush chat	Sch. IV
2	Prinia socialis	Ashy prinia	Sch. IV
3	Upupa epops	Common Hoopoe	Sch. IV
4	Corvus macrorhynchos	Jungle crow	Sch. V
5	Galloperdix spadicea	Red spur fowl	Sch. IV
6	Coturnix coturnix	Common Quail	Sch. IV
7	Coturnix coromandelica	Rain quail	Sch. IV
8	Perdicula asiatica	Bush quail	Sch. IV
9	Gallus gallus	Jungle fowl	Sch. IV
10	Streptopelia chinensis	Spotted dove	Sch. IV
11	Streptopelia decaocto	Eurasian collared dove	Sch. IV
12	Sterna aurantia	River Tern	Sch. IV
13	Nectarinia asiatica	Purple Sunbird	Sch. IV
14	Turdoides striatus	Jungle Babbler	Sch. IV
15	Ardea cinerea	Grey Heron	Sch. IV
16	Vanellus cinereus	Red-wattled lapwing	Sch. IV
17	Ardeola grayii	Indian Pond Heron	Sch. IV
18	Francolinus pondicerianus	Grey francolin	Sch. IV
19	Psittacula krameri	Rose-ringed parakeet	Sch. IV
20	Centropus bengalensis	Lesser coucal	Sch. IV
21	Merops orientalis	Green bee-eater	Sch. IV
22	Apus affinis	House swift	Sch. IV
23	Columba livia	Rock pigeon	Sch. IV
24	Halcyon smyrnensis	White-throated kingfisher	Sch. IV
25	Egretta garzetta	Little egret	Sch. IV
26	Bubulcus ibis	Cattle egret	Sch. IV
27	Corvus splendens	House crow	Sch. V
28	Dicrurus macrocercus	Black drongo	Sch. IV
29	Acridotheres tristis	Common myna	Sch. IV
30	Acridotheres ginginianus	Bank myna	Sch. IV
31	Saxicoloides fulicata	Indian robin	Sch. IV
32	Sturnus pagodarum	Brahminy starling	Sch. IV

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33	Pycnonotus cafer	Red-vented bulbul	Sch. IV
34	Passer domesticus	House sparrow	Sch. IV
35	Motacilla maderaspatensis	White-browed wagtail	-
36	Microcarbo niger	Little cormorant	Sch. IV
37	Himantopus himantopus	Black winged Stilt	Sch. IV

3.8.11 Phytoplankton

Similarly, for phytoplankton analysis, sub-surface water sample were taken directly from the sites in 100 ml sampling bottles and preserved with Lugol's solution immediately. Then the samples were centrifuged in the laboratory followed by removal of desired amount of supernatants from the centrifuge tube to make the required concentration. Phytoplanktons were then analyzed using a compound microscope and haemocytometer in the concentrates. The number of organisms per liter was calculated as follows:

No. of organisms per liter = No. of organisms x 107/concentration factor x No. of sides examined.

3.8.12 Planktons- Phyto and Zoo

The phytoplankton population recorded in the post-monsoon and pre-monsoon seasons at all the sampling locations is presented in below table. The phytoplankton group consists of families Bacillariophyceae were Cynophyceae, Euglenophyceae, and Xanthophyceae. The Bacillariophyceae were mainly represented by Diatoms, Nitzscia affinis, Melosira, Navicula and Fragillaria in the Lower Ganga canal. Chlorophyceae was represented by chlorella, volvox, cladophora, maugotia and Spyrogyra. Similarly, Cyanophyceae was represented by anabaena, Lyngbya, Microcystis and Oscillatoria. Euglenophyceae was repressed by E. Viridis and Ciratinum sp. Xanthophyceae was represented by Tribonema bombycinum.

Among the Zooplanktons, Rotifera, Copepoda and Cladocrea were observed. The Zooplanktons recorded in the post-monsoon & pre-monsoon season is presented in below table;

Table 3.27: Phytoplankton recorded in study area

Bacillariophyceae	Bacillariophyceae	Chlorophyceae	Chlorophyceae	Myxophyceae
A.biasolettianum	Fragillaria sp.	Actinastrum	Microcystis sp.	Anabaena
Amphora Montana	G. minutum	A.falcatus	Nostoc sp.	Cylindrospermum sp.



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C. arcus	Luticola mutica	C.vulgaris	O.limosa	Euglenophyceae
Cocconeia placentala	Navicula sp.	Chlorobotrys	O.princes	E.acus
C. placentula	N. capitata	Chlorococcum humicola	Spirulina sp.	E.viridis
C.stelligera	N. fonticola	Eudorina sp.	Teterpedia sp.	Ciratinum sp.
Cymbella affinis	N. frustulum	H.reticulatum	Ulothrix	Chrysophyceae
C. leavis	N. linearis	M.amoena	Volvox globatum	Botryococcus sp.
Cymbella sp.	N. palea	Oedogonium sp.		Xanthophyceae
Encyonema minutum	Nitzschia sp.	Palmella sp.		Tribonema bombycinum

Table 3.28: Zooplanktons recorded in the Lower Ganga Canal

Rotifera	Cladocera
Asplancha priodonta	Anura fissa
Brachinous quadridentatus	Diapotomus sp.
Brachinous calyciflorus	Diaphanosomas sp.
Brachinous forficula	Mesocyclops sp.
Brachinous sp.	Moina micrura
Keratella sp.	Nauplius larvae
Keratella tropica	Moinodahphnia sp.
Keratella cochlearis	Protozoa
Keratella quadrata	Amoeba
Notholca sp.	Arcella
Polyarthra sp.	Diffugia sp.
Copepods	Euglena sp.
Cyclops sp.	Euglena viridis
Miscellaneous	Paramecium sp.
Chironomus larva	Vorticella sp.
Mosquito larvae	-
Nematodes	-
Oligochaetes	-

There is no National Park, Wild life Sanctuary, Biosphere Reserve, Wildlife Corridor, Tiger/Elephant Reserve within 10 km radius area from the proposed project site. There are no Sch.1 species existing within study area according to Wildlife Protection act 1972.

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3.9 Socio-Economic Environment

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of an area provides a good opportunity to assess the socioeconomic conditions of an area. This study will possibly make a change in living and social standards of the particular area benefitted due to the Project.

It can undoubtedly be said that due to the proposed project of CBWTF, which will manage the biomedical waste from all health-care centres in the districts of Sambhal and nearby districts also.

3.9.1 Objectives of the Study

The objectives of this socio-economic report consist of:

- To conduct socio-economic assessment study in Project Area
- To know the current socio-economic situation in the region to cover the sub sectors of education, health, sanitation, and water and food security.
- To recommend practical strategic interventions in the sector.
- To help in providing better living standards.

3.9.2 Scope of Work

- To study the Socio-economic Environmental of area from the secondary sources,
- To conduct socio-economic survey for primary data collection and to know the current socio-economic situation in the region to cover the sub sectors of education, health, sanitation, and water and food security,
- Developing a questionnaire for survey,
- Prediction of project impact and mitigation measures,
- To recommend practical strategic interventions in the sector

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3.9.3 Background information of the Area

Sambhal is situated at a distance of 167 km (104 mi) from the national capital, New Delhi on the banks of the Ramganga River (a tributary of the Ganges). It is also divisional headquarters of Northern Railway (NR) and Moradabad Mandal (Commissionery).



Figure 3.24: Location project site on district Smabhal Map

3.9.4 Socio Economic Profile of the Study Area

Table 3.29: Socio Economic Profile of the Study Area

Particular	Uttar Pradesh State	Moradabad district	Study Area
Area (in sq. kms.)	240,928	3,718.0	314
No. of Households	33448035	5,71,893	
Population	199812341	47,72,006	
Male	104,480510	25,03,186	
Female	95,331831	22,68,820	
Scheduled Castes	1134273	7,31,406	
Scheduled Tribes	41357608	685	
Literacy	67.68	47.44	
Sex Ratio Females per 1000 Males)	912	906	



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Source: Census of India 2011

3.9.5 Baseline Data & Analysis

The socio economic study includes data collection on Demography, Education, Medical & Health, Occupation, Agriculture & Cropping pattern, Basic Amenities and Religious Rituals details. The primary study was conducted within 10 km radius study area from the project site. Village specific information were collected from the data of census 2011 and the secondary information collected from various government departments like health department, agriculture department, IMD etc.

3.9.6 Demography of the study area

Total area covered for demography study is 314 sq km. The population as per Census 2011 records is 158808 (for 10 km radius buffer zone). As per Census 2011 records, Sex ratio is 868 (females per 1000 males) observed in study area, Total SC & ST population is 9748 & 1, respectively in the study area. Literacy rate is 42.0 % in the study area.

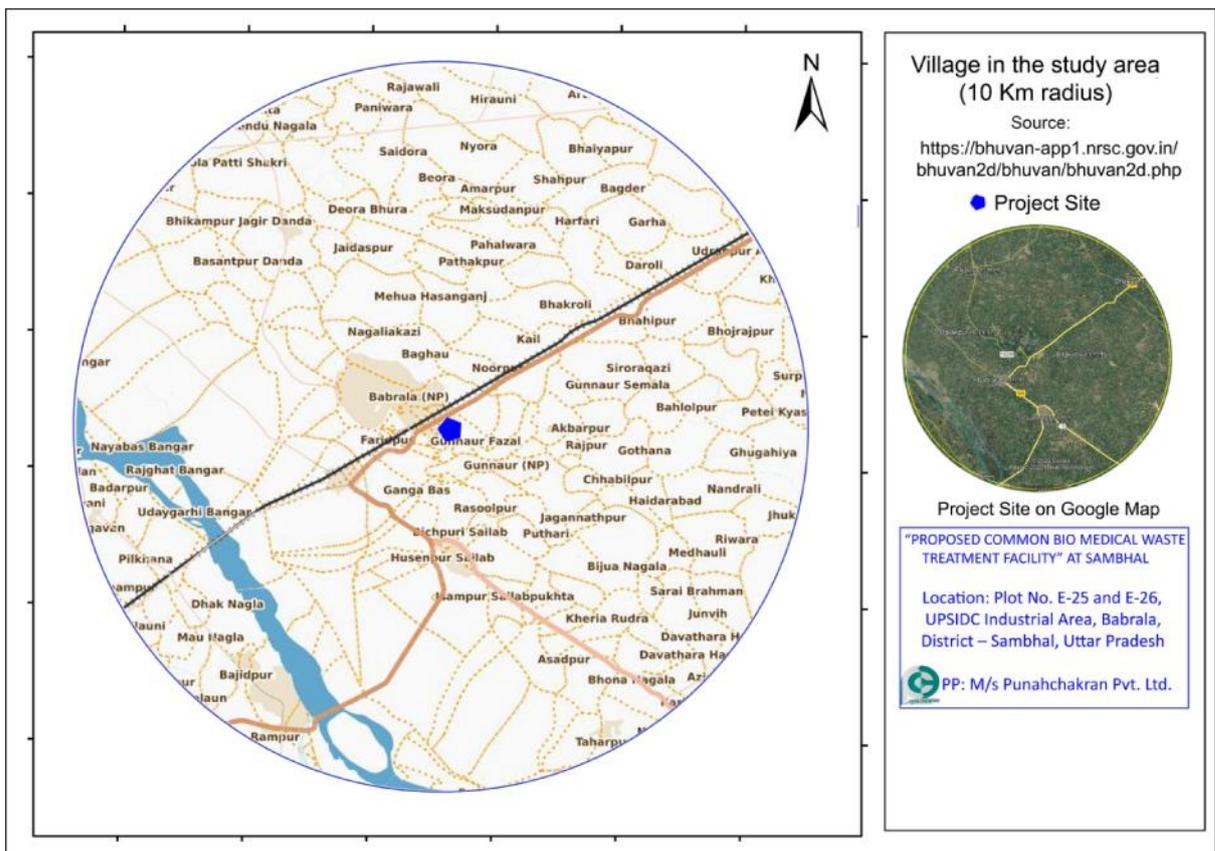


Figure 3.25: Villages in the radius of 10 km from project site

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Table 3.30: Demography Detail of Study Area

Name	No_H H	TOT_P	TOT_M	TOT_F	P_SC	M_S C	F_S C	P_S T	P_LIT	M_LI T	F_LI T	TOT_WOR K_P	NON_WOR K_P	MAIN_WOR K_P
Bhikampur Jagir Danda	371	2408	1254	1154	337	182	155	0	724	501	223	734	1674	486
Basantpur Danda	398	2171	1151	1020	169	85	84	0	761	531	230	691	1480	674
Patei Nasir	180	1039	568	471	217	121	96	0	358	267	91	414	625	380
Deora Bhura	261	1594	875	719	283	155	128	0	616	439	177	513	1081	503
Jaidaspur	227	1199	634	565	308	159	149	0	538	357	181	495	704	468
Chandu Nagala	472	3196	1720	1476	598	334	264	0	1287	847	440	1004	2192	864
Hirauni	682	4253	2340	1913	655	357	298	0	1311	932	379	1906	2347	1110
Bhaiyapur	224	1273	647	626	371	188	183	0	332	219	113	669	604	254
Paniwara	224	1296	680	616	434	237	197	0	515	354	161	321	975	300
Rajawali	375	2334	1277	1057	282	151	131	0	924	625	299	889	1445	861
Saidora	469	2966	1561	1405	248	130	118	0	1272	849	423	959	2007	690
Beora	383	2342	1236	1106	222	112	110	0	1029	700	329	794	1548	682
Nyora	720	4454	2379	2075	247	132	115	0	1286	935	351	1136	3318	1122
Amarpur	135	727	357	370	12	6	6	0	367	229	138	371	356	195
Maksudanpur	87	527	267	260	0	0	0	0	191	124	67	138	389	121
Pahalwara	260	1495	782	713	56	27	29	0	623	424	199	400	1095	395
Harfari	362	2329	1256	1073	139	76	63	0	881	609	272	687	1642	596
Bagder	351	2273	1247	1026	95	52	43	0	929	626	303	749	1524	550
Nagaliakazi	20	100	51	49	13	8	5	0	44	26	18	19	81	19
Mehua Hasanganj	861	5451	2920	2531	331	165	166	0	2287	1580	707	1445	4006	1271

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Pathakpur	432	2404	1322	1082	286	160	126	0	1087	805	282	651	1753	599
Kail	727	4717	2541	2176	397	197	200	0	2105	1417	688	1357	3360	1087
Bhakroli	616	3783	2045	1738	522	288	234	0	1748	1133	615	880	2903	769
Daroli	197	1246	677	569	210	120	90	0	383	258	125	330	916	299
Bhahipur	364	2345	1237	1108	482	262	220	0	910	613	297	826	1519	664
Baghau	767	4330	2326	2004	356	191	165	0	2147	1360	787	1185	3145	936
Noorpur	333	2101	1139	962	75	41	34	0	518	347	171	506	1595	463
Gunnaur Fazal	57	361	194	167	15	8	7	0	96	67	29	101	260	96
Husenpur Sailab	100	550	298	252	0	0	0	0	207	145	62	175	375	120
Bichpuri Sailab	150	1048	549	499	0	0	0	0	410	279	131	298	750	249
Rasoolpur	421	2762	1442	1320	432	234	198	0	1092	715	377	768	1994	655
Jagannathpur	249	1641	846	795	400	212	188	0	759	483	276	493	1148	376
Isampur Sailabpukhta	79	480	251	229	0	0	0	0	177	107	70	111	369	107
Asadpur	363	2272	1205	1067	372	189	183	1	1077	716	361	653	1619	592
Bhona Nagala	272	1723	960	763	149	77	72	0	689	485	204	811	912	270
Rajpur	144	954	510	444	0	0	0	0	499	345	154	457	497	220
Gothana	441	2712	1470	1242	541	289	252	0	1187	839	348	1199	1513	539
Bahlolpur	247	1599	839	760	79	33	46	0	667	429	238	707	892	339
Kuhera	408	2481	1334	1147	219	102	117	0	838	583	255	1146	1335	847
Ghugahiya	187	1074	569	505	0	0	0	0	287	202	85	394	680	366
Gunnaur Semala	343	2205	1161	1044	82	38	44	0	559	377	182	706	1499	590
Akbarpur	463	2815	1471	1344	195	101	94	0	885	640	245	1181	1634	954

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Siroraqazi	489	3335	1810	1525	573	310	263	0	1364	959	405	1152	2183	1120
Bhojrajpur	214	1520	810	710	0	0	0	0	496	326	170	543	977	481
Dhanaripatti Lalsingh	658	3900	2049	1851	898	481	417	0	1336	908	428	1348	2552	1100
Garha	474	2782	1502	1280	568	307	261	0	975	697	278	1243	1539	650
Udranpur Azmatnagar/Azpatnagar	462	2752	1455	1297	296	142	154	0	1160	788	372	888	1864	729
Rustampur Pipalvala	167	1023	541	482	29	14	15	0	452	290	162	283	740	279
Manharnagala Urf Bhagnagar	281	1800	956	844	25	13	12	0	640	453	187	418	1382	371
Talibpur	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Khalilpur	293	1934	1055	879	390	220	170	0	830	576	254	546	1388	450
Surpur	193	1269	699	570	235	125	110	0	458	309	149	719	550	568
Chhabilpur	77	451	242	209	25	14	11	0	201	130	71	290	161	287
Haidarabad	137	821	431	390	383	197	186	0	424	259	165	395	426	232
Medhauri	403	2711	1527	1184	359	202	157	0	1295	888	407	1651	1060	688
Sarai Brahman	209	964	531	433	586	317	269	0	529	332	197	229	735	225
Junvih	527	3089	1657	1432	473	247	226	0	1689	1044	645	904	2185	710
Riwara	335	2207	1191	1016	434	229	205	0	795	548	247	972	1235	589
Nandrili	591	3508	1872	1636	214	106	108	0	1680	1142	538	1625	1883	691
Bijua Nagala	264	1625	889	736	254	135	119	0	600	418	182	291	1334	280
Kheria Rudra	224	1262	663	599	0	0	0	0	510	332	178	353	909	341

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Name	No_H H	TOT_P	TOT_M	TOT_F	P_SC	M_S C	F_S C	P_S T	P_LIT	M_LI T	F_LI T	TOT_WOR K_P	NON_WOR K_P	MAIN WORK_P
Davathara Himanchal	253	1601	888	713	83	44	39	0	770	526	244	462	1139	392
Davathara Harlala	266	1570	864	706	0	0	0	0	835	569	266	472	1098	448
Azizpur	467	2183	1168	1015	59	35	24	0	1126	749	377	1231	952	406
Taharpur	67	348	200	148	41	22	19	0	89	59	30	110	238	107
Badarpur	613	3608	1917	1691	106	60	46	0	2088	1373	715	1031	2577	720
Nayabas Bangar	218	1177	639	538	45	28	17	0	600	395	205	316	861	74
Pilkhana	683	4700	2482	2218	1145	622	523	0	2024	1377	647	1357	3343	1235
Mau Nagla	360	2269	1238	1031	115	65	50	0	1218	820	398	765	1504	683
Bajidpur	304	1682	910	772	1447	779	668	0	894	577	317	494	1188	395
Rampur	943	5807	3055	2752	1296	669	627	0	3245	2114	1131	2143	3664	1189
Rajghat Bangar	493	2592	1444	1148	223	117	106	0	1253	775	478	949	1643	524
Udaygarhi Bangar	508	3006	1622	1384	487	271	216	0	1090	740	350	806	2200	665
Dhak Nagla	403	2282	1182	1100	256	136	120	0	1391	837	554	596	1686	432
Total	25998	158808	85077	73731	20874	11126	9748	1	66659	44829	21830	53851	104957	39739





3.9.7 Vulnerable Group

While developing an Action Plan, it is very important to identify the population who fall under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the observed villages schedule caste (S.C.) population is 13.14 % and Schedule Tribe population 0.0006 % in study area. 86.86 % population observed as other.

3.9.8 Literacy Rate

Literacy Rate is the amount of people in a country with the ability to read and write. The analysis of the literacy levels is done in the study area. The 10 km radius study area demonstrates a literacy rate of 42.0 % as per survey data. The male literacy rate in the study area works out to be 28.23 % whereas the female literacy rate, which is an important indicator for social change, is observed to be 13.75 % in the study area as per the survey data. This indicates that there is a need to focus in sociological aspect in the region and enhance further development. In the present study, the literacy rate is quiet low in the study area. Male and Female literacy rate of villages are varying place to place. Although Female literacy rate in the region is coming out very low as compared to male. Literacy is one of major issue to focus in the study area and also try to reduce the difference between male and female literacy rate.

3.9.9 Economic Activity

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., main workers, marginal workers and non-workers. The main workers include cultivators, agricultural laborers, those engaged in household industry and other services.

The marginal workers are those engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties like, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories. The percentage of total working population and non-working population is 33.91 % and 66.09 % respectively of whole



population of observed villages. As per the analysis of all the villages the ratio of non-working population is more than working population.

3.9.10 Various Sources

The Income & Expenditures of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to income sources. Most of the people are involved in agriculture and wage labor as occupational pattern, while some are earning from government services, private business, poultry farming etc. for livelihood in study area.

3.9.11 Agriculture & Cropping Pattern

Most of the villagers are involved in agricultural activities. Apart from agricultural activities they also work as wage labour to earn livelihood. In these areas cropping pattern is based on the two season crops- Rabi and Kharif. But mostly villagers start their agriculture activities in rainy season. Some villagers sow their crops in both seasons. These farmers sow crops like wheat, Rice, Sugar Cane etc.

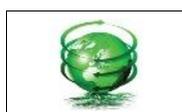
3.9.12 Basic Amenities

A better network of physical infrastructure facilities (well-built roads, rail links, irrigation, power and telecommunication, information technology, market-network and social infrastructure support, viz. health and education, water and sanitation, veterinary services and co-operative) is essential for the development of the rural economic.

A review of infrastructure facilities available in the area has been done based on the information from base line survey of the study area. In this review, the villages which fall within 10 Km radius round the site has been considered. Infrastructure facilities available in the area have been described in the subsequent sections as below.

3.9.13 Educational Facilities

According to data, Primary Schools are available in most villages. Middle, Secondary and Senior Secondary Schools (depending on population size) are also available in densely populated villages. For higher education people have to commute the other villages.





3.9.14 Health Facilities

The nearby villages have medical facilities. In some villages primary health sub-centre and primary health centre are available. Maternity home is also available in the study area and most of the villages are having Aanganbari centers. Other health centers i.e. Ayurvedic center, homeopathic dispensary and private clinic and medical stores also available in the study area. Some population is suffering from disease like Tuberculosis, Blindness and affected from seasonal disease.

3.9.15 Other Infrastructure Facilities

Basic facilities are available in study area as educational facilities, health, transportation, electricity, drinking water, market, bank, post office, petrol pump; Administrative office, Aanganbari Centers, Community hall, Co-operative bank and Commercial Bank etc. are available.

a) Transport Facilities

The study area is served by road transport. Most of the villages are connected by bus/other transport services. The area has good road network, which includes Babrala Railway Station: 3.19 Km (SW) and Bhakrauli Railway Station: 4.01 Km (NE) from the project site.

b) Post and Telegraphs

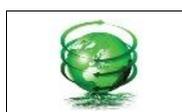
The study area has an average level of post services. The study area is served by adequate telephone and mobile network.

c) Electrification in the area

All villages in the study area are electrified. Electricity is available for domestic, commercial, industrial agricultural and public lighting purposes.

d) Drinking Water Facility

Village people are availing drinking water facilities generally from the Hand pump, open well, tube well and tap. The water is also supplied through tanker in few villages. During summer scarcity of water has been noted in the study area. Drinking water is vital requirement for humans as well as animals. Here requirement of drinking water is fulfilled by well, hand pump, drinking water supply by government by tank. Ground water is the source of water in this area.



Project: Common Bio Medical Waste Treatment Facility (CBWTF) coming up at Plot No. E-25 and E-26, UPSIDC Industrial Area, Falaaha District – Sambhal, Uttar Pradesh		
Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

3.9.16 Conclusion

The socio economic study of the study area on behalf of observed villages gives clear picture of its population, average household size, literacy rate, sex ratio, schedule tribe and schedule castes etc.

A major part of population is suffering from the lack of permanent job to run their day to day life and get basic facility.

The infrastructure and amenities available in the area denotes the economic well-being of the region. The study area as a whole possesses average of infrastructural facilities. However, in comparison with the facilities available in other parts of the districts this area higher level of amenities likes higher education, health, drinking water and communication network. The area is well connected with road transport and communication facilities

3.9.17 Suggestions for improvement of Socio-Economic Status

The socio-Economic status of the population in the project area shall be improved through CER and focused community development interventions. Some of the salient activities are illustrated below:

- Youth empowerment programs through awareness creation about various government schemes, providing appropriate opportunities with relevance to their qualification and skills, conducting skills inculcating programs etc.,
- Periodical health checkup camps need to be conducted
- Sensitization and awareness programs on child and mother health, sanitation and personal hygiene, HIV/AIDS etc.
- Mother-child care awareness programs and need based health camps
- Strengthening the educational infrastructure in rural schools
- Distribution of vitamin and de worming tablets to Anganwadi and school going children, distribution of iron tablets to women will bring a tremendous change in the health of women and children.
- Veterinary camps and Para-Vet services to enhance the milk production of existing milk producing households.

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A number of CSR activities can be initiated in the project area villages on convergence mode whilst partnering with exiting Government schemes and financial support from developmental institutions like NABARD.

3.10 Traffic Survey Study

3.10.1 Introduction

The proposed common Bio-medical Waste Treatment Facility (CBWTF) of M/s Punahchakran Private Limited is located at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh. The Impact due to and on background traffic (through traffic) considering the site frictions, on/from the Site bound vehicles needs to be examined and quantified. This may impact network flow on SH - 39. Hence a detailed traffic investigation was carried out.

3.10.2 Objective

The objectives of the Traffic Study are to find out the following: -

1. Present traffic conditions in and around the project site of proposed distillery,
2. Highlighting the issues & concerns,
3. Level of Services of the surrounding network,
4. Conceptual improvement scheme at site and network level.

3.10.3 Scope of Study

The scope of work is as per the given project activities.

1. Conduct primary Traffic Survey on normal working day (24 Hrs) to analyse existing level of services and volume counts around the site.
2. Forecast traffic volumes for after proposed establishment to analyse future level of services and demand.
3. Propose road infrastructure improvement required to cater to the future traffic demand with the project.
4. Linking proposed project traffic to external roads with minimum interruption.
5. Internal Traffic Management

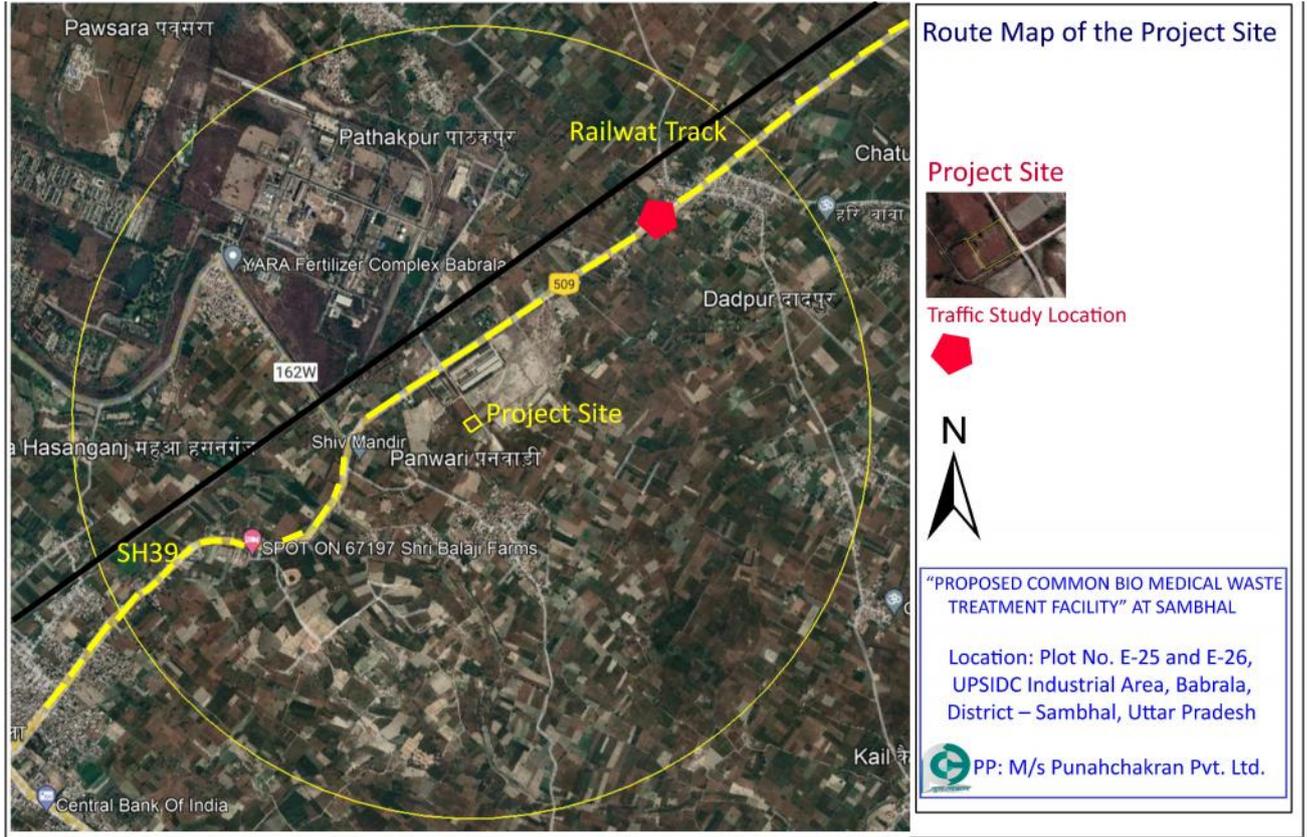


Figure 3.26: Traffic Survey Location on SH39 and its service road near factory site



Table 3.31: Traffic Survey Study

	Time	Two Wheelers	As % of Total vehicular count	As PCU's	Three wheelers & Light vehicles	As % of total vehicular count	As PCU's	Medium Vehicles (agriculture tractor & LCV's)	As % of Total vehicular count	As PCU's	Heavy Vehicles (Truck & buses)	As % of Total vehicular count	As PCU's	Total
4	8.00	70	10.48	35	35	8.25	35	16	2.96	24	48	6.20	144	238
6	9.00	52	8.13	26	32	7.55	32	22	4.07	33	40	5.17	120	211
8	10.00	54	7.08	27	37	8.73	37	34	6.30	51	56	7.24	168	283
5	11.00	30	3.93	15	18	4.25	18	25	4.63	37.5	28	3.62	84	154.5
5	12.00	41	5.37	20.5	20	4.72	20	32	5.93	48	30	3.88	90	178.5
6	13.00	18	2.36	9	18	4.25	18	18	3.33	27	25	3.23	75	129
8	14.00	20	2.62	10	14	3.30	14	15	2.78	22.5	23	2.97	69	115.5
4	15.00	25	3.28	12.5	16	3.77	16	19	3.52	28.5	28	3.62	84	141
8	16.00	48	6.29	24	15	3.54	15	17	3.15	25.5	34	4.39	102	166.5
4	17.00	44	5.77	22	14	3.30	14	14	2.59	21	13	1.68	39	96
6	18.00	40	5.24	20	15	3.54	15	12	2.22	18	14	1.81	42	95
6	19.00	76	9.96	38	18	4.25	18	16	2.96	24	9	1.16	27	107
5	20.00	55	8.52	27.5	24	5.66	24	30	5.56	45	53	6.85	159	255.5
3	21.00	40	5.9	20	20	4.72	20	41	7.59	61.5	56	7.24	168	269.5
0	22.00	30	4.59	15	18	4.25	18	45	8.33	67.5	50	6.46	150	250.5
1	23.00	12	1.57	6	13	3.07	13	28	5.19	42	40	5.17	120	181
0	24.00	10	1.31	5	14	3.30	14	42	7.78	63	38	4.91	114	196
3	1.00	11	1.44	5.5	11	2.59	11	23	4.26	34.5	48	6.20	144	195
1	2.00	14	1.83	7	15	3.54	15	19	3.52	28.5	20	2.58	60	110.5
0	3.00	6	0.79	3	12	2.83	12	21	3.89	31.5	24	3.10	72	118.5
3	4.00	8	1.05	4	8	1.89	8	16	2.96	24	34	4.39	102	138
2	5.00	9	1.31	4.5	14	3.30	14	13	2.41	19.5	24	3.10	72	110
3	6.00	9	1.18	4.5	14	3.30	14	14	2.59	21	27	3.49	81	120.5
4	7.00	10	1.39	5	9	2.12	9	8	1.48	12	12	1.55	36	62
Total 24 Hr		722	100.00	366	424	100.00	424	540	100	810	774	100	2322	3922

Project: Common Bio Medical Waste Treatment Facility (CBWTF) coming up at Plot No. E-25 and E-26, UPSIDC Industrial Area, Fabarala District – Sambhal, Uttar Pradesh		
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Actual Volume Scenario				
Name of Road	Actual Volume	Carry capacity	V/C	PUC for Road
SH39	3922	45600.0	0.086	A

Additional Traffic during operation of plant due to biomedical waste transportation

Table No.: 3.32, Additional Traffic due to the project

Waste transportation	Requirement	Requirement		Type of Vehicle and capacity	Source
		No. of Trips per Day	PCU		
Bio medical waste	Approx 5 TPD	2	12	Pickup/1.5 T	Through Vendors/by road
Factory Workers					
Employees + visitors	8 Worker	2	8	Car	
	12 Worker	2	12	Two wheelers	

Bio medical waste will be transported through pickup. No any significant impact will be on traffic due to proposed CBWTF.

Expected Volume Scenario (Peak Hourly traffic)

Expected Volume Scenario (Peak Hourly traffic)			
Name of Road	Modified Volume	Carry capacity	V/C
SH39	3922 + 30	3952	0.086

Name of Road	Recommended PCU/Day as per IRC 64 -1990 guidelines for capacity of Roads in rural areas (For Six lane Roads)	Maximum PCU/ Day observed	Expected from proposed project	After proposed establishment
SH39	45600 PCU/day	3922	30	3952

3.16 Conclusion

The environment baseline study was conducted in the Study area by both secondary data & primary data collections. Abiotic factors including air, water and soil were studied for the core & buffer zone.

It was found that most of the parameters were within the limits as per the Indian Standards. In general, there is no major threat to the quality of these parameters. Similarly, the study for the biotic factors was conducted. Hence it can be concluded that the present environment status of the study area is good enough for the project activity. Adoption of adequate pollution control measures will protect the surrounding environment.



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Chapter 4 – ANTICIPATED IMPACTS AND MITIGATION MEASURES

4.0 Introduction

Impacts related to the project within the project site or its surrounding will be due to the activities during construction and operation phase. Further, the project, during both the phases will have impacts on various abiotic and biotic components.

This section of the EIA report will delineate the impacts due to this project to the abiotic and biotic components.

4.1. CONSTRUCTION/ INSTALLATION PHASE

4.1.1. Activity – Site Preparation and Leveling

Aspects

Loss of green cover

Increased PM/ dust

Increased gaseous emissions

Increased ambient noise

Table 4.1: Activity- Site Preparation and Leveling

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	Increased PM level and dust generation due to site preparation & levelling may cause respiratory problems to the workers and people in the vicinity.	<ul style="list-style-type: none"> Construction activities for the project will be confined to the project site only for a short duration. Water sprinkling will be done to reduce dust. Dust suppression systems (water spray) will be done as per requirement at the project site. Adequate PPE and nose masks will be provided to the workers who will be engaged in dust generating activities.
Water Environment	-The storm water recharge capacity will be decreased.	<ul style="list-style-type: none"> Proper drainage for storm-water will be maintained.

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	-Dust emission deposition over Surface water body may deteriorate its quality by increasing the pathogen in the water body and thereby affecting aquatic life and making water unfit for consumption.	<ul style="list-style-type: none"> • Water sprinkling will be done to reduce the dust generation. • Dust suppression systems (water spray) will be done as per requirement at the construction site.
Land Use	-	-
Soil Environment	Due to removal of vegetation, decrease in fertility of soil, chances of soil erosion.	Compaction of soil will be done to avoid soil erosion.
Socio-Economic	-	
Ecology & Biodiversity	Increased PM Level will result in deposition of dust on leaves which may cause decrease in transpiration rate of flora.	Proposed construction will be carried out within the premises where the site is barren and vacant; adjacent areas are also vacant and have only bushes.
Noise & Vibration	During site preparation excavators will be used which may cause whole body vibration of the operator and also may cause auditory impact. Other machinery used for consolidation and compaction of concrete will also generate noise.	Noise generated due to site preparation and leveling will be only for a specified period during day time only. Excavator deployed will have a closed cabin with vibration isolator.
Hydrology & Geology	No major impact envisaged	
Solid & Hazardous Waste	None	None

4.1.2. Activity –Installation of Machinery

Aspects

Emission of dust

Increased PM level

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Generation of noise

Soil contamination

Table 4.2: Activity- Installation of machinery

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	Dust will be generated due to the installation of the machineries and other equipment within the project site, which may cause respiratory problems to the workers and decrease the aesthetic look of the area	<ul style="list-style-type: none"> Water sprinkling will be done to reduce the dust. Dust suppression systems (water spray) will be done. Soil or mud that will be generated from the project site during the installation of machineries will be properly stacked and covered within the project site for the due course of time and if required water sprinkling will be done on the muck so that it may not blow off.
Water Environment	No major impact envisaged	None
Land Use	None	None
Soil Environment	None	None
Socio-Economic	None	None
Ecology & Biodiversity	Increased PM Level will result in deposition of dust on leaves which may cause decrease in Transpiration rate of flora	Water sprinkling will be done to reduce the dust generation
	Drilling and hammering for installation of different equipment / machines may generate noise and vibration. Drilling at high frequency may cause damage to nerves, tendons and muscles of the driller which may cause vibration white finger and may also cause psychological effects like annoyance and headache.	Drilling machines should be of reputed make and in good condition and drillers may be provided anti-vibration gloves and ear muffs/plugs.





4.1.3 Activity –Operation of Construction machinery (Concrete mixing machinery, JCB, etc)

Aspects

- Used oil generation
- Air emission
- Dust generation
- Oil & Chemical Spillages
- Noise generation

Table 4.3: Activity- Operation of construction machinery

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	<ul style="list-style-type: none"> • Emissions from the use of construction machinery will cause respiratory problems to the workers at site and nearby population. • Pollutants emitted from the stack will increase the Ground Level Concentration of pollutants which will affect the respiratory health of people in a nearby area. 	<ul style="list-style-type: none"> • Stack of adequate height (30 m) shall be provided in order to minimize the GLC. • Low Sulphur fuel shall be used in operation of DG sets. • Personal Protective Equipment like nose masks shall be provided to the construction workers. • Proper maintenance of construction equipment/ machineries, etc. • Dust suppression and water sprinkling system will be installed for suppression of particulates.
Water Environment	Spillage of Oil & chemicals, if in any case encountered, can deteriorate the ground-water & surface water body. Which in turn may affect the life also?	The hazardous waste generated will be used oil apart from Incinerators Ash & ETP sludge. Used oil will be stored in HDPE drums and kept in covered rooms under lock and key and will be sold to authorized vendors only.
Land Use	None	None
Soil Environment	None	None
Socio-Economic	None	None

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4.1.4. Activity – Transportation (Raw Material, Labour)

Aspects

- Vehicular emission
- Diesel/petrol leakage
- Road congestion & breakage of road
- Noise generation

Table 4.4: Activity: Transportation (Raw material and Labours)

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	<ul style="list-style-type: none"> • Gaseous emissions from vehicles used for transportation will affect the health of construction workers and nearby population. • Leakage of petrol/Diesel may result in emission of VOCs in the air environment which may cause irritation in eyes, nose and throat, difficulty breathing and nausea. • Transportation of construction material shall result in dust emission which will affect the respiratory health of construction workers and nearby population 	<ul style="list-style-type: none"> • Vehicles with valid PUC certificates only will be used for transportation of construction material • The vehicle used for transportation will comply with the conditions stipulated by SPCB in addition to the requirements mentioned in Motor Vehicle Act, 1988 (59 of 1988). • Construction material will be transported in closed and covered trucks. • Water sprinkling will be carried out for dust suppression from movement of transport vehicles. • Plantation of trees around the project periphery will be carried out.
	<ul style="list-style-type: none"> • -If dust emitted gets deposited on the water body can deteriorate the water quality. • -If raw material falls down near or on the water body it can deteriorate the water quality. 	<ul style="list-style-type: none"> • vehicles carrying construction material and construction debris will be cleaned before it is permitted to ply on the road





Soil Environment	<ul style="list-style-type: none"> Chemical degradation of soil would occur 	<ul style="list-style-type: none"> Procedures for maintenance of equipment would ensure that this risk is minimized, and clean-up response is rapid if any spill occurs. Lubricating waste oil shall be collected separately in drums and handed over to the authorized outside agency.
Socio-Economic	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Noise & Vibration	<ul style="list-style-type: none"> Due to transportation of construction materials and machineries for installation high level of noise may be generated which may cause physiological & psychological effects on workers like annoyance, speech interference, headache, Auditory impact, increase in heartbeat of elderly people. 	<ul style="list-style-type: none"> Barriers of noise absorbing materials with adequate height will be maintained throughout the boundary of the project site. Plantation within the project site will be done which will dampen the noise.
Hydrology & Geology	None	None

4.1.5. Activity –Working & daily activity of construction labour

Aspects

Solid waste & E-waste generation

Water requirement & waste water disposal

Table 4.5: Working & daily activity of construction labour

Environmental components	Impact	Proposed Mitigation Measures
Air Environment	Bio-degradable Waste generation may lead to odour problems if not stored properly & treated within time.	The generated organic waste shall be collected properly & shall be given to the approved vendor.
Water Environment	For construction labourers, 2 KLD of Domestic water shall be	<ul style="list-style-type: none"> Total water required during installation phase will be 5 KLD which shall be taken from

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	sourced through the tanker supply water and this will lead to 0.6 KLD of waste water.	Tanker water supply. 2KLD of water shall be utilized for domestic purposes and 3KLD shall be used for construction purpose. Approximately 0.6 KLD domestic waste water will be generated which will be discharged to the soak pit via septic tank. <ul style="list-style-type: none"> • Temporary toilets will be provided.
Land Use	None	None
Soil Environment	Impact on soil due to improper disposal of solid waste & liquid waste includes the leaching from biodegradable waste and effect on flora from spillage of waste on soil.	Domestic waste water will be generated which will be discharged to the soak pit via septic tank.
Socio-Economic	Solid waste & waste water generated may cause nuisance due to smell If not properly managed & treated.	The generated organic waste shall be collected properly disposed by approved vendor
Ecology & Biodiversity	none	None
Noise & Vibration	None	None
Hydrology & Geology	Disposal of untreated waste water if it infiltrates into the ground-water may deteriorate the quality of ground-water.	0.6 KLD domestic wastewater will be generated which will be discharged to the soak pit via septic tank.
Solid & Hazardous Waste	During the construction phase 4 kg/day of solid waste shall be generated. Improper storage and disposal of Biodegradable waste will enhance the risk of microbial	<ul style="list-style-type: none"> • Solid waste from the labours will be properly collected, and managed as per solid waste management rule, 2016. • The generated organic waste will be collected properly

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	contamination, population, will enhance the risk of disease occurrence and cause foul smell. It will attract the vectors.	& disposed off to Solid Waste Dumping Site. <ul style="list-style-type: none"> Recyclable materials like aluminium, steel, wood pieces, cement bags, plastic containers, cartons, glass etc. will be given to recyclers. E-waste if generated shall be properly disposed as per E-Waste (Management) Rules, 2016
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4.2. OPERATION PHASE

4.2.1. Activity – Loading & unloading of bio-medical waste

Aspects

Generation of PM, Dust

Spillage/Leakage of bio-medical waste

Generation of Noise

Generation of packaging material

Generation of odour

Table 4.6 Activity- Loading and unloading of bio-medical waste

Environmental Components	Impact	Mitigation Measures
Air Environment	<ul style="list-style-type: none"> Spillage/leakage of bio-medical waste during loading or unloading may cause irritation in the eyes of the workers and mucous membrane, acute respiratory illness, and may also affect their immune system. Very less dust will be generated during the loading or unloading activity. 	<ul style="list-style-type: none"> Workers will be trained properly regarding handling of bio-medical waste and PPE like nose mask and goggles will be provided to the workers. If required, water will be sprayed at the dust generation point. Spillage will be managed by proper handling of the waste in the first place.
Water Environment	Spillage of bio-medical waste, oil & chemicals, if in any case encounters water body can	<ul style="list-style-type: none"> If case spillage occurs, storage will be channelized properly to drains and all PPE shall

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	deteriorate the ground-water & surface water body which in turn may affect the aquatic life also	<p>be worn during this time.</p> <ul style="list-style-type: none"> The unloading of BMW waste will be done in a marked safe area. All systems and connections shall be maintained and checked regularly so that connections are leak proof. Containment such as proper slopes connected with the sump shall be provided, so that during spillage if any occurs, the spill can be collected and disposed off properly. In case of spills of toxic chemicals, dry adsorbents/cotton should be used for cleaning instead of water.
Land Use	None	None
Soil Environment	Chemical Degradation of soil	The tankers, drums etc. would be ISO approved and as per the specifications of internationally approved vendors so as to minimize any spillage, venting of solvent etc. therefore there would be no impact on soil after this precaution is ensured.
Socio-Economic	None	None
Ecology & Biodiversity	<ul style="list-style-type: none"> Spillage of waste on soil can inhibit the growth of plants and pre-mature leaves senescence. Vehicular emission like NO₂, NO etc. can inhibit the growth of plants and pre-mature leaves senescence. Increased PM Level will result deposition of dust on leaves which may cause decrease in Transpiration rate of flora 	<ul style="list-style-type: none"> The unloading activity will be done with a safe zone defined and in a marked safe area. Hence minimal change of impact on ecology Plantation along the boundary wall will be done. More than 33% of land area will be developed as green area as per the guidelines of CPCB.

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Noise & Vibration	Unloading of bio-medical waste will not cause much significant impact on noise level of the area, it may only cause physiological effects like annoyance to the workers	Proper training will be given to the workers for handling of raw materials. If required, PPE will be provided to the workers.
Hydrology & Geology	None	None
Solid & Hazardous Waste	Solid waste generated like discarded containers, chemicals and HDPE bags will be generated, which may cause harm if come into contact.	All the discarded containers will be sold to approved recyclers or traders after cleaning.

4.2.2. Activity – Treatment Process (Incineration, autoclave & shredding)

Aspects

Water requirement

Generation of heat

Generation of hazardous waste

Energy requirement

Table 4.7: Activity – Treatment process (Incineration, autoclave and shredding)

Environmental Components	Impact	Mitigation Measures
Air Environment	<ul style="list-style-type: none"> The major air pollutants released from DG Set & Boiler will be NO_x, SO₂ and PM. The SPM, SO₂, NO_x, Dioxins, Furans and HCl emission from the stacks attached to Incinerators and may cause eye irritation and acute respiratory illness to the people nearby. Fugitive emission is 	<ul style="list-style-type: none"> To control emissions from incinerators of Ceramic Filter Bag House shall be Provided. Chimney (30 m above ground level) will be provided from the incineration process. A lean concentration of NaOH Solution and water will be used to neutralize the flue gasses/solutions. For mitigation of impacts of air pollution from boiler, stack

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	<p>air pollutants released to the air other than those from stacks. Typically small releases from leaks in plant equipment, handling and transportation of Biomedical Waste, Internal Roads, etc. which will cause irritation in eyes, nose and throat, difficulty breathing and nausea.</p> <ul style="list-style-type: none"> • population 	<p>height minimum of 30m above ground level.</p> <ul style="list-style-type: none"> • As per CPCB guidelines, online monitoring systems shall be installed for the measurement of Temperature, CO & CO₂, dioxins & furans. • To control or prevent fugitive emission regular maintenance of pollution control devices will be carried out. Good housekeeping shall be done.
Water Environment	<ul style="list-style-type: none"> • Utilization of water may impact the water demand of the vicinity and Improper disposal of waste water generated may affect the quality of nearby surface water body & ground water. • Improper disposal of waste generated may affect the quality of ground-water. • Spillage of oil & chemicals, if in any case encountered, can deteriorate the ground-water & surface water body, which in turn may affect life also. • Water tables may be depleted in case ground-water is used for the construction. • If dust emitted gets deposited on the water body can deteriorate the water quality. 	<p>Water requirement for the proposed CBWTF project is 9 KLD (Industrial – 8.0 KLD & Domestic - 1.0KLD). The amount of total waste water generated out of the proposed Bio Medical Waste Treatment Facility is 7.0 KLD (~ considering 5% loss) which shall be treated in ETP having capacity of 10 KLD. The treated water that will be 7 KLD will be reuse in makeup of process water in air pollution control device. It will be a Zero liquid Discharge Unit.</p>

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	<ul style="list-style-type: none"> The waste water If not properly disposed off, then it can deteriorate the surface water quality of nearby water bodies by increase in the no. of pathogens, BOD, COD, TSS, and making water unfit for consumption. 	
Land Use	None	None
Soil Environment	Chemical Degradation of soil due to disposal of waste water, solid waste on the soil or spillage of chemicals on soil.	<ul style="list-style-type: none"> All the waste will be collected and kept in separate rooms with pucca floors. No disposal of waste will be done on soil. Procedures for maintenance of equipment would ensure that this risk is minimized. Sump shall be made and proper channelization of spillage shall be made.
Socio-Economic	None	None
Ecology & Biodiversity	<ul style="list-style-type: none"> NO₂, SO_x gaseous emission from treatment process inhibit the growth of plants and promote pre-mature leaves senescence. Increased dust emission can lead to climate change which eventually will result in a decrease in plant/tree cover. Increased noise will cause disturbance of existing fauna. Impact on aquatic life of nearby surface water.. 	<ul style="list-style-type: none"> Water sprinkling will be done to reduce the dust generation. Dust suppression systems (water spray) will be done as per requirement. Ambient air quality will be regularly monitored to ensure that ambient air quality standards and suggested limits will be met at all times. All measures will be taken to avoid spillage of waste and chemicals on soil.
Noise & Vibration	During the treatment process, noise and vibration	<ul style="list-style-type: none"> Machineries of the reputed make and less noise producing will





	<p>may be generated from the machineries which may cause speech interference, annoyance, hearing impairment, increase in heartbeat/ blood pressure in the workers.</p>	<p>be purchased.</p> <ul style="list-style-type: none"> Stationary machineries and equipment will be properly enclosed by enclosures and will be provided with dampeners for minimizing noise generated due to vibration of machineries. It will be re-checked and assured that mufflers systems are installed in engines of machineries which will help in reduction of noise. Silencers of all the machineries and equipment will be checked and old worn out machineries will be replaced by new and less noisy machineries/equipment.
Hydrology & Geology	<p>-Due to spillage/leakage the chances of contamination of surface water as well as ground water increases.</p>	<ul style="list-style-type: none"> Waste water generated will be treated in ETP. No waste water will be discharged to the surface body or ground-water, all the water will be reused within the project after treatment. All probable leakage areas such as pipelines, joints and pumps shall be inspected and maintained proactively. Leak Detector(s) installations are recommended. Spillage will be managed by detection of leaks in the first place from structures or vessels. Containment such as proper slopes connected with the sump shall be provided so that during spillage if any occurs, the spill can be collected and disposed-off properly.
Solid & Hazardous Waste	<p>-Process residue will be generated which are hazardous, which may</p>	<ul style="list-style-type: none"> Proper care shall be taken while handling & transportation, PPE will be used.

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	<p>cause harm if come into contact with skin. -Sludge and any other may cause nuisance if not maintained properly.</p>	<ul style="list-style-type: none"> Process residue will be recycled completely. No process waste/residue will be disposed off.
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4.2.3. Activity – Operation of machinery & Equipment (Boiler, DG set, ETP, Incinerators, auto-clave and shredder)

Aspects

Generation of waste gases, PM, Sox, NOx, PM_{2.5}, VOC.

Generation of Sludge, used oil.

Water requirement

Generation of Noise & vibration

Generation of waste water

Requirement of Fuel

Generation of Ash

Spillage/leakage

Generation of Hazardous waste

Table 4.8: Activity-Operation of machinery & Equipment

Environmental Components	Impact	Mitigation measures.
Air Environment	Flue gas emission (SO ₂ , NO _x & CO ₂) will be from a stack attached with a boiler, where furnace oil will be used as fuel, and D.G. set in which diesel will be used as fuel and PM _{2.5} and PM ₁₀ will also be generated due to the burning of fuels.	<ul style="list-style-type: none"> For mitigation of impacts of air pollution, stack height minimum of 30 m above ground level shall be provided for the boiler. Adequate stack height will be maintained To control emissions from incinerator Ceramic Filter Bag House shall Be Provided. Chimney (30 m above ground level) will be provided from the incineration process. A lean



		<p>concentration of NaOH Solution and water will be used to neutralize the flue gasses/solutions. For mitigation of impacts of air pollution from boiler, stack height minimum of 30 m above ground Level..</p> <ul style="list-style-type: none"> Regular maintenance of valves, pipes etc will be done. PPEs will be provided to the workers. <p>Frequent work area monitoring will be done to ensure fugitive emission is under control.</p>
Water Environment	<p>Utilization of water may impact the water demand of the vicinity and Improper disposal of waste water generated may affect the quality of nearby surface water body & ground water.</p> <p>-If boiler ash emitted gets deposited on water body can deteriorate the water quality.</p> <p>-The waste water If not properly disposed off, then it can deteriorate the surface water quality of nearby water body by increase in the no. of pathogens, BOD, COD, TSS etc and making water unfit for consumption. It will also affect the aquatic life.</p>	<ul style="list-style-type: none"> It will be a zero liquid discharge unit. Waste water generated will be treated in ETP. All the treated water will be used in the process, no untreated/treated water will be discharged. It will be zero liquid discharge project Green belt/greenery will be developed along most of the periphery of the project area as well as along roads.
Land Use	None	
Soil Environment	Chemical Degradation of soil due to disposal of waste water, solid waste on the soil.	<ul style="list-style-type: none"> Proper care shall be taken for disposal of waste Proper channelization of waste water to treatment facilities shall be done. Sludge shall be stored

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		in a separate room and sent to TSDF.
Socio-Economic	None	None
Ecology & Biodiversity	<ul style="list-style-type: none"> • NO₂, SO_x, and gaseous emission from manufacturing process, boiler, inhibit the growth of plants and pre-mature leaves senescence. • Increased dust and ash emission can lead to climate change which eventually will result in a decrease in plant/tree cover • Ash-filled voids cannot support tree species because of poor root system development which in turn results in uprooting of trees even by low velocity winds. 	<p>All the polluting machinery will be installed with appropriate air pollution control system</p> <p>-</p>
Noise & Vibration	<p>During the operation of machinery, noise and vibration may be generated from the machineries which may cause speech interference, annoyance, hearing impairment, increase in heartbeat/ blood pressure in the workers.</p>	<ul style="list-style-type: none"> • Machineries of the reputed make and less noise producing will be purchased. • Stationary machineries and equipment will be properly enclosed by enclosures and will be provided with dampeners for minimizing noise generated due to vibration of machineries. • It will be re-checked and assured that mufflers systems are installed in engines of machineries which will help in reduction of noise. • Silencers of all the machineries and equipment will be checked and old worn out machineries will be replaced by new and less





		noisy machinery/equipment. <ul style="list-style-type: none"> Sufficient oiling and lubrication will be done to all the parts of the machineries to ensure that minimal noise is generated.
Solid & Hazardous Waste	ETP sludge, and used oil will be generated which are hazardous, which may cause harm if come into contact Sludge and any other may cause nuisance if not maintained properly	<ul style="list-style-type: none"> Proper care of waste shall be taken while handling & transportation, PPE will be used. All ETP sludge will be stored in leak proof PVC containers in isolated area on pakka floor with in the premises as per HWM Rules and handed over to authorized treatment and disposal facility of Delhi Pollution Control Committee Used lubricating will be sent to the approved recycler.

4.2.4. Activity – Collection and Transportation of bio-medical waste

Aspects

- Vehicular Emission and Dust emission
- Littering of bio-medical waste
- Road congestion & Breakage of roads
- Noise Generation
- Spillage/leakage of biomedical waste

Table 4.9. Activity- Collection and transportation of bio-medical waste

Environmental Component	Impact	Mitigation measures
Air Environment	<ul style="list-style-type: none"> Gaseous emissions from vehicles used for transportation will affect the 	<ul style="list-style-type: none"> Vehicles with valid PUC certificates will be used for transportation. Plantation all around the



	<p>respiratory health of staff and nearby population.</p> <ul style="list-style-type: none"> Leakage of waste may result in emission of VOCs in the air environment which will cause irritation in eyes, nose and throat, difficulty breathing and nausea. 	<p>periphery will be done.</p> <ul style="list-style-type: none"> Proper maintenance of vehicles shall be done periodically to ensure no leakage from the vehicles Vehicular transportation will be done shift wise in order to reduce the stress on the roads. Proper maintained and cleaning of vehicles and tires shall be done in order to reduce dust generation. The transportation of the bio-medical waste shall be done in coloured coded bags in covered trucks & tempo.
Water Environment	<p>If dust emitted or spillage/leakage gets deposited on water body can deteriorate the water quality.</p>	<ul style="list-style-type: none"> The transportation of the bio medical waste shall be done in covered trucks in colored coded bags Special refer trucks will be employed for transportation from the hospital to site. -Trucks will be fully covered during
Land Use	None	None
Soil Environment	<p>-Chemical degradation of soil would occur due to spill of chemical or other waste on soil.</p>	<ul style="list-style-type: none"> Procedures for maintenance of equipment would ensure that this risk is minimized and clean-up response is rapid if any spill occurs. Waste shall be collected separately in drums and handed over to the authorized outside agency.





Socio-Economic	<ul style="list-style-type: none"> Dust and emission from movement of vehicles are likely to cause some impacts on the working population within the immediate vicinity of the project site. Traffic congestion in the area Accidental leakage of the chemical during transportation can cause fire. 	<ul style="list-style-type: none"> Flexible dust suppression systems (water spray) will be used as per requirement. Preventive maintenance will be carried out for vehicles and pollution checks on a periodic basis. Materials will be fully covered during transportation to the project site by road. A sheet listing the materials shall be available in the vehicle and the emergency phone numbers shall also be listed.
Ecology & Biodiversity	Increased noise due to vehicular transportation will cause disturbance of existing avi-fauna, however, avifauna is not restricted to one place for a long time, thus it will not result in their displacement.	<ul style="list-style-type: none"> Vehicles used in the transportation of construction material will have a PUC certificate. Water sprinkling was done to reduce the dust generation Dust suppression systems (water spray) shall be done as per requirement at the construction site. Vehicular movement for transportation of raw material will be carried out only in day- time and will try to avoid unnecessary honking with the help of sign boards.
Noise & Vibration	Due to transportation of construction materials and machinery for installation high levels of noise may be generated which may cause physiological & psychological effects on	<ul style="list-style-type: none"> Silencers will be checked in the vehicles used for transportation of materials. No honking zone will be maintained. Reverse horn in the transportation vehicles will be banned. Only PUC certified vehicles





	workers like annoyance, speech interference, headache, Auditory impact, increase in heartbeat of elderly people. There will not be much impact due to vibration on project	shall be allowed for transportation done which will dampen the noise.
Hydrology & Geology	Due to spillage of chemical/waste there may be chances of contamination of surface water as well as ground water increases	Measures will be taken to avoid spillage of chemical/waste.
Solid & Hazardous Waste	Accidental litter off of material, may cause potential health impacts.	Incinerator Ash ETP SLUDGE both will be handover to authorize TSDF.

4.2.5. Activity - Working & daily activity of staff, Visitors

Aspects

Solid & e-waste generation

water requirement & waste water generation

Table 4.10: Activity- Working & daily activity of staff, visitors

Environmental Components	Impact	Mitigation Measures
Air Environment	Bio-degradable Waste generation may lead to odour problems if not stored properly.	Bio-Degradable waste shall be stored in a separate room and given to the approved vendor for final disposal.
Water Environment	<ul style="list-style-type: none"> Waste water, if not properly disposed off, then it can deteriorate the surface water quality of nearby water body. The abstraction of groundwater is not proposed 	



	<p>for the project, hence there will be no impact on Groundwater.</p> <ul style="list-style-type: none"> Disposal of untreated waste water may deteriorate water quality of surface & ground water by increase in the no. of pathogens, BOD, COD, TSS etc 	
Land Use	None	None
Soil Environment	Impact on soil due to improper disposal of solid waste includes, the leaching from biodegradable waste and effect on flora from spillage of waste on soil.	All solid waste and hazardous waste will be properly collected, stored in a separate room and disposed off. Biodegradable waste and recyclable waste will be collected and disposed off by approved vendors.
Socio-Economic	<ul style="list-style-type: none"> Improper storage and disposal of solid waste, may decrease the aesthetic value of complex and lead to increase in risk of disease occurrence of persons. There may occur foul smell which will cause nuisance in staff. employment generation 	All solid waste from the proposed project shall be properly collected, stored and disposed. All the waste will be given to the approved vendor. Total 38 manpower will be required from nearby areas.
Ecology & Biodiversity	No significant impact	None
Noise & Vibration	No significant impact	None
Hydrology & Geology	<p>Infiltration of silt and sand may occur with improper storm water harvesting.</p> <p>Untreated wastewater, if infiltration to groundwater it may deteriorate water quality of ground water by increase in the no. of pathogens, BOD, COD, TSS etc in ground water</p>	<ul style="list-style-type: none"> Storm water channelization shall be made in the project site and the same shall be collected in the tanks. The domestic waste water will be treated in soak pit



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	and thereby affecting and making water unfit for consumption.	
Solid & Hazardous Waste	<ul style="list-style-type: none"> Improper storage and disposal of Biodegradable waste will enhance the risk of microbial contamination, population. Improper storage and disposal of Solid Waste will enhance the risk of disease occurrence and cause foul smell. It will attract the vectors. 	<p>Solid waste shall be managed as per solid waste management rule, 2016.</p> <p>E-waste if generated shall be properly disposed as per E-Waste (Management) Rules, 2016</p>

4.3 Air quality modelling

For the proposed atmospheric dispersion modelling study, United States Environmental Protection Agency (USEPA) approved and also recommended by the Ministry of Environment and Forests (MoEF), Government of India, regulatory air quality model i.e. Industrial Source Complex Short Term (ISCST₃-version 3) is applied to predict ground level incremental concentrations (GLCs) of concerned critical pollutants. Prior to air quality modelling exercise, meteorological condition during one season over project site is extensively studied. Concentrations are estimated for the critical pollutants assessed over appropriate averaging times (i.e. 8 hours and 24 hours) based on the applicability of the National Ambient Air Quality Standards (NAAQS)

4.3.1 ISC Short Term Model

The Industrial Source Complex Short Term (ISCST₃) model is the US EPA's one of the regulatory models for many New Source Review (NSR) and other air permitting applications. The ISCST₃ model is based on a steady-state Gaussian plume algorithm, and is applicable for estimating ambient impacts from point, area, and volume sources out to a distance of about 50 kilometers. The ISC Short Term model accepts hourly meteorological data records to define the conditions for plume rise, transport, diffusion, and deposition. The model

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estimates the concentration value for source and receptor combination for each hour of input meteorology, and calculates user-selected short-term averages.

4.3.2 Meteorology

Meteorology is the fluid mechanics applied to the atmosphere. Meteorological conditions play an important role in determining existing air quality and environmental conditions. The essential relationship between meteorology and atmospheric dispersion involves the wind in the broadest sense of the term. Wind fluctuations over a very wide range of time and space scales accomplish dispersion and strongly influence other processes associated with them. The characterization of the existing meteorological conditions near a source of pollutants is, therefore, a critical aspect for assessing air quality in the ambient environment. For the rapid air quality impact assessment meteorological data for the winter season over the project region are used for air quality modelling. The following subsections describe the prime meteorological parameters during the observation period which govern the dispersion of pollutants.

4.3.3 Wind Direction and Speed

Wind direction is reported as the direction from which the wind blows and is based on surface observations. Over the course of a year, wind usually blows in all directions with varying frequencies. Certain direction, which occurs more frequently than others, is known as the prevailing wind direction. Wind speed and direction and their frequency during post-monsoon and winter season are represented by wind rose diagram. The wind rose denotes a class of diagrams designed to display the distribution of wind direction experienced at a given location over a period of time — long for a climatologically record of prevailing winds or short to show wind character for a particular event or purpose. Wind rose summarizes a considerable amount of wind frequency information into a single graphic shown in **Figure 1** during the monitoring period below:

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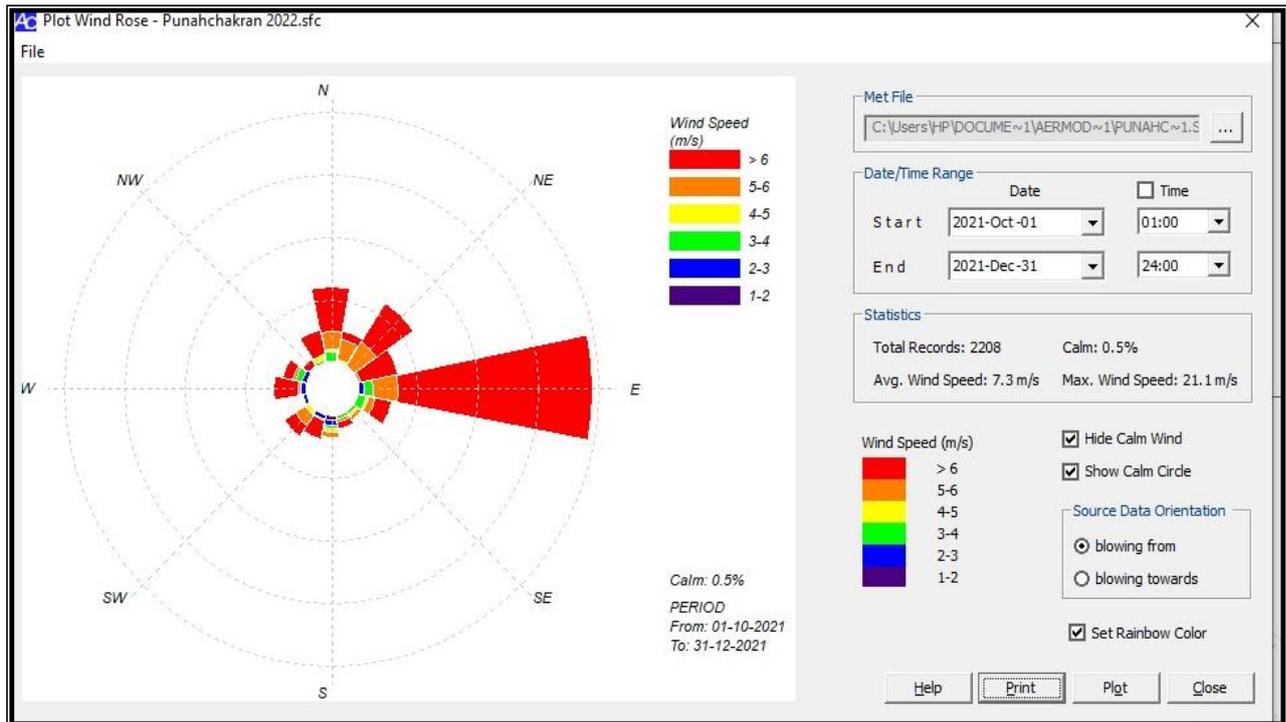


Figure 4.1: wind frequency information

4.3.4 Impact Assessment through Mathematical Modelling

Prediction of impacts on air environment has been carried out employing mathematical model based on a steady state Gaussian plume dispersion model designed for multiple point sources for short term. In the present case, Aermოდ Cloud, flat terrain dispersion model based on steady state Gaussian plume dispersion, designed for point sources for short-term and developed by United States Environmental Protection Agency [USEPA]. Particulate matter (TSPM, CO, SO₂, & NO_x) is the primary pollutant emitted from the CBWTF unit with CPP. Because of the raw material used, main operation in the CBWTF plant has the potential to produce particulate matter (TSPM, CO, SO₂, & NO_x) is combustion of Fuel in the Incinerator. The second largest sources are the dust and hygiene handling system in the plant. Few other potential fugitive emission points, called transfer points, are at the end of all process.

4.3.5 Stack Emissions

In order to carry out efficient dispersion of gaseous pollutants, desired velocity of emission shall be ensured through proper functioning of FD/ID fans. → Optimum air-fuel ratio (AFR) in the Co-generation shall be ensured throughout the operation period. → Sampling port &

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monitoring point and online monitoring system shall be provided at prescribed stack height.
 → APCS will be installed with the specifications as prescribed along with adequate stack height and online monitoring system.

(i) Pollutants/Model Options Considered for Computations

The model simulations deal with major pollutant TSPM, CO, SO₂, & NO_x emitted from the proposed plant.

(ii) Model Options used for Computations

The options used for short-term computations are:

- ❖ The plume rise is estimated by Briggs formulae, but the final rise is always limited to that of the mixing layer;
- ❖ Stack tip down-wash is not considered;
- ❖ Buoyancy Induced Dispersion is used to describe the increase in plume dispersion during the ascension phase;
- ❖ Calms processing routine is used by default;
- ❖ Flat terrain is used for computations;
- ❖ It is assumed that the pollutants do not undergo any physico-chemical transformation and that there is no pollutant removal by dry deposition;
- ❖ Washout by rain is not considered;
- ❖ Cartesian co-ordinate system has been used for computations; and
- ❖ The model computations have been done for 20 km with 500-m interval.

4.3.6 Model input data

a) Meteorological data Meteorological inputs required are temperature, relative humidity, wind speed, wind direction, cloud cover etc. which was recorded at site during Post-monsoon season (October to December, 2021).

b) Stack emissions the emission details are given in table below:

The continuous source of emissions in the proposed project will be from Incinerator that would be used to generate steam and power.

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Table 4.11: The emission detail from stack

S.No.	Parameter	Details of Incinerator Stack	DG set Stack
1	Major Pollutant	CO, SO ₂ and NO _x	TSPM, SO ₂ and NO _x
2	No. of Stack	01 No.	01 No.
3	Stack attach to Incinerator	0.25 TPH Incinerator	Adequate DG stack height
4	Material of Construction	MS	Mild Steel
5	Height of Stack	30 Meters	10 m
6	Capacity of Incinerator	0.25 TPH Incinerator	75 KVA
7	Diameter at the top of Stack	1.2 meters	0.15 Meters
8	Temperature	925°C	102°C
9	Flue Gas Exit Velocity	5.9 m/s	8.1 m/s
10	Fuel	LDO/HSD	Diesel
Rate of Emission			
A	TSPM	---	0.1 g/s
B	SO ₂	3.2 g/s	0.29 g/s
C	NO _x	1.9 g/s	0.11 g/s
D	CO	0.9 g/s	----

The wind rose diagram reveals that wind was blowing predominantly from the East direction having speed in the range of 1 m s⁻¹ to 6 m s⁻¹ during the monitoring period. The onsite average wind speed was observed 7.3 m s⁻¹ with frequency of calm winds 0.5 % during the monitoring period. The maximum wind speed is 21.1 m/s.

4.3.7 Atmospheric stability

A measure of the tendency of air to move upward or downward within the atmosphere generates turbulence. The atmosphere may be more or less turbulent at any given time, depending on the amount of incoming solar radiation as well as other factors. There are six defined Pasquill atmospheric stability classes, from A to F, each representing a different degree of turbulence in the atmosphere. When moderate to strong incoming solar radiation

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heats air near the ground, causing it to rise and generating large eddies, the atmosphere is considered unstable. Unstable conditions are associated with atmospheric stability classes A, B and C. In this stability class air has strong tendency to move up or down, and the atmosphere is more turbulent. When solar radiation is relatively weak or absent, air near the surface has reduced tendency to rise and less turbulence develops. In this case, the atmosphere is considered stable, the wind is weak, and the stability class would be E or F. Stability classes D represents conditions of neutral stability (moderately turbulent). Neutral conditions are associated with relatively strong wind speeds and moderate solar radiation. The frequency of stability classes during the study period is provided in **Table 1.**

TABLE 4.12: FREQUENCY OF STABILITY CLASSES

Stability Class	Frequency (%)
A – Extremely Unstable	1.9
B – Unstable	20.3
C – Slightly Unstable	8.8
D – Neutral	5.3
E – Slightly Stable	8.5
F – Stable	55.2

This data indicates that over the monitoring period, the site exhibits trends of stable conditions. Stable conditions exhibit poor vertical mixing, and low levels of contaminant dispersion. Use of this stability data for modeling purposes will produce higher concentrations of pollutants at a given receptor (i.e. more conservative results).

4.3.8 Mixing height

Mixing Height (MH) is the vertical extent through which the contaminant plume can be mixed. Forecasting of mixing height is done with the aid of the vertical temperature profile. The MH is a function of stability. In unstable air the MH is higher and in stable air the MH is lower. With a lower MH, there is a smaller volume of air in which the pollutant can be dispersed, resulting in higher concentrations in the ambient environment. There is a seasonal variation of MH. During summer daylight hours, MH can be few thousand feet whereas for winter it can be a few hundred feet. It varies also in the course of a day. It is lowest at night



and increases during the day. Secondary information has been used to determine the mixing height over the study region for the study period and it varies from 25-1000 meters (IMD).

4.3.9 Potential air environment impact

During the operation phase CBWTF site expected the air pollution from Incinerator and DG Stack source (i.e. Point Sources). In order to assess the air quality impact on the ambient air environment due to CBWTF operation. However, site will be expected to run as on average 8 hours per day, but for the conservative area impact assessment, it is assumed that all CBWTF site will be run continuously for 24 hours.

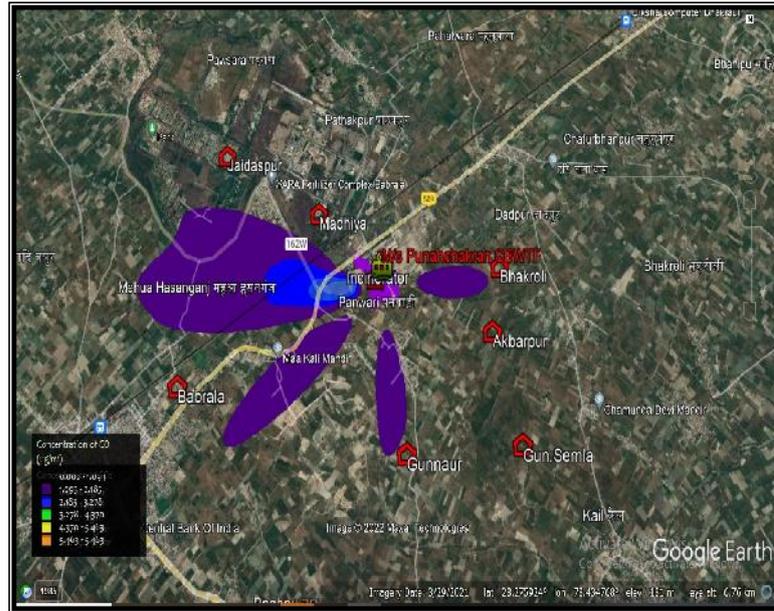
CO, TSPM, SO₂ and NO_x emissions due to CBWTF operations and the vehicular movement are expected as major pollutants. Emission Area Source characteristic used for atmospheric dispersion modelling is provided in the following:

The maximum GLC for the **Incinerator** of measured pollutants CO, SO₂ and NO_x predicted average over 24 hours are estimated to be 5.46 g/m³, 14.57 g/m³ and 8.65 g/m³ E 247816, N 3130580, Elevation 180.5, which is at the distance of 400 m in West from the centre of the project site.

The maximum GLC for the **DG set** of measured pollutants TSPM, SO₂ and NO₂ predicted average over 24 hours are estimated to be 10.35 g/m³, 30.02 g/m³ and 11.39 g/m³ at (E 248116, N 3130615, Elevation 180.3, which is at the distance of 100 m in WSW from the centre of the project site.

The spatial distribution of ground level incremental concentrations of CO, SO₂, and NO_x due to proposed CBWTF site on the impact zone area of 10km x 10km on modelling grid size of 100mx100m around the proposed site is shown in Below **Figures** respectively. The predicted TSPM, SO₂, NO_x ground level concentration is given in the **Table 3** along with resultant concentration at the monitoring location around the project site. Modelling result envisages that incremental ground level concentrations of modeled pollutants due to operation of proposed CBWTF site during the assumed aforesaid hours are negligible. The resultant concentration level of CO, TSPM, SO₂, NO_x pollutants are well within the NAAQS as shown in the **Table 3**.

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Google Earth Image CO Incinerator (KML File)

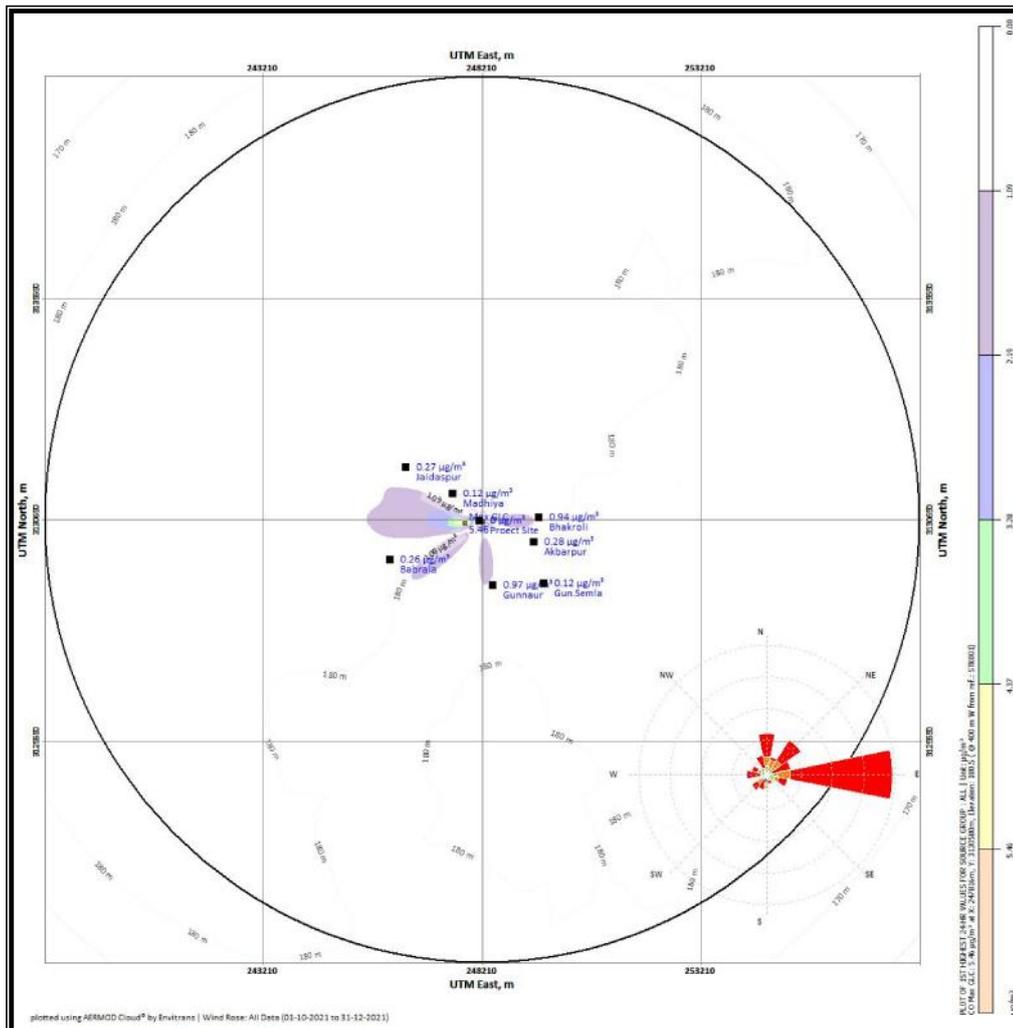
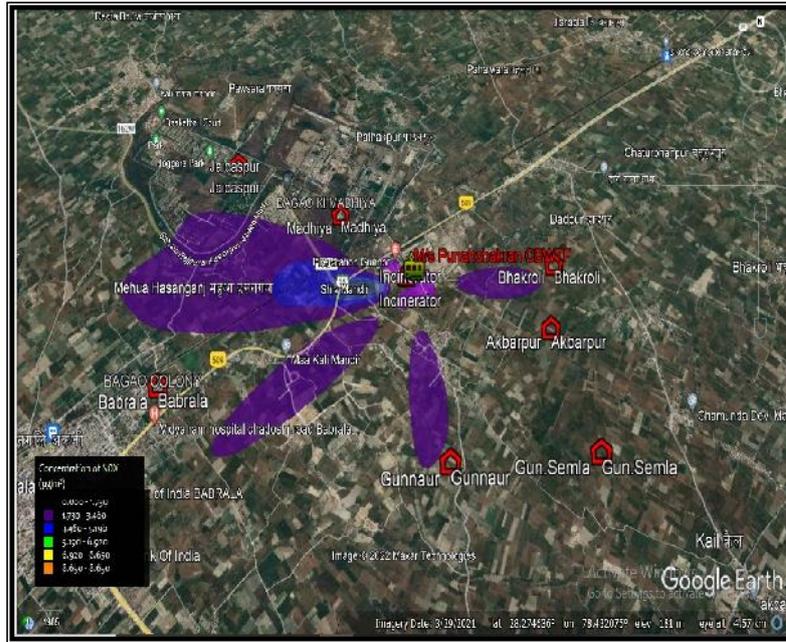


Fig 4.2: Spatial distribution of 24 hour average Incinerator CO conc ($\sim\mu\text{g}/\text{m}^3$)

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Google Earth Image NOx Incinerator (KML File)

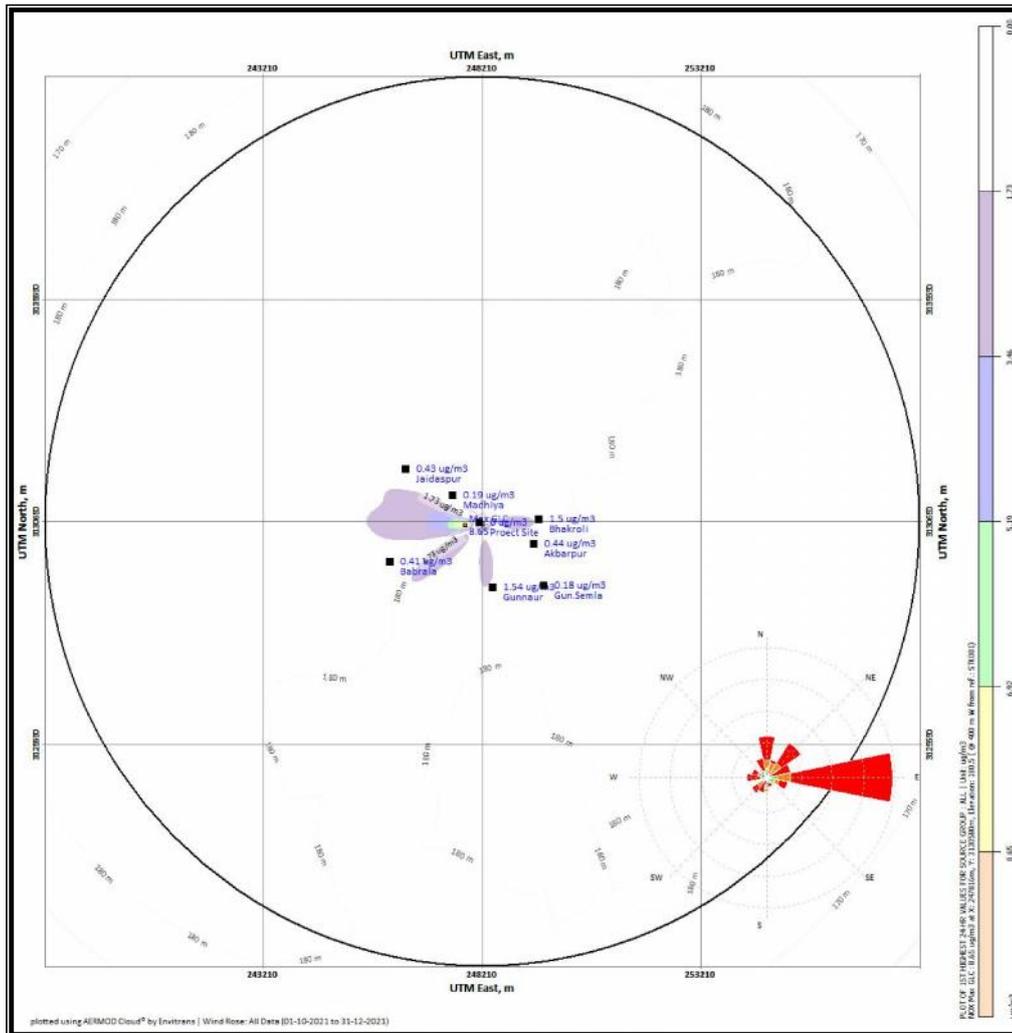
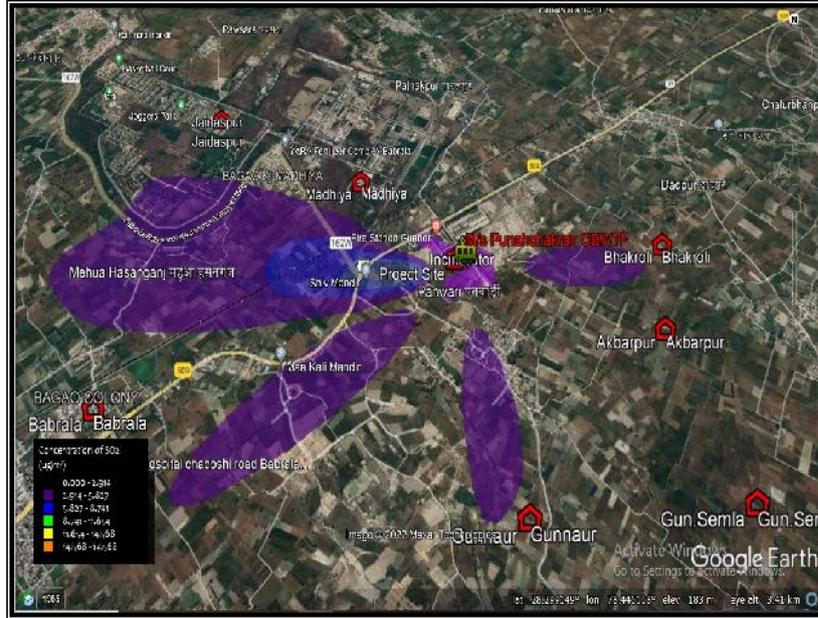


Fig 4.3: Spatial distribution of 24 hour average Incinerator NO₂ conc (~g/m³)

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Google Earth Image SO₂ Incinerator (KML File)

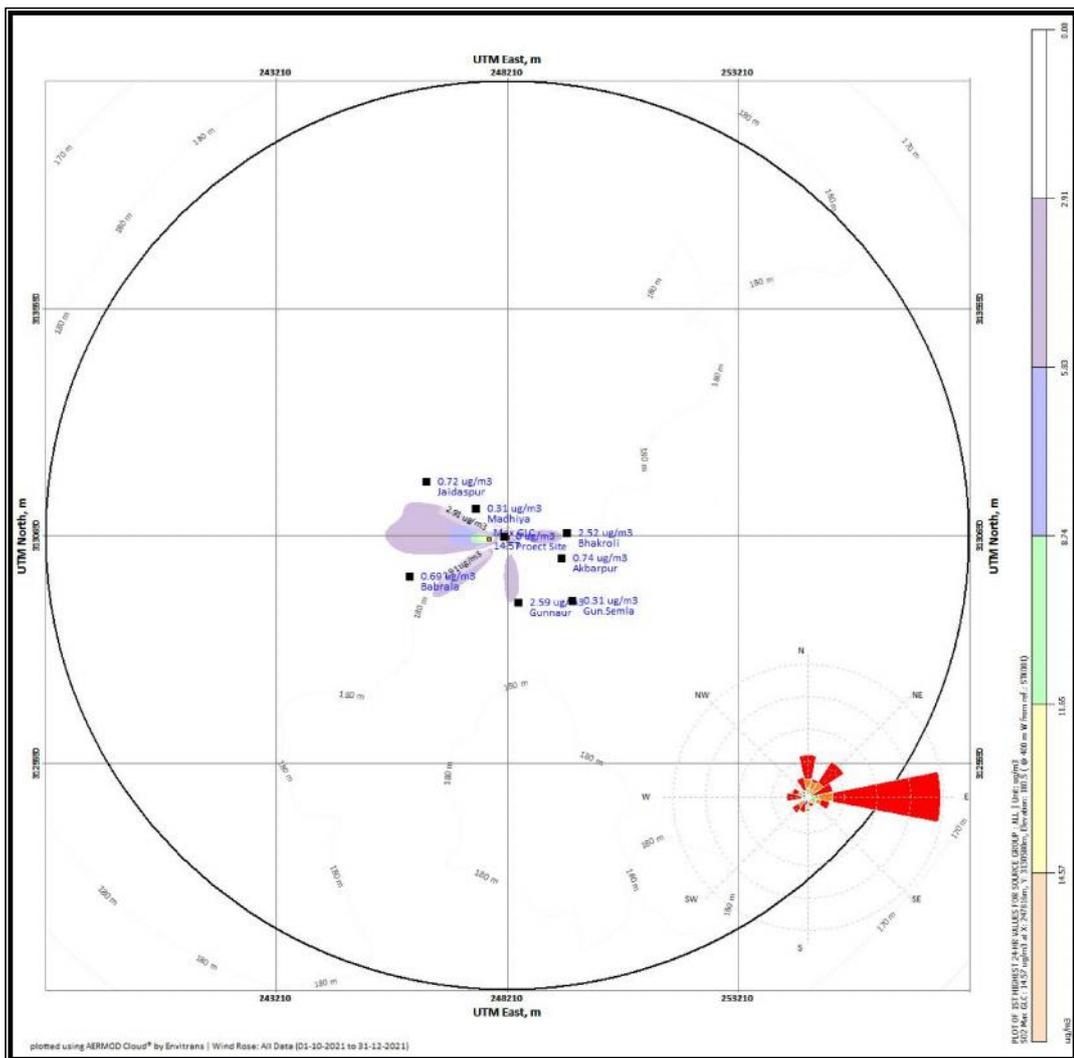
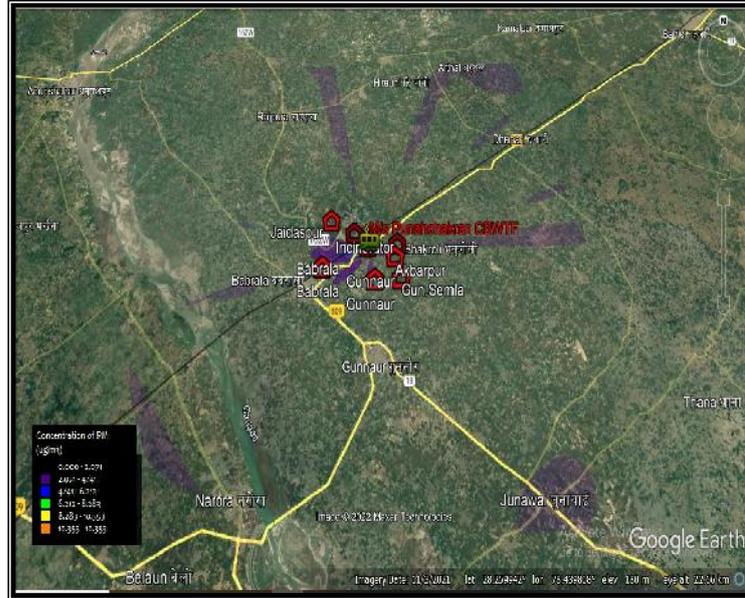
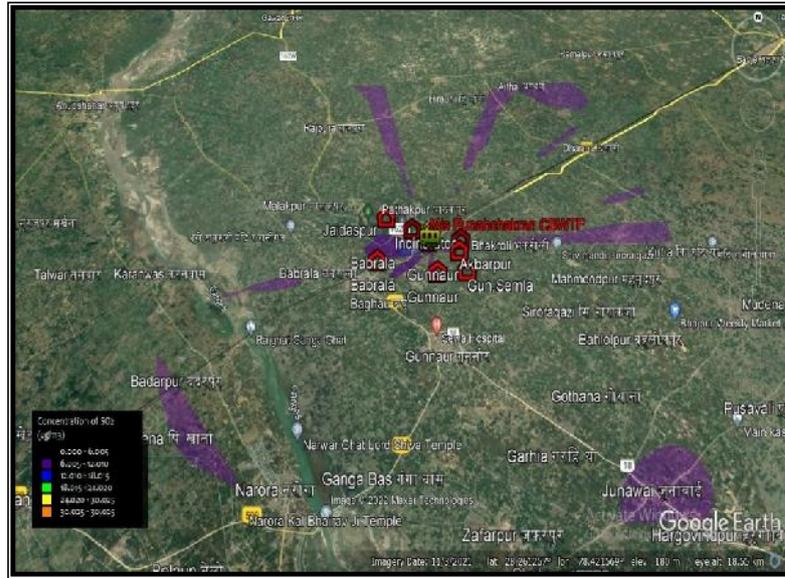


Fig 4.4: Spatial distribution of 24-hour average Incinerator SO₂ conc (~g/m³)

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Google Earth Image DG Set SO₂ (KML File)

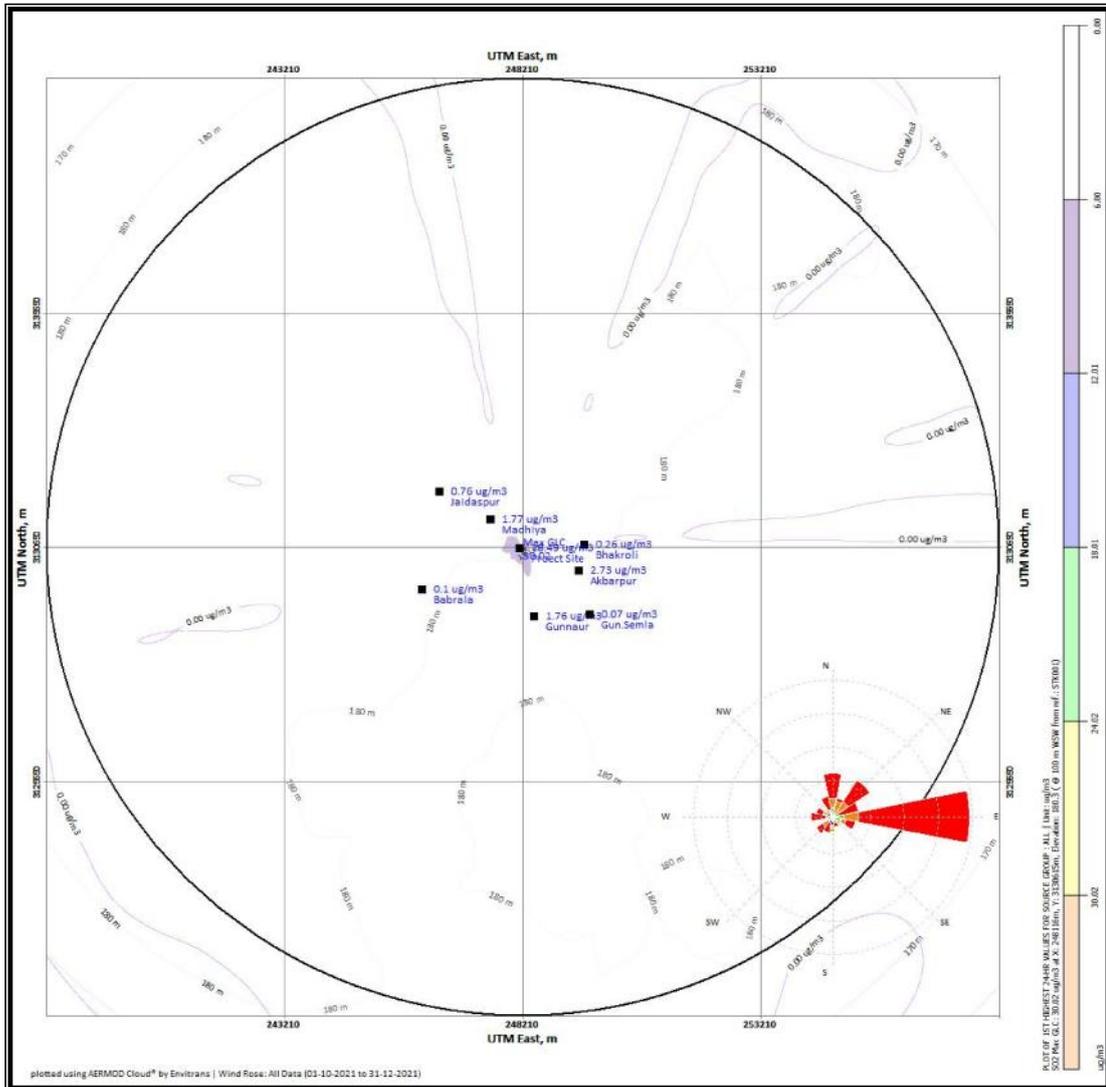
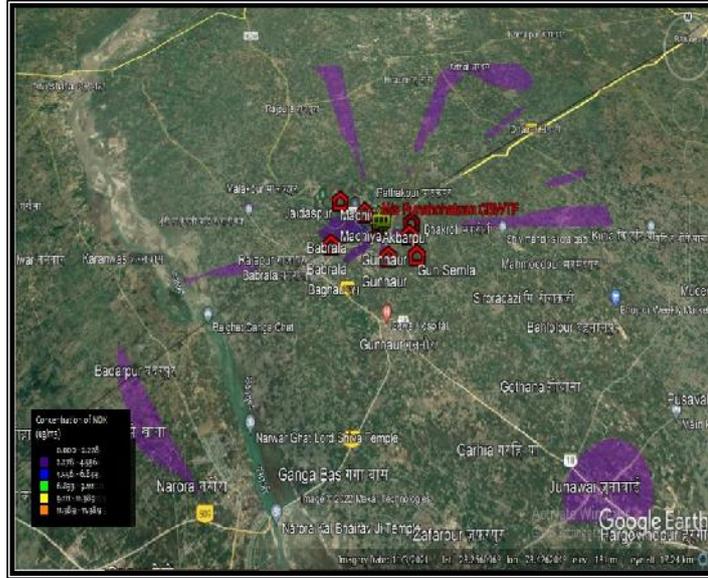


Fig 4.6: Spatial distribution of 24-hour average DG Set SO₂ conc. (~g/m³)

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Google Earth Image DG Set NOx (KML File)

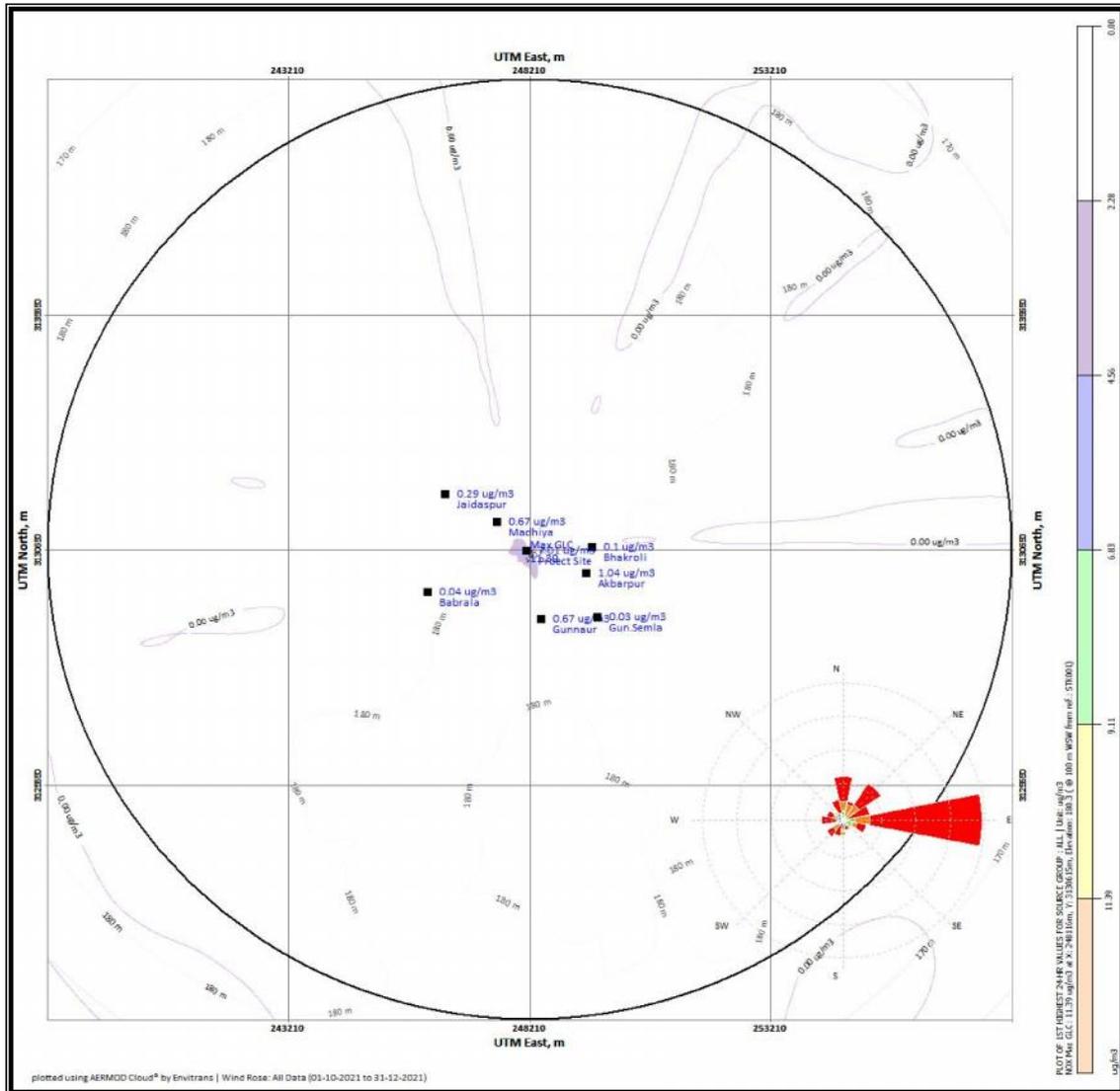


Fig: 4.7 Spatial distribution of 24-hour average DG SET NO_x conc. (-g/m³)

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Table 4.13: CBWTF modeling result

CBMWTF MODELLING RESULT									
INCINERATOR STACK									
POLLUTANTS	MAX GLC E 247816, N 3130580, Elevation 180.5, which is at the distance of 400 m in West	AQ1 PROJECT SITE 28°16'42.67"N 78°25'54.28"E	AQ2 Madhiya 28°16'59.02"N 78°25'11.36"E	AQ3 Jaidaspur 28°18'8.43" N 78°23'58.37 "E	AQ4 Babrala 28°16'3.16" N 78°24'39.76 "E	AQ5 - Gunnaur 28°14'39.86 "N 78°25'58.03 "E	AQ6 Akbarpur 28°15'26.47" N 78°27'21.93" E	AQ7 Gunnaur Semla 28°14'52.33" N 78°28'40.94" E	AQ8 Bhakroli 28°16'40.80" N 78°28'2.70"E
CO	5.46 g/m ³	5.46 g/m ³	0.12 g/m ³	0.27 g/m ³	0.26 g/m ³	0.97 g/m ³	0.28 g/m ³	0.12 g/m ³	0.94 g/m ³
SO ₂	14.57 g/m ³	14.57 g/m ³	0.31 g/m ³	0.72 g/m ³	0.69 g/m ³	2.59 g/m ³	0.74 g/m ³	0.31 g/m ³	2.52 g/m ³
NO _x	8.65 g/m ³	8.65 g/m ³	0.19 g/m ³	0.43 g/m ³	0.41 g/m ³	1.54 g/m ³	0.44 g/m ³	0.18 g/m ³	1.15 g/m ³
DG STACK									
POLLUTANTS	MAX GLC E 248116, N 3130615, Elevation 180.3, which is at the distance of 100 m in WSW	AQ1 PROJECT SITE 28°16'42.67"N 78°25'54.28"E	AQ2 Madhiya 28°16'59.02"N 78°25'11.36"E	AQ3 Jaidaspur 28°18'8.4 3"N 78°23'58. 37"E	AQ4 Babrala 28°16'3.16" N 78°24'39.76 "E	AQ5 - Gunnaur 28°14'39.86"N 78°25'58.03"E	AQ6 Akbarpur 28°15'26.47 "N 78°27'21.93 "E	AQ7 Gunnaur Semla 28°14'52.33 "N 78°28'40.9 4"E	AQ8 Bhakroli 28°16'40.80" N 78°28'2.70"E
TSPM	10.35 g/m ³	10.35 g/m ³	0.61 g/m ³	0.26 g/m ³	0.03 g/m ³	0.61 g/m ³	0.94 g/m ³	0.02 g/m ³	0.09 g/m ³
SO _x	30.02 g/m ³	30.02 g/m ³	1.77 g/m ³	0.76 g/m ³	0.1 g/m ³	1.76 g/m ³	2.73 g/m ³	0.07 g/m ³	0.26 g/m ³
NO _x	11.39 g/m ³	11.39 g/m ³	0.47 g/m ³	0.67 g/m ³	0.04 g/m ³	0.67 g/m ³	1.04 g/m ³	0.03 g/m ³	0.1 g/m ³



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Chapter 5 – ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.0 Introduction

A project of any nature consists of various activities which involve men, money and material. These activities may consume natural resources and discharge wastes which are likely to have serious consequences on the environment. A number of alternative options may be available to carry out many of these activities. An option with least or nil adverse environment impacts is to be selected. Critical analysis is therefore required for selection of the right alternative.

Alternative Analysis (AA) has been done for critical aspects of the project. M/s Punahchakran Private Limited has proposed a Common Bio-Medical Waste Treatment and Disposal Facility (CBMWTF) in the state of Uttar Pradesh for the proper handling and treatment of biomedical wastes from all health-care centers in the districts of Moradabad, Sambhal, Badaun, Aligarh, Hathras, Kasganj and Etah covering 100 km radius area from the facility. Location of proposed project is Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh. As per EIA Notification, 2006 and subsequent amendments; alternative site consideration is applicable during screening of project if recommended by concerned committee. As no alternative sites were examined during screening of the project; the same was not included.

5.1 Site Selection

The proposed project site is meeting site selection criteria of CPCB guidelines as well as the site selection criteria of TSDF's also shown in **Table 5.1**. The following areas have to be excluded or rejected (knock out Criteria) for this type of industries. Areas with unstable geological features like unstable or weak soil, organic soil, soft clay or clay-sand mixtures, soil that lose strength with compaction or with wetting, clays with a shrink-swell character, sand subjected to subsidence and hydraulic influence.

- Subsidence: e.g. owing to subsurface mines, water, oil or gas withdrawal or solution prone subsurface.
- Wet lands.
- Historical migration zones.
- Flood prone areas
- Area with 500 m from water supply zone and within 200 m from property line

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- Natural depression and valleys where water contamination is likely
- Areas of ground water recharge and extremely high water table zone
- Unique habitation areas, close to national parks with scenic beauty and formerly used landfills Areas with high population, unique archaeological, historical, paleontological and religious interests.
- Agricultural and forests lands and existing dump sites.
- Atmospheric conditions that would prevent safe disposal of an accidental release.
- Major natural hazards, e.g. volcanic activity, seismic disturbance, etc.
- Sensitive locations, e.g. storing flammable or explosive materials, airports.
- An unfavorable local hydro-geological situation e.g. springs or drinking water well within very close proximity to the chosen area.
- Extremely bad access i.e. no existing access roads to the selected site which may be involved.
- Long distance more than 5 km from main roads.
- Great differences in altitude between the area of waste collection and the selected site.

Table 5.1 Location Criteria for the Proposed Project

S.No	Parameter	Criteria	Observation
1	Lake or pond (Distance from SW body)	Should not be within 200 m	There are no major lakes or ponds within 200m of project boundary.
2	River	Should not be within 100 m	There is no river within 100m from the project boundary. Bardmar River located at a distance of 1.05 Km in west direction.
3	Flood plain	Should not be within 100 year flood plain	Not in the flood plain area
4	High way – State or National	Should not be within 200 m	NH93: 0.38 Km (N) SH 18: 3.72 Km (S)
5	Habitation – Notified habituated area	Should not be within 200 m	Village Panwari: 0.48 Km (S) The proposed project is located at Plot No. E – 25 and E – 26, UPSIDC Industrial Area, Babrala, District – Sambhal, Uttar Pradesh.



			As per the CPCB Guidelines we have adopted the additional control measures, as the buffer zone distance from the notified residential area is less than 500m. We have adopted the best available technologies for biomedical waste management, strictly followed the standard for operation of the CBWTF and adopt the zero liquid discharge by the CBWTF.
6	Public Parks	Not suitable	Not in critical habitat area
7	Critical habitat area – area in which one or more endangered species live	Not suitable	Not in critical habitat area
8	Reserved Forest area	Not suitable	Not in Reserved Forest area
9	Wet lands	Not suitable	No Wet lands in study area
10	Air Port or Airbase	Should not be within 20 km	Jewar Noida International Airport: 85 Km (W)
11	Water supply	No Water supply well within 200 m	No water supply well within 200 m
12	Coastal Regulation Area	Not suitable	Not in Coastal Regulation Area
13	Ground Water Table level	GW table should be >2m from the base of the landfill	Depth to water level in the area during pre-monsoon period varies from 10.1 to 12.3 mbgl and in post-monsoon period varies from 9.4 to 11.9 mbgl.
14	Sensitive eco-fragile Areas	Not suitable	None in study area
15	Earthquake zone (Fault Line Zone)	--	Seismic Zone IV



5.2 Handling of Biomedical waste

For effective management and handling of the bio-medical waste. It needs to incorporate legal, technical and financial constraints that will be imposed on such practices. The primary objective for providing such a system shall be to ensure safe, efficient and economic collection incorporating segregation at source, transport, disinfection, destruction and disposal of the residue, while ensuring that the system is reliable for now and for the foreseeable future.

The overall objective encompasses the following specific objectives:

- To reduce the health effects/ risks associated with the proposed activities.
- To minimize the environmental impacts.
- To ensure the technical reliability of the adopted technology in terms of safety, flexibility and sustainability under local conditions.
- To maximize resource productivity.
- To ensure the techno-economic feasibility of the proposed scheme.

5.3 Components of integrated Bio-Medical Waste Management

An integrated waste management system for bio-medical wastes must look into various stages of the process. These key components can be broadly classified into the following:

- Waste Segregation: Waste will have to be segregated into domestic refuse, hazardous wastes and infectious wastes separately. Further the infectious wastes will have to be segregated into plastics, metals, and other infectious wastes generated. Segregation is done effectively if performed at source. MoEFCC has issued clear guidelines for color coded segregation.
- Waste Collection and Transport: Facility / unit have to ensure that there are no environmental or human health impacts while collecting & transporting Bio-Medical wastes.
- Treatment/ Storage/ Disposal: Treatment/ storage and disposal of the wastes have various options available and are described in detail.

5.4 Alternate Treatment Technologies

The alternate options for treating bio-medical waste are Plasma Pyrolysis Microwaving Hydroclaving.

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5.4.1 Plasma Pyrolysis

Plasma Pyrolysis treatment technology can be installed for disposal of bio-medical waste wherein waste is treated at high temperature under controlled condition to form gases like methane, hydrogen and carbon monoxide which are subjected to combustion (oxidation) in secondary chamber. In this process waste is converted into small clinkers which can be disposed in secured landfills.

Plasma pyrolysis technology requires technical persons for operation and is very expensive. Hence incineration technology has been adopted meeting all the emission standards as per Bio-Medical Waste Management Rules 2016.

5.4.2 Microwaving

In microwaving, microbial inactivation occurs as a result of the thermal effect of electromagnetic radiation spectrum lying between the frequencies 300 and 300,000 MHz. Microwave heating is an inter-molecular heating process. The heating occurs inside the waste material in the presence of steam.

5.4.3 Hydro-claving

Hydroclaving is similar to that of autoclaving except that the waste is subjected to indirect heating by applying steam in the outer jacket. The waste is continuously tumbled in the chamber during the process. Over the years of experience it is identified that the overall performance of autoclave is consistent and less expensive compared to Microwaving and Hydroclaving.

5.5 Advantages of CBWTF over Individual Facilities at HCEs

The bio-medical waste management facility would be most effective if incorporated as an integrated facility with a disinfecting unit, a destruction unit and a disposal unit. The options for locating such a unit shall have a common facility that will cater to a group of hospitals or an inbuilt facility within every hospital, having an integrated management system. The advantages of a common facility over inbuilt facility in each of the components of waste management are elaborated below:

- Waste minimization would require the same effort in both the options.

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- Collection and Transportation of the wastes would be minimal for an inbuilt facility compared to that of a common facility.
- Efficient management and treatment options would be low in inbuilt facility as this would require a group of trained professionals to handle.
- Social Acceptability for inbuilt facility is very low, as most of the hospitals are located in the heart of the residential areas with high population density. The prevalent concept of NIMBY (Not in my Backyard) further decreases the level of social acceptability. As a centralized facility would be located away from residential areas having low population density, it would be more acceptable.
- Impacts on Human Health and the Environment would be much higher in case of inbuilt facilities as the number of individuals exposed to the various pathways would be much higher, while at the common facility it is really low.
- Commercial Aspects can be broadly grouped into capital and operational costs. The capital costs would be significantly higher in the case of inbuilt facility. Installation of an integrated bio-medical waste management facility would incur a capital cost that would not be commercially viable for most institutions. The operating cost would also be higher at the in-built facility as this would require professional supervision and manpower and the actual operating cost of the machinery. A holistic view of the bio-medical waste management clearly indicates that operations of such waste management facilities should be left to trained professionals for a safe and better disposal.

CHAPTER 6 – ENVIRONMENTAL MONITORING PLAN

6.0 Introduction

An environment monitoring plan is prepared for installation as well as the operation phase. It provides a delivery mechanism to address the adverse environmental impacts of a project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works. An environmental monitoring program is important as it provides useful information and helps to:

- Assist in detecting the development of any unwanted environmental situation, and thus provides opportunities for adopting appropriate control measures.
- Define the responsibilities of the project proponents, contractors and environmental monitors and provide 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 requirements at various levels.

6.1 Construction Phase

Table 6.1: EMP for Construction Phase

S.No.	Monitoring	Monitoring Area	Parameters	Frequency
1	Ambient Air Quality	Monthly	PM _{2.5} , PM ₁₀ , SO ₂ , NO ₂ and CO	Twice a year
2	Stack	Monthly	PM _{2.5} , PM ₁₀ , SO ₂ , NO ₂	DG set of 32 KVA#2, 10KVA#1
3	Water quality for Drinking water	Monthly	L10, L50, L90, Ld, Ln, Leq, Ldn, Lmin, Lmax	Twice a year
4	Water quality for Construction purpose	Monthly	Basic Parameters	Twice a year
5	Ambient Noise Level	Monthly	Day and Night noise level	Two locations
6	Noise level	Monthly	Leq Day & Night-	DG set of 32 KVA#2, 10KVA#1

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S.No.	Monitoring	Monitoring Area	Parameters	Frequency
7	Soil quality	Monthly	All parameters to check soil Fertility	Four Locations in and around the project site

6.2 Operation Phase

Table 6.2: EMP for Operation Phase

S.No.	Monitoring/ Equipment of Monitoring	Monitoring Area	Parameters	Frequency
1	Ambient Air Quality	Nearest village	PM _{2.5} , PM ₁₀ , SO ₂ , NO ₂	Four Locations in and around the project site
2	Work Area-air monitoring	Monthly	HCl, Dioxins & Furans	Plant & machinery area
3	Stack	Monthly	<ul style="list-style-type: none"> Particulate Matter, Sulphur Dioxide (SO₂), Nitrogen Oxides (NO₂), for Incinerators, boiler & DG Sets HCl, Dioxins & Furans for Incinerators	DG set of 32 KVA#2, 10KVA#1 and Incinerators Stack
4	Water Quality for drinking water	Monthly	All parameters mentioned in IS:10500	One drinking water sample
5	Effluent Treatment Plant or other treatment	Monthly	pH, BOD, COD, TDS, TSS, Chloride, Sulphate, Total Hardness, Oil and Grease, Zinc.	Inlet and Outlet of ETP
	Ambient Noise Level	Monthly	Day and Night noise level	Two locations
6	Work area-Noise monitoring	Monthly	Leq Day & Night	Plant & machinery area (Incinerators, Autoclave & Shredder) One monitoring at every place
7	DG Set Room		Leq Day & Night	DG set of 32 KVA#2, 10KVA#1
8	Soil Quality		All parameters to check soil	Four Locations in and

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S.No.	Monitoring/ Equipment of Monitoring	Monitoring Area	Parameters	Frequency
			Fertility	around the project site
9	Odour Control monitoring	Weekly	Manual	Within the facility area
10	Solid Waste Generation Monitoring / Record Keeping		Records of generation, handling, storage, transportation and disposal of other solid, aqueous and organic hazardous wastes as required by hazardous waste authorization	Within the facility area

6.3 Work Zone Monitoring

The occupier or operator of the common bio-medical waste treatment facility will install a continuous emission monitoring system for the parameters as stipulated by the State Pollution Control Board in authorization and transmit the data in real time to the servers at State Pollution Control Board. Work zone monitoring shall be carried out by the HSE department every month for gaseous pollutants (Dioxins & Furans). Records will be kept. Location for sampling shall be identified. Samples will be analyzed for Dioxins & Furans.

6.4 Submission of Six-Monthly Compliances

As per the standard environment clearance conditions, six monthly compliance of the conditions mentioned in the Environmental Clearance letter has to be submitted to various concerned officials of MOEF, SPCB and Regional office of CPCB. This compliance have to be submitted in the months of June and December for the periods April to September and October to March respectively every year for construction phase until the construction is completed and operation phase for the life of the project.

6.5 Environment Audit

Annual Environment Audit shall be conducted to check the compliance of environmental conditions.

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Chapter 7 – ADDITIONAL STUDIES

7.0 Introduction

In this chapter following topics are discussed:

- Public Consultation
- Risk Assessment & Disaster Management Plan

7.1 PUBLIC CONSULTATION

The Environmental Impact Assessment report has been prepared as per the Terms of Reference (ToR) issued by SEIAA, Uttar Pradesh vide proposal No. SIA/UP/MIS/66542/2021 dated 17.08.2021. The Public hearing is not applicable as per the OM dated 27 April 2018 of MoEF&CC to the project or activities located within the industrial area/park. (OM attached)

7.2 Risk Assessment

Evaluating Hazard

The need for the sophisticated techniques for evaluating hazards depends on the result of Preliminary Hazard Analysis. Various techniques for evaluation hazards are:

- Accident Consequence Analysis
- Event Tree Analysis
- Fault Tree Analysis
- Failure Modes, Effects and Criticality Analysis.

Table 7.1: Hazard identification

S. No.	Toxicity	Oral Toxicity LD ₅₀ (mg/kg)	Dermal Toxicity LD ₅₀ (mg/kg)	Inhalation Toxicity LD ₅₀ (mg/kg)
1	Highly Toxic	1-50	1-200	0.1-0.5
2	Extremely Toxic	51-500	201-2000	0.5-2.0

In order to be in a state of readiness to face the adverse effects of accidents, an Emergency Preparedness Plan (EPP) has to be prepared. Such a plan must. Inter-alia, cover the possible hazardous situations in the locality and the causes, areas most likely to be affected, on-site and off-site plans, establishment of Emergency Control Centers(ECC), location of emergency

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services and duties of officers/staff during emergency. The EPP document for accidents is to be designed to provide for measures to contain the incident and for minimization of effects due to fire, explosives, release or escape of toxic gas, spillage of hazardous substances in storage, processing or during transportation. The necessary preventive and protective steps required to be taken before, during and after an accident need to be worked out in operational terms and detailed in the document.

7.2.1 Identification of Toxic, Flammable, Explosive Chemicals

Toxic Chemicals: Chemicals having the following values of acute toxicity and which owing to their physical and chemical properties are capable of producing major accidents:

Flammable Chemicals: Flammable gases: Gases which at 200C and at standard pressure of 101.3 kPa are:

Ignitable when in a mixture of 13 percent or less by volume with air, or have a flammable range with air of at least 12 percentage points regardless of the lower flammable limits.

Extremely flammable liquids: chemicals which have flash point lower than or equal to 230C and boiling point less than 35°C

Very highly flammable liquids: chemicals which have a flash point lower than or equal to 230C and initial boiling point higher than 35°C.

Highly flammable liquids: chemicals which have a flash point lower than or equal to 600C but higher than 23°C.

Flammable liquids: chemicals which have a flash point higher than 60°C but lower than 90°C.

Explosives: Explosives means a solid or liquid or pyrotechnic substance (or a mixture of substances) or an article.

This is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings;

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This is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as a result of non-detonative self-sustaining exothermic chemical reaction.

7.2.2 On-Site Emergency Plan

An onsite emergency is caused by an accident or hazard that takes place within the plant area and the effects are confined to the plant area.

The onsite emergency plan consists of following key elements:

- Planning as per hazard analysis
- Preventive measures
- Emergency response procedure
- Recovery procedure

7.2.3 Planning

1. Mapping of hazard vulnerable area.
2. There shall be Disaster Management Cell in place.
3. The disaster management cell have following members to share the responsibility:
 - Site Controller (Administrator of complex)
 - Incident Controller (Asstt. Administrator)
 - Personal Manager
 - Communication Officer
 - Fire Officer
 - Security Officer
 - Engineering In-charge
 - Fire pump attendant
 - First Aid Team

7.2.4 Earthquake:

The project is situated at Seismic zone-IV area. Special attention shall be given to the structural design of foundation, elements of masonry, timber, plain concrete, reinforced concrete, pre-stressed concrete, and structural steel. All applicable guidelines will also be followed in this regard to ensure safety of the building.

7.2.5 Flooding:

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To avoid flooding or water logging in the area due to the existing nearby low lying area. All the rain water will be diverted to rain water / storm water drain and extra water will be diverted in storm line of area.

7.2.6 Fire and Life Safety

Safety Precautions

1. Smoking must be prohibited.
2. Vehicle access should be strictly controlled.
3. Fuel tanks, packaged materials shall be kept in separate rooms.
4. Ventilation must be sufficient to cope with the maximum expected vapor levels in building.
5. Storage tank vents to atmosphere should be sized for fire-heated emergency vapor release.
6. Electrical equipment must be explosion-proof to meet national electrical code requirements.
7. Dry chemical extinguishers should be accessible for small fires. An adequate supply of hand-held and wheeled types should be available.
8. Hydrants should be strategically placed with adequate hoses.
9. Small spills should be remediated with sand, earth, or other non-combustible absorbent material, and the area then flushed with water. Larger spills should be diluted with water and dyked for later disposal.

7.2.7 Precaution In Case Of Fire

- For proposed Common Bio-medical waste treatment, all practicable measures shall be taken to prevent outbreak of fire and its spreads, both internally and externally, to provide and maintain
- Safe means of escape for all person in the event of a fire, and
- The necessary equipment and facilities for extinguishing fire.
- Effective measures shall be taken to ensure that all the workers are familiar with the means of escape in case of fire and have been adequately trained in the routine to be followed in such cases.
- Fire Fighting Personal Protective Equipment.

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- Due consideration must be given to hazards from chemical and heat exposure. Therefore, fire-fighters should wear full-face, positive pressure, self-contained breathing apparatus or an air-line. Chemical protection may be provided with impervious clothing, gloves and footwear. Suitable materials include polyvinyl plastic, neoprene or rubber.

7.2.8 Chemical & Hazardous Material:

CHEMICALS

The only chemical used in the treatment is Sodium Hypo Chlorite (NaOCl) shall be used as disinfectant in Autoclaving. NaOCl is a highly reactive oxidizer. It is greenish-yellow in color with an odour similar to that of chlorine. Strength hypochlorite is often diluted prior to being injected into a water stream, in order to provide proper mixing and disinfection. When an insufficient amount of dilution water is used the hypochlorite can cause the pH to rise. If the dilution water is hard water, the rise in pH will result in calcium carbonate precipitation which will coat the inside of piping, valves and pumps. This scale deposit will tend to be greatest in areas of high turbulence. In order to prevent scaling use soft water. Besides it fuel HSD shall be used in Incinerator & D.G. Sets.

Measures to be adopted while Chemical & Fuel Handling:

- Workers shall wash their hands thoroughly after handling.
- Fuels/chemicals shall be used only in a well-ventilated area.
- Workers shall use spark-proof tools and explosion proof equipment.
- Workers shall avoid contact with eyes, skin, and clothing.
- Container shall be kept tightly closed.
- Workers shall avoid contact with heat, sparks and flame.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
- Operator training as well as written operating instructions, safety rules and check lists shall be provided.

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7.3 Protective protection:

Sources of Exposure

Human exposure to fuels can occur via absorption, contact with the eyes, inhalation or ingestion.

7.3.1 First Aid Measures

1. In case of fuel come in contact with the skin, remove contaminated clothing. Wash with soap and water for 15 minutes. Seek medical attention if irritation occurs.
2. In case of chemicals contact with the eyes, flush immediately with gently running water for a minimum of 15 minutes, ensuring all surfaces and crevices are flushed by lifting lower and upper lids. Obtain medical attention.
3. In case of inhalation of chemical's vapours, remove the individual to fresh air, but only if it is safe to do so. Asphyxiation from vapours may require artificial respiration. Due to the possibility of delayed onset of more serious illness, it is important to obtain medical attention.
4. Ingestion of chemicals is life threatening. Onset of symptoms may be delayed for 18 to 24 hours after ingestion. Do not induce vomiting. Transport to medical attention. The individual should remain under close medical care and observation for several days.

7.3.2 Chemical & Fuel Storage:

- Chemical/Fuel shall be kept away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container.
- Chemical/Fuel shall be stored in a cool, dry, well-ventilated area away from incompatible substances.
- Storage & handling area shall be readily accessible with safety showers, fire extinguishers and other fire-fighting equipment, water hydrants with spray nozzle and other emergency equipment such as chemical proof suits and respiratory apparatus.
- The flammable materials shall be stored in a separate safety storage room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well ventilated place.

Spills / Leaks: Spills will be absorbed with inert material (e.g. vermiculite, sand or earth), they will be placed in suitable container. All sources of ignition shall be removed and a spark-proof

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tool shall be used. Ventilation shall be provided and a vapour suppressing foam shall be used to reduce vapours.

Table 7.2: List of Hazardous Materials

S No.	Name of the Hazardous substance	Place of storage	State and operating pressure & Temp.	Type of hazards possible	Control measures provided
1.	Yellow Category waste (Human anatomical waste, animal waste, soiled waste and etc.)	Red storage room (plant area)	Ambient Condition	Fire, Infection	1] Fire Extinguisher (CO ₂ ,DCP) 2] PPE 3] sand Bucket 4] Emergency provision for Fire Brigade from outside source. 5] PPE shall b provided.
2.	Red category waste (microbiology & Biotechnology waste, tubing, catheters, intravenous sets etc.)	Yellow storage room (plant Area)	Ambient Condition	Fire, Infection	1] Fire Extinguisher (CO ₂ ,DCP) 2] PPE 3] sand Bucket 4] Emergency provision for Fire Brigade from outside source 5] PPE shall be provided
3.	Diesel	D.G. Room & Process	Ambient Condition	Fire	1] Fire Extinguisher (Foam)



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		Room			2] Sand Buckets
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7.3.3 Major accidental Release measures & measures for storage & handling

- The chemical/fuel shall be stored in a separate safety storage room, shall be kept away from sources of ignition.
- Proper ventilation should be maintained.
- Proper medical facility arrangement shall be provided in case of any accidental release.
- In case of leak or spill, ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not contact with acids. Do not handle with bare hands.

7.4 Collection, development and dissemination of information

- Prior to working with these chemicals, workers should be trained on its proper handling & storage.
- Label Precautions and First Aid.
- Emergency plan shall be prepared and mock drill of the on-site emergency should be conducted
- Inspection of the CBWTF shall be done at least once in year and annually status report on the compliance with the Rules shall be submitted.

Mechanical:

Mechanical hazards are created by powered operation of equipments or tools. Mechanical hazards can occur at:

1. Process machinery
2. DG set room
3. Vehicular Movement

Following preventive measures shall be taken:

1. Periodic replacement of critical components of machine.
2. Proper training to operators of machines.
3. There will be safe distance demarcation on heavy machines like cranes (during construction)

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4. Sign of danger at the hazard places.

Table 7.3 Process & vessel hazards and controls

SNo	Name of plant	Hazardous Process and Operation	Materials in the process / operation with their Quantity	Name Of The Vessel And Its Location	Operating Parameters	Type Of Hazard Possibles	Control Measures Provided
1.	Incineration plant	Incineration	Yellow category waste	Primary chamber and secondary chamber, Incineration area	Temperature 8500C – primary chamber and 10500C – secondary chamber	Fire, Explosion, Burn	1] Fully Automatic 2] Emergency Local Stop 3] Fire Extinguisher (CO2) 4] PPE 5] Emergency Provision for Fire Brigade from outside source.
2.	Auto-clave	Sterilization	Red Category Waste	Autoclave	Temp. around 135 °C & 2.2 Kg./sq.cm	Fire, Health Hazard	1] Fully automatic Computer based automation



					pressure		2] Emergency Local Stop 3] PPE
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Electrical:

The electrical current can pass to the floor & metals due to inadequate insulation or accidentally. Electric spark can generate due to short circuiting in the electrical room

Thermal:

Thermal hazards are objects or substances that transfer energy as heat. Incinerator is a thermal hazard for Bio Medical Waste processing.

The thermal hazard can cause burn of skin; following preventive measures can be taken:

- 1) Operators in the thermal hazard area shall be provided with protective gears like gloves, goggles etc.
- 2) For emergency first aid room will be maintained.

7.5 Emergency Response Procedure

Even after all the preventive measures for any emergency, following infrastructure shall be provided:

1. There will be an Emergency Control Room.
2. Assembly area shall be demarked for Industry.
3. Communication system shall be installed which includes intercom and public address system.
4. Fire alarm shall be installed at vulnerable place.
5. The safe zones (at the time of emergency) shall be displayed at different locations.
6. First Aid facility shall be made available at Control room.

In case of emergency following action shall be taken:

1. The emergency shall be declared in case of following:
 - i. Fire alarm buzzing (Fire hazard)
 - ii. Vibration/Earthquake feeling (Earthquake)

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- iii. Water logging above 30 cm from ground level (Flood)
 - iv. Any unusual smell of gas or suffocating feeling (Chemical leakage)
 - v. Security alarm from main gate. (Security risk/Terrorism)
2. On declaration of emergency, communication shall be made to residents for any type of emergency
 3. All the workers of the affected area shall be moved to safe zone
 4. The control measures shall be done as per the emergency action plan for each type of hazard.
 5. All the members of disaster management cell shall take charge of their respective duties.
 6. Outside help like fire tender, police, ambulance etc. shall be called by site controller or Incident controller.

7.6 Recovery Procedure

The recovery procedure will depend on the type of emergency. Recovery procedure shall be followed by engineering section to restore the essential services. The PLI (Public Liability Insurance) shall be done as a part of off/on site emergency plan.

7.6.1 Off-Site Management Plan:

If an accident takes place in unit & its impacts are felt outside its premises, the situation is called an “Off-site Emergency”. To meet such Emergencies, an Off-site Emergency Plan is required to be prepared.

7.6.2 Cause of off-site emergency

In a Common Biomedical Waste Treatment Facility, the chemical & raw material storage room & handling area & transportation of the raw material may cause off- site emergency to occur.

7.7 Preventive Measures during Transportation

Transportation system with proposal of safety measures and appropriate waste handling system. There will be use of approx. 09 vehicles daily for transportation of bio-medical waste. These vehicles are for collection of bio medical waste from various medical establishments for 24 Hrs. The Vehicles shall be designed as per following CPCB norms:

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- Separate cabins for driver/staff and the bio medical waste. There shall be provision of bulkhead between the driver’s cabin and the vehicle body, which shall be designed to retain the load if the vehicle is involved in a collision.
- The base of the waste cabin shall be leak proof and is easy to wash and disinfect.
- The inner surface of the waste cabin shall be made of smooth surface to minimize water retention.
- The vehicles shall be properly labeled with the symbol of Biohazard as per schedule III of the Rules and display the name, address and telephone number of the Company.
- The waste cabin shall have provision for sufficient opening from rear side so that Biomedical Waste can be easily loaded and unloaded.
- The vehicles shall be provided with the first aid kit to handle emergency situations.
- Empty plastic bags, suitable protective clothing, cleaning equipment, tools, and disinfectant, together with special kits for dealing with liquid spills, shall be carried in a separate compartment in the vehicle.
- Vehicles or containers used for the transportation of biomedical waste shall not be used for the transportation of any other material. They shall be kept locked at all times, except when loading and unloading.
- Details of GPS system which shall be installed at all the transport vehicles

All the vehicles engaged in the collection and transportation of Bio Medical Waste from Health Care Establishments (HCE) in Banda shall be provided with Global Positioning System (GPS) to keep a track on the services rendered to the HCE. Reports will be generated on the routes covered by these vehicles for proper planning and management of collection and transportation of Bio Medical Waste. Flagging system shall be provided with the GPS system to view the online coverage of all the routes of the vehicles.

7.8 During Storage & Handling

- A written procedure to handle and report needle stick injuries and other waste-handling incidents. Injuries caused by needle sticks and sharp instruments will be documented, reviewed, and changes implemented to prevent similar incidents in the future;
- The threshold limit for the storage of the chemical at any point of time shall not exceed.

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- To prevent and control risk and damage, all the raw material shall be stored in leak proof polybags at a secured and contained location with proper safety measures.
- Handling is shall be done as per NIOSH guidelines
- There shall be no drainage lines or water bodies near the raw material storage & chemical or fuel storage room to avoid contamination of water up to long distances.

7.9 Emergency Response Procedure

Under the ‘Manufacture, Storage and Import of Hazardous Chemicals Rules ‘ preparation of ‘Off-site Emergency Plan’ is covered in Rule No.14. The duty of preparing and keeping up to date the ‘Off-site Emergency Plan’ as per this rule is placed on the District Emergency Authority. Already so, occupiers are charged with the responsibility of providing the above authority with such information, relating to the industrial activity under their control, as they may require for preparing the off-site emergency plan.

As per the rules, the main component of the Off-Site Emergency Plan is coordination with the District Authority. The District Authority (i.e. District Collector, Factory Inspector etc.) in conjunction with the company & nearby industries under mutual aid scheme and relevant emergency services should have an off-site emergency plan considering the following:

- Incidents at the site including fires and/or explosions would likely cause concern among local population. Although, the unit does not fall in residential area & does not have any residential premises in the vicinity, the people will be advised to stay away from the area, and relevant actions shall be followed.
- In addition to company’s own Emergency control center, the "local" external agencies will also be involved in the formulation of procedures for off-site incidents and in response to any incident;

Other external agencies that will also be involved in response to any incident are:

- Traffic Police;
- Fire services available with nearby industries;
- Civil Authority;
- Factory Inspector;

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- State Pollution Control Board; etc.

The following aspects shall be addressed in any detailed response to an off-site incident:

- Organization: details of command structure, coordination arrangement, implementation procedures, emergency control centers. The organizational chart to deal with the emergencies (onsite & off site) is given ahead.
- Communication: identification of personnel involved, communication center, lists of telephone numbers (as given above) etc.
- Specialist Emergency Equipment; details of availability & location of heavy lifting gear bulldozers, specialized fire-fighting equipments;
- Specialist Technical Knowledge; details of organization or individuals whom it may be necessary to call e.g. for specialized chemical knowledge, impact knowledge etc.;
- Mutual Aid Scheme: details of companies in this scheme and available facilities with them & their phone nos.;
- Meteorological Information Sources; arrangements for obtaining details of weather conditions prevailing and weather forecast on regular basis;
- Humanitarian Arrangements; details of provisions for transport, evacuation routes and centers, food, treatment of injured etc.;
- Public Information; arrangements for dealing with the media, informing relatives of employees and local population;
- Incident Assessment; arrangements for collecting information on incident causes and reviewing the efficiency and effectiveness of all aspects of the emergency plan;

Efficient off-site incident planning also involves interaction on regular basis among various organizations. To ensure that every procedure put in place will run efficiently and effectively, exercise (mock drills) involving all the relevant organizations will be carried out. These will be monitored and assessed with procedures updated to reflect knowledge gained;

Roles & Responsibilities of External Agencies

The roles of the various parties that may be involved in the implementation of an off-site plan are described below:

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A) Role of the Police

- Protecting life and property and controlling traffic movements.
- Controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

B) Role of the Fire Authorities

- The control of a fire is 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.
- Fire authorities having major hazard works in their area should have familiarized themselves with the location on site of all stores of flammable materials, water and foam supply points and firefighting equipments.

C) Role of the Health Authorities

- Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they should form an integral part of any emergency plan.

D) Roles of the Government Safety Authority

- In the event of an accident, local arrangements regarding the role of the factory inspector will apply.
- In the aftermath, factory inspectors may wish to ensure that the affected areas are rehabilitated safety.

Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 prescribes for the constitution of the State Crisis Group as apex body at the State Level to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents and for the constitution of District and Local Crisis Groups.

A. Functions of the State Crisis Group

- Review all district off-site emergency plans in the State with a view to examine its adequacy in accordance with the Manufacture, Storage and Import of Hazardous Chemical, Rules and forward a report to the Central Crisis Group once in three months;
- Assist the State Government in the planning, preparedness and mitigation of major chemical accidents at a site in the State;

- iii. Continuously monitor the post-accident situation arising out of a major chemical accident in the State and forward a report to the Central Crisis Group;
- iv. Review the progress report submitted by the District Crisis Groups;

B. Functions of the District Crisis Group

- i. Assist the preparation of the district off-site emergency plan;
- ii. Review all the on-site emergency plans prepared by the occupier of Major Accident Hazards installation for the preparation of the district off-site emergency plan;
- iii. Assist the district administration in the management of chemical accidents at a site lying within the district;
- iv. Ensure continuous information flow from the district to the Centre and State Crisis Group regarding accident situation and mitigation efforts;
- v. Forward a report of the chemical accident to the State Crisis Group; and Conduct mock-drill of a chemical accident at a site each year.

C. Functions of the Local Crisis Group

- i. Prepare local emergency plan for the industrial pocket;
- ii. Ensure dovetailing of the local emergency plan with the district off-site emergency plan;
- iii. Train personnel involved in chemical accident management;
- iv. Conduct at least one full scale mock-drill of a chemical accident at a site every six months and forward a report to the District Crisis Group; and
- v. Respond to all public inquiries on the subject

7.10 Recovery Procedure

The recovery procedure will depend on the type of emergency. Recovery procedure shall be followed by engineering section to restore the essential services. The PLI (Public Liability Insurance) shall be done as a part of off/on site emergency plan.

Emergency Control Team

7.10.1 KEY PERSONNEL

The key Personnel involved in Emergency (Onsite & Offsite) are given below:

1. Emergency Controller – Plant Head

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2. Incident Controller
3. Security Supervisor
4. HOD – Utility & EHS
5. Safety Officer
6. Fire fighter
7. Evacuation members [Emergency Response Team (ERT) Members]
8. First Aid provider
9. Rescue members

7.11 Occupational Health & Safety

Workers handling and disposing biomedical waste are at potential risk of exposure to infection from sharps related accidents or when containers of waste burst, open and leak, or spills of certain waste materials occur. Exposure to a needle or other sharp object contaminated with the blood of an infectious person presents the greatest potential risk for transmission of HBV, HIV, and other blood borne pathogens to the health-care worker and waste handler.

Action plan for the implementation of OHS standards as per OSHAS shall be followed as given below:

- Occupational health surveillance programme shall be done six monthly & and their records are being maintained.
- Company will take reasonable steps to reduce the risk of exposure to infection by establishing written policies and procedures based upon the most currently accepted clinical and occupational health and safety information in consultation with workers, handling and disposing of biomedical waste. These policies and procedures will be reviewed and updated regularly, with compliance to their requirements verified as necessary.
- Regular assessment of waste management procedures shall be done to assure compliance with applicable standards
- A written procedure to handle and report needle stick injuries and other waste-handling incidents shall be there. Injuries caused by needle sticks and sharp instruments will be documented, reviewed, and changes implemented to prevent similar incidents in the future;

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- Emphasize the need for point of generation segregation so that waste shall be placed within an appropriate waste container.
- Type and quality of waste containers will be review regularly, if necessary it will be upgraded to more suitable container;
- Handling practices will be reviewed regularly to determine problems of inappropriate handling. If so, modify the handling techniques. At project site in case of emergency First Aid facility shall be provided.
- Health check-up camps shall be organized on regular basis at company dispensary / nearby locations.
- Prior to working with bio-medical, workers shall be trained on its proper handling & storage.
- To educated/ train the workers for MSDS & handling of these chemicals.
- Proper medical facility arrangements shall be provided in case of any accidental release.
- ESI facility shall be made available.
- Proper fire-fighting measures like buckets & portable fire extinguishers shall be provided at strategic locations.
- Emergency plan shall be prepared and mock drill of the on-site emergency shall be conducted.
- Employers and employees shall be made aware of the hazardous properties of materials in their workplaces, and the degree of hazard each poses. Inspection of the treatment facility shall be done at least once in year and annually status report on the compliance with the Rules is being submitted.
- It shall be made sure that waste haulers and handlers will always be proper clothed and wear personal protective equipment so that harmful agents, whether physical, chemical, or infectious, are prevented from gaining access to open wounds, cuts, or by absorption through the skin. Personal protective equipment may include cut proof gloves, gowns, safety glasses, protective footwear, etc..
- A course of Hepatitis B (HBV) vaccine will be offered to all employees dealing with handling and disposing of biomedical waste who are at risk of exposure to human blood, blood products, or body secretions.



- A safety officer / environmental officer shall be recruited and lead all the safety issues related to man, machine & materials.
- Exterior refuge or safe areas shall be located away from the site of the emergency and which provides sufficient space to accommodate the employees.
- Public Liability Insurance Act, 1991 shall be followed.

7.12 Personal Protective Equipment

The level of risk of exposure to particular chemical will dictate the appropriate level of personal protective equipment (PPE) required, Provide wearing side shielded safety spectacles and appropriate gloves, footwear, face shields, respiratory protection, fire-resistant clothing, or chemical suits.

- Respirators: A complete respiratory protection program has been instituted. It includes evaluations of workers' abilities to perform tasks while wearing CPC, Regular training of personnel, fit testing, Periodic environmental monitoring, Regular maintenance, inspection, and cleaning.
- Clothing: Workers wear appropriate protective clothing to prevent skin exposure.
- Skin Protection: Workers wear solvent resistant gloves and clothing.
- Eye Protection: Workers wear splash proof chemical goggles and face shield when working with liquid, unless full face piece respiratory protection is worn.
- Eyewash facility and a safety shower: Common work places are equipped with Eyewash facility and a safety shower.

7.13 Worker Health Checkup Plan

Company shall conduct pre-employment and post-employment medical tests for its employees besides various educative and awareness programs on health and safety. A full time medical assistance centre will be made available to its employees to carry out any first aids.

Following is the list of Medical Tests / occupational health surveillance program for the employees.

Table 7.4: List of medical tests

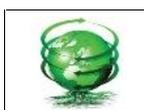
Health Parameter	Proposed Practice
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Lung Function Test	Shall be done Annually
Hepatitis B (HBV)	Shall be done Annually
ECC	Shall be done Annually
Blood Sugar, Cholesterols	Shall be done Annually
Liver and Kidney Function Tests	Shall be done Annually
Audiometry	Shall be done Annually
Spirometry	Shall be done Annually
Vision Testing (Far, near, color and ocular defects)	Shall be done Annually
Complete Blood Count (CBC)	Shall be done Annually

Table 7.5: Budget for Occupational Health & Safety

S. No	Description	Amount (Rupees in Lacs)
1	Workers will be subjected to primary health check-up before they are employed to ascertain their health conditions. Thereafter, Regular Medical check-up & First Aid facility will be organized for workers to evaluate the adverse impact if any on these persons due to the proposed activity. Occupational health surveillance programme shall be done six monthly. A safety officer / environmental officer shall be recruited.	2.0
2	Infrastructure facilities such as sanitation, fuel, restroom, canteen etc. shall be provided to the labour force during construction as well as to the casual workers including truck drivers during the operation phase.	2.0
3	Workers will be provided with masks, gloves, goggles & ear muffs for safe working	1.0
4	Covered transportation of vehicles	2.0
5	Insurance for worker & Tie up with ESI Hospital	3.0



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Total	10.0 lacs
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7.14 Safety, Health and Environmental (SHE) Management Plan & Team

The company has a written policy for the safety, Health and Environment Management.

Through this policy, the company management commits itself to the following objectives.

- Meet all the relevant laws, regulations and international agreements
- Conduct its activities safely, protecting the health of all employees and the products users
- Reduce the adverse environmental impacts to a practicable minimum at an acceptable cost to the company and society
- Encourage continuous improvement in safety, health and environment performance.

7.15 Social Impact Assessment. R&R action plan

No rehabilitation and resettlement is applicable for this project

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Chapter 8 – Project Benefits

8.0 Introduction

In the service of a huge population, these hospitals are generating “Bio-Medical Wastes” that are incompatible with the environment. These wastes need professional attention for effective management as the infectious nature of the waste can cause irreparable damage to the human health and the environment. It has become imperative to monitor and control the management and handling of these wastes.

Due to the proposed facility, hazardous bio medical waste will be properly treated and disposed but lack of segregation practices, results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal. Various communicable diseases, which spread through water, sweat, blood, body fluids and contaminated organs, are important to be prevented. The bio medical waste spread in and around the hospitals calls flies, insects, rodents, cats and dogs that are responsible for the spread of communication disease like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles and other article like glass bottles without proper sterilization are responsible for Hepatitis, HIV, and other viral diseases. From the proposed facility these kinds of diseases shall be prevented to be spread from the bio medical wastes.

For the proposed facility, required skilled and unskilled laborers will be utilized maximum from the local area. The increasing health care facilities increase the demand of bio-medical waste management, to some extent. In brief it can be concluded that, the proposed activities will not produce adverse impact on sanitation, communication and community health, as sufficient measures have been proposed to be taken under the Environmental Management Plan. Due to proposed project, the surrounding environment will not face any problem related to pollution because all kind of wastes will be handled properly and No alteration in transport routes will be required.

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8.1 Benefits from Bio Medical Waste

8.1.1 Physical Infrastructure

The beneficial impact of proposed project on the civic amenities will be substantial after the commencement of project activities. The basic requirement of the community needs will be strengthened by extending healthcare to the community, building/strengthening of existing roads in the area which will help in uplifting the living standards of local communities.

8.1.2 Employment Opportunities

The project will create opportunities for employment. Skilled and unskilled manpower will be needed. Secondary jobs are also bound to be generated to provide day-to-day needs and services to the work force. This will also temporarily increase the demand for essential daily utilities in the local market. Due to this proposed project, relevant to this project other job opportunities may generate which will improve the socio economic status of the area.

Neighboring villagers of the project will get its benefits more by giving preference to them in relation to direct employment associated with the various project activities. Construction and operation phase of the proposed project will involve a certain number of laborers, contractors and construction workers. There is a possibility that local people will be engaged for this purpose. The operation phase will involve a number of skilled and unskilled workers. The total 38 manpower will be required for this project. There is a possibility that local people will be engaged for this purpose to the extent possible and hence improve the existing employment scenario of the region. First preference will give to localize people for all kind of required employment in the project and especially for unskilled employment the company will take localize people.

8.2 Improvements in the Social Infrastructure

Agriculture & plantation are one of the basic sectors of employment for the local people in this area. The project will lead to indirect and direct employment opportunity. Employment is expected during construction and operation period, waste lifting and other ancillary services. Employment in these sectors will be temporary or contractual and involvement of unskilled labor will be more. A major part of this labour force will be mainly from local villagers who are

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expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area.

The following changes in socio-economic status are expected to take place with this project.

- The project is going to have positive impact on consumption behavior by way of raising average consumption and income through multiplier effect.
- The project is going to bring about changes in the pattern of demand from food to nonfood items and sufficient income is generated.
- Due to the corporate social responsible activities by project authorities, the socioeconomic condition of the people will be improved.
- People perceive that the project will in the long run help in the development of social infrastructures/such as.
 - Education facilities
 - Banking facilities
 - Post offices and Communication facilities
 - Medical facilities
 - Plantation and parks
 - Community facilities

Industrial development and consequent economic development should lead to improvement of environment through better living and greater social awareness. On the other hand, the proposed project is likely to have several benefits like improvement in indirect employment generation and economic growth of the area, by way of improved infrastructure facilities and better socio-economic conditions. Better hygienic conditions, as Bio-Medical waste with solid waste being dumped at several places will be brought to one place for further treatment and scientific disposal.

8.3 Other Tangible Benefits

- Additional housing demand for rental accommodation will increase
- Cultural, recreation and aesthetic facilities will also improve.
- Improvement in communication, transport, education, community development and medical facilities.
- Overall change in employment and income opportunity

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Chapter 9 – ENVIRONMENT COST BENEFIT ANALYSIS

9.0 Cost and benefit

External effects of a project are usually defined as income or income-equivalent welfare changes for individuals or groups not directly affiliated with the project. A project generating external effects neither receives nor makes a full financial payment to these individuals or groups. In economic analysis, all environmental effects, both costs and benefits, should be identified and, where possible, quantified. Environmental effects can be quantified by measuring the change in output that these effects cause in the economy. It is recognized, however, that some environmental effects, because of their nature, do not readily lend themselves to quantification.

The environmental impacts identified in the study are measured as the differences between the following three scenarios:

Scenario A: No existence of the project.

Presently, Bio-medical wastes in the district of Deoria and its surrounding districts are catered by various CBWTF operators. These facilities are located more than 75 km from these areas. There are a number of complaints in the local administrative levels regarding irregular waste collection in the district of Deoria. The wastes, therefore, are either stored unattended for longer period of time or are being forced to dump without availability of storage. These unattended/ dumped wastes are potential threat to come in direct contact with the human beings especially children and also to the stray animals. The direct contact of bio-medical wastes to human beings has potential to cause a number of diseases on human health. The unattended / dumped wastes are also likely to contaminate soil, ground water and may even spread off along with storm water.

Project Cost = 0.00

Environmental Management Capital Cost = 0.00

Environmental Management Recurring Cost = 0.00

Scenario B: Establishing the project without planning and environmental management practices

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Operating the bio-medical waste treatment facility, without environmental plan implemented will have more adverse impact. There are likely generation of huge quantity of particulate matters and fugitive emission from the incinerator. In addition, toxic gas release in the form of Dioxin, Furans, Mercury and its compound are likely to have a major health impact. Contamination of soil and ground water due to dumping of incinerator ash will also cause potential threat to the environment and vegetation.

Project Cost = 380lakhs

Environmental Management Capital Cost = 0.00

Environmental Management Recurring Cost = 0.00

Scenario C: Environmental investments are implemented as planned

The project with implantation of environmental investments will help to achieve regular collection and disposal of bio-medical wastes from the district of Banda and its surrounding districts resolving the problem as stated in Scenario A. In addition, installation of environmental pollution control measures, implementation of environmental management plan and best operation practices will lead to resolve any issue arising out as mentioned in Scenario B.

Project Cost =281.25 lakhs

Environmental Management Capital Cost = 44 lakhs

Environmental Management Recurring Cost =10 lakhs/ Annum

Differences in the environmental impacts projected in the "with" and "without" scenarios represent incremental costs and benefits quantified and monetized in this study. Costs were defined as the investment and operating costs of new equipment to reduce pollution to the level.

The cost benefit analysis without project, with project has been assessed below:

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Table 9.1: Cost benefit analysis

Parameters	Without Project	Project without Environmental Management	Project with Environmental Management
Cost Component			
Project Cost	0.00	281.25 Lakhs	281.25 Lakhs
EMP Capital Cost	0.00	0.00	44.0 Lakhs
EMP Recurring Cost	0.00	0.00	10.0 Lakhs/Annum
Benefit Component			
Bio-medical waste management in the area	Waste handling difficulty Waste disposal difficulty	Every day waste collection and disposal	Every day waste collection and disposal
Health Benefit	Poor hygienic condition near hospital area where wastes are stored Impact due to wastes coming in direct contact with humans and stray animals	Better hygienic condition in hospitals Safe locality	Better hygienic condition in hospitals Safe locality
Social Benefit	Unclean surroundings	Clean Hospitals Clean city	Clean Hospitals Clean city
CER funding	No funding	Improvement in local community	Improvement in local community
Pollution due to particulate matters	No impact	High level of particulate matter dispersion due to operation of incinerator	Controlled emission
Pollution due to fugitive emissions and toxic gas release	No impact	High level release of gases and dispersion due to operation of incinerator	Controlled emission
Ground Water contamination	Unattended wastes leaching to ground water	Limited leaching to ground water	No leaching

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Chapter 10 – ENVIRONMENTAL MANAGEMENT PLAN

10.0 Introduction

Environmental management plan (EMP) has been prepared for the proposed facility, to minimize negative impacts and is formed on the basis of prevailing environmental conditions and likely impacts of this project on various environmental parameters. This plan will also facilitate monitoring of environmental parameters. Preparation of EMP is required for formulation, implementation and monitoring of environmental protection measure. EMP includes schemes for proper and scientific treatment and disposal mechanism for air, liquid and solid hazardous pollutants. Apart from this, green belt development, safety aspect of the workers, noise control, fire protection etc. are also included in it. The various components of the EMP are outlined in subsequent sections.

10.1 Purpose of Environmental Management Plan

Various purposes of the environmental management plan are:

- To treat and dispose off all the pollutants viz. air, liquid, gaseous and solid waste so as to meet statutory requirements (Relevant Pollution Control Acts) with appropriate technology. It will help to reduce the adverse effect on human being as well as on environment due to the proposed facility.
- To support and implement work to achieve environmental standards and to improve the methods of environmental management.
- To promote green-belt development.
- To encourage good working conditions for employees.
- To reduce fire and accident hazards.
- Budgeting and allocation of funds for environment management system

10.2 Environmental Management during Construction phase

The impacts during the construction phase on the environment would be basically of temporary nature and are expected to reduce gradually on completion of the construction activities.

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10.2.1 Air Quality Mitigation Measures

For the proposed project site leveling and grading will be carried out if required, where ever possible to maintain the natural elevations they will not be disturbed, only leveling activity will be carried out for providing roads, sewage network, storm water system, and places required for construction of sheds and administrative buildings. According to the engineering assessment, most of the excavated soil generated during construction activities will be reused within the project site for leveling during road formation etc. The excess if any will be given to local contractors for disposal in low lying areas, road construction use etc.

During construction period most of the dust will be generated from the movement of construction vehicles on unpaved roads. Unloading and removal of soil material shall also act as a potential source for dust nuisance. The control measures proposed to be taken up are given below.

- Water sprinkling on main haul roads in the project area will be done, this activity will be carried out at least twice a day, if need arises frequency will be increased on windy days, in this way around 50% reduction on the dust contribution from the exposed surface will be achieved.
- The duration of stockpiling of excavated soil will be as short as possible as most of the material will be used as backfill material for the open cut trenches for road development.
- Temporary tin sheets of sufficient height (3m) will be erected around the site of dust generation or all around the project site as barrier for dust control.
- Tree plantations around the project boundary will be initiated at the early stages by plantation of 2 to 3 years old saplings using drip irrigation or by regular watering so that the area will be moist for most part of the day.
- All vehicles carrying raw materials will be instructed to cover with tarpaulin / plastic sheet, unloading and loading activity will be stopped during windy period.
- To reduce the dust movement from civil construction site to the neighborhood the external part of the construction activity will be covered by plastic sheets

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10.2.2 Water Quality Mitigation Measure

During site development necessary precautions will be taken, so that the runoff water from the site gets collected to working pit and if any over flow is, will be diverted to nearby greenbelt / plantation area. During construction activity all the equipments washed water will be diverted to working pit to arrest the suspended solids if any and the settled water will be reused for construction purposes, and for sprinkling on roads to control the dust emission, etc.

The waste generated from the site work shop will be segregated like used oil, lubricants, etc and disposed to authorized recyclers the waste like soiled cotton, paper, etc will be disposed to dump/TSDF.

The domestic wastewater generated from temporary toilets used by the work force will be diverted to septic tank followed by soak pit. Therefore, impact on water quality due to proposed unit would be insignificant.

10.2.3 Noise Mitigation Measures

Noise generating equipment will be used during day time for brief period of its requirement. Proper enclosures will be used for reduction in noise levels, where ever possible the noise generating equipment will be kept away from the human habitation. Temporary tin sheets of sufficient height (3m) will be erected around the noise generating activity or all around the project site as barrier for minimizing the noise travel to surrounding areas. Therefore, impact on noise environment due to proposed project would be insignificant.

All vehicles entering into the project will be informed to maintain speed limits, and not blow horns unless it is required. Personal protective equipment like earmuffs, helmets covering ears would be provided to the workers working near noise generating equipment and would see that workers use the protective gadgets regularly.

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10.2.4 Solid Waste Mitigation Measures

The solid waste generated during construction period being predominantly inert in nature, construction and demolition waste does not create chemical or biochemical pollution. However maximum effort would be made to reuse and recycle them. The most of the solid waste material will be used for filing/leveling of low-laying areas, as road construction material, if any excess given to local contractors for lifting and dumping in low lying areas. All attempts would be made to stick to the following measures.

- All construction waste shall be stored within the site itself. A proper screen will be provided so that the waste does not get scattered.
- Attempts will be made to keep the waste segregated into different heaps as far as possible so that their further gradation and reuse is facilitated.
- Materials, which can be reused for purpose of construction, leveling, making roads will also be kept in separate heaps from those which are to be sold. The use of the construction material basically depends on their separation and conditions of the separated material. A majority of these materials are durable and therefore, have a high potential for reuse. It would, however, be desirable to have quality standards for the recycled materials. Construction waste can be used in the following manner.
- Reuse of bricks, tiles, stone slabs, timber, piping railings etc to the extent possible and depending upon their conditions.
- Sale/ auction of materials which cannot be used at the site due to design constraint
- Plastics, broken glass, scrap metal, used cement bags, etc can be sent for recycling in the industries.
- Rubble/ brick bats can be used for building activity, such as leveling, under coat of lanes where the traffic does not constitute heavy moving loads.
- Larger unusable pieces can be sent for filing up low laying areas.
- Fine material such as sand, dust, etc can be used as cover material
- The unearthed soil can be used for leveling as well as for lawn development
- The broken pieces of the flooring material can be used for leveling in the building or can be disposed off

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- The unused or remaining paints/varnishes/wood can either be reused or can be disposed.

10.2.5 Land Environment

Following steps are proposed to take care of impact of construction activity on project land area:

- On completion of civil works, all debris etc. will be completely removed from site to avoid any incompatibility with future use.
- Other materials like paint, diesel etc. will be properly stored and handled to prevent any spillage on land.
- All the wastes will be stored at a designated site within the premises to prevent scattered discharge on land.

10.2.6 Ecology

Proposed facility will not involve any trees cutting exercise so, there will be no impact on ecology. However, about 33% of total plot area is proposed for greenbelt development.

10.2.7 Socio-Economic

Overall socio - economic effect of construction phase will be positive due to direct and indirect employment opportunity for the local livings. Local people from nearby villages of the surroundings from the site will be employed for construction work to the maximum extent possible.

10.3 Environmental Management during Operations Phase

Operations phase being longer in duration and because of its potential to create continuous impacts is important from the impact point of view. Comprehensive and effective EMP has to be prepared and implemented to safe-guard environment during operations phase.

10.3.1 Air Quality Management including Odour control

The air pollutants in the plant may be classified broadly into particulate matter like dust, fumes etc. and gases like Sulphur dioxide, Nitrogen oxide and Hydrogen chloride etc. The

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measure to control the air pollution will ensure the ambient air quality standards as laid down by Central Pollution Control Board for industrial areas. The system proposed for air pollution control will provide acceptable environment condition in the working areas and abate air pollution in the surrounding area of the plant.

Source of Air Pollution	Proposed APCM
D.G. Set back up	DG set of 32 KVA#2, 10KVA#1 within project site
Incinerator (250 kg/hr)	Ceramic bag-house filter followed by chimney (30 m above ground level) will be provided from the incineration process.

Measures adopted to mitigate the air emissions

- Proper ventilation shall be maintained
- Plantation work for green belt development shall be developed as per CPCB guidelines
- Ambient air quality will be regularly monitored to ensure that ambient air quality standards and suggested limits are met at all times.

Stack Emission

Incinerator: To control emissions from incinerator of 300 kg/hr Ceramic Filter Bag House shall be provided. Chimney (30 m above ground level) will be provided from the incineration process. A lean concentration of NaOH Solution and water will be used to neutralize the flue gasses/solutions.

DG Set: For mitigation of impacts of air pollution from D.G. sets, stack height of 3.0m above roof level shall be provided for proposed D.G. set of capacity 32 KVA#2, 10KVA#1.

Odour Control

1. As per BMW Rules the waste should be treated within 48 hrs of its generation.
2. Daily washing of waste collecting containers, vehicle compartment and floor of store room.
3. Closed cabin vehicles shall be used for the collection and transportation of bio-medical wastes.

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4. Masks shall be provided to workers to avoid health issues due to odour.
5. Hygienic conditions shall be maintained.
6. Green Belt/Plantation will be maintained across the project site to check odour within the premises.
7. Dilution of odorant by odour counteraction or neutralize by spraying Ecosorb (organic and biodegradable chemical) around odour generation areas at regular intervals.
8. Area will be properly ventilated.

Impact of the transport of bio medical waste & vehicular pollution control & its management

For transportation of bio medical waste, trucks shall be used. Traffic to the different sites during construction/installation will be intensive and heavier than at present in normal operating conditions. Dust emission from movement of vehicles is likely to cause some impacts on the working population within the immediate vicinity of the project site. In turn, it will subject existing roads to more stress.

To control the impact, dust suppression systems (water spray) will be used as per requirement at the construction site. Construction materials will be fully covered during transportation to the project site by road. Vehicle flow during shift changes shall be regulated by allowing exits in a phased manner. The present road conditions are reasonably good for proposed movement of traffic. Preventive maintenance will be carried out for vehicles and pollution checks on a periodic basis will be mandatory.

10.3.2 Water Quality Mitigation Measures

Water Consumption and waste water discharge

The source of water supply for proposed facility shall be sourced from groundwater. Water requirement for the proposed CBWTF project is 9 KLD (Industrial – 8.0 KLD & Domestic - 1.0KLD). The amount of total waste water generated out of the proposed Bio Medical Waste Treatment Facility is 7.0 KLD (~ considering 5% loss) which shall be treated in ETP having capacity of 10 KLD. The treated water that will be 7 KLD will be reuse in makeup of process water in air pollution control device. It will be a Zero liquid Discharge Unit.

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Scheme of waste-water management

The wastewater passes through the oil and grease tank to remove excess oil from the wastewater. The waste water after removal of oil and grease will be collected in an equalization tank to hold the wastewater for some predetermined time in a continuously mixed basin to produce a uniform wastewater. The wastewater is then subjected to Flocculation tank. In a flocculation tank, the water is stirred or otherwise moved around so that the particles move around, bump into other particles. Chemicals (most commonly "alum"/ polyelectrolyte) are often added to the water going into a flocculation tank to help aid particle formation. The next step in the process is to separate the solid sludge with the wastewater hence the wastewater will be transferred to Tube settlers which capture the settle-able fine flock that escapes the clarification zone beneath the tube settlers and allows the larger flock to travel to the tank bottom in a more settle-able form. The Tube-settler's channel collects solid into a compact mass which promotes the solids to slide down the tube channel to sludge drying beds and the water content will go into the carbon filter to remove contaminants and impurities, utilizing chemical adsorption. After giving UV treatment the treated water obtained shall be reused.

Water Conservation measures

Following measures shall be adopted for water conservation:

1. Reduction: The first step is reduction of water consumption, with strict measurement and control of consumption. So, minimum water will be used for floor & vehicle washing.
2. Re-use: Treated water from the ETP will be reused in floor & vehicle washing & Gardening.

Scheme of ETP

Design Basis

We are offering the system, which a latest technology is based on Suspended Growth Process for the treatment of wastewater.

The Suspended Growth Process reactor incorporates the advantage of fixed film technologies & combined with them the fine bubble diffused aeration techniques to get a high efficiency biological treatment Unit.

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Effluent shall be collected in an underground Equalization tank through an Bar screen, Oil & Grease Trap. The Equalize effluent from Equalization tank would be transferred through a transfer pump to the aeration tank equipped with a Diffused Aeration Assembly. Over flow from the aeration tank would be transferred to a settling tank. Sludge from the settling tank would be transfer to the Sludge drying beds.

The finally treated water will meet out the norms of Pollution Control Board and can be reuse for auxiliary applications such as floor washing, toilets flushing, fire fighting, Gardening, etc.

DESIGN CRITERIA

Design Information

Feed Sewage rate: 10m³/day

Operating Hours: 24

The Treatment plant has been designed to treat 10 M³/day of Effluent/Sewage. The duration of treatment considered is 24 operating hours a day, thus arriving at a flow rate of 0.42M³/hr.

Design Feed water analysis

We are basing our design on the basis of the Raw Sewage analysis of mixed feed

S. No	Parameter	Concentration*
1	pH	7.0-8.0
2	BOD (3 days at 27°C)	500
3	COD	700
4	Suspended Soild	400
5	Oil	40
6	Colifirm	107

*All parameters except PH expressed as mg/l.

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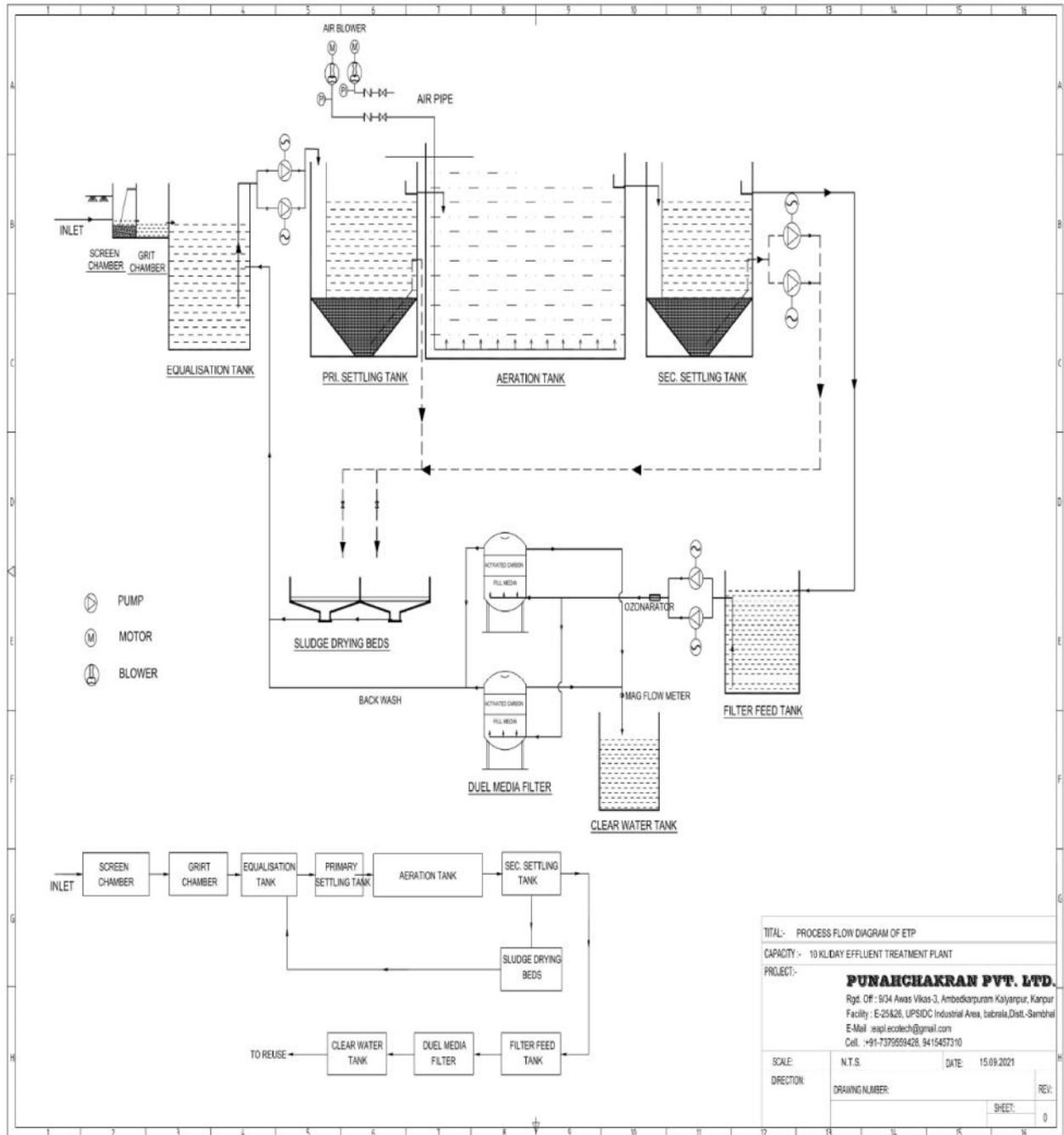


Figure: Effluent treatment process flow chart

Primary Treatment – Free Oil Separation (Oil & Grease Trap)- The oil & grease trap tank is free oil removal equipment oil .Effluent is fed to the Oil & grease trap tank. Due to the density difference between the oil & water, oil is separated from water using stokes principle. Oil being lighter than water floats. Hence to skim off the floating oil, slotted pipe oil skimmer has been provided. Oil via slotted pipe oil skimmer is collected in the oil collection drum & disposed of.

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Equalization Tank - The equalization tank is designed to equalize BOD/COD loading to the next treatment stage. It is designed with a 24 hour residence time and with mixing by coarse bubble aeration.

Mixing & Flocculation Units - The equipment provided for these include the agitator (FM) in the Mixing tank (MT) and the Flocculator (FLCC) in Flocculator tank (FLCCT). Alum (as coagulant) and Polyelectrolyte (as flocculant) are selected to enable coagulation with high speed mixing and destabilizing the particle and then to start floc formation with long chain structure in the flocculation tank with gentle mixing. 20 minutes residence time is provided in the flocculation tank for particles to become heavy before entering into the lamella clarifier thereafter.

Tertiary Treatment– The wastewater is then polished by removal of suspended particles in a multi- grade sand filter (MGF) and residual refractory organic materials if any in activated carbon filters (ACF). The COD is adsorbed in the active centres of the granular activated carbon. The system is designed so that the carbon can be removed as easily as possible and in a staged manner so that the plant copes hydraulically whilst an adsorber is being changed.

UV+Oxidation: The effluent will be provided with the Advanced Oxidation treatment like per ozonation (i.e. UV/O₃) to polish water and remove all COD. AOPs are processes which result in in-situ generation of hydroxyl radicals (OH) which are most powerful and 109 times faster than Ozonation which has been used for quite some time in wastewater treatment (Parsons, 1997). AOPs are collectively referred to all those processes which ultimately generated OH radicals. These include, Fenton's Process, UV/ Fenton's Process, Per-oxidation, Photolysis of Hydrogen Peroxide, Electrochemical AOPs, Ultrasound AOPs and Heterogeneous Photocatalysis (Oturán and Aaron, 2014).

10.3.3 Noise Levels Management

The main sources of noise generation is due movement of vehicles carrying waste, all vehicle (drivers) entering into the project will be informed to maintain speed limits, and not blow horns unless it is required.

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The other areas where noise generation is anticipated is incinerator section, DG set room, necessary personal protective equipment like earmuffs, helmets covering ears would be provided to the workers working near noise generating equipment and would see that workers use the protective gadgets regularly. Regular maintenance of the equipment will be carried out as per the schedule given by suppliers. The noise pollution management measures proposed is given below.

- Acoustic Enclosure for all the high noise level equipments
- All the design/installation precautions as specified by the manufacturers with respect to noise control are strictly adhered
- Major noise generating sources are insulated adequately by providing suitable enclosures
- Other than the regular maintenance of the various equipment, ear plugs are provided to the personnel close to the noise generating units
- All the opening like covers, partitions shall be designed properly

10.3.4 Solid Waste Management

Table 10.1 Solid Waste Management

S.No.	Solid waste	Quantity of generation, TPD approx	Disposal method
1	Waste from Autoclave		Autoclaved Plastic & rubber etc. will be sent to Shredder & then from shredder it will be sent to authorize recyclers. Sharps will be treated in autoclave. After autoclaving, sharps will be encapsulated. Glass bottles shall be sold to recyclers after chemical disinfection.

Hazardous waste

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S.No.	Solid waste	Quantity of generation, TPD approx	Disposal method
1	Used oil	30 liter/ month	Used oil from machineries/D.G. Set will be carefully stored in HDPE drums in an isolated covered facility. The used oil will be sold to authorized vendors for the treatment of the same. Suitable care will be taken so that spills / leaks of used oil from storage could be avoided.
2	Incinerator Ash	10kg/day	Will be handover to authorized recycler. .
3	ETP Sludge	0.13 kg/day	It will be stored in leak proof PVC containers in isolated area on pakka floor with in the premises as per HWM Rules and handed over to authorized treatment and disposal facility of Delhi Pollution Control Committee

10.3.4. Covid -19 Waste management Plan

The covid-19 wastes are managed as per the Guidelines for Handling, Treatment, and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients – Rev. 4 on dated 17.07.2020. The details are as follows:

Duties of Common Biomedical Waste Treatment Facility (CBWTF)

- Report to SPCBs/PCCs about receiving of waste from COVID-19 isolation wards / Quarantine
- Camps / Quarantined homes / COVID-19 Testing Centers;
- Operator of CBWTF shall ensure regular sanitization of workers involved in handling and collection of biomedical waste;
- Workers shall be provided with adequate PPEs including three layer masks, splash proof aprons/gowns, nitrile gloves, gum boots and safety goggles;
- Use dedicated vehicle to collect COVID-19 ward waste. It is not necessary to place separate label on such vehicles;
- Vehicle should be sanitized with sodium hypochlorite or any appropriate chemical disinfectant after every trip.
- -COVID-19 waste should be disposed-off immediately upon receipt at facility.

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- In case it is required to treat and dispose more quantity of biomedical waste generated from COVID-19 treatment, CBWTF may operate their facilities for extra hours, by giving information to SPCBs/PCCs.
- Operator of CBWTF shall maintain separate record for collection, treatment and disposal of COVID-19 waste.
- Do not allow any worker showing symptoms of illness to work at the facility. May provide adequate leave to such workers and by protecting their salary.

Duties of SPCBS/PCCS

- Shall maintain records of COVID-19 treatment wards / quarantine centers / quarantines homes in respective States.
- Ensure proper collection and disposal of biomedical waste as per BMW Rules, 2016 and SoPS given in this guidance document;
- Allow CBWTFs to operate for extra hours as per requirement;
- May not insist on authorization of quarantine camps as such facility does not qualify as health facilities. However, may allow CBWTFs to collect biomedical waste as and when required;
- In case of States not having CBWTFs as well as rural or remote areas, not having access to CBWTFs, the existing captive facilities of any hospital may be identified for disposal of COVID-19 waste as per provisions under BMW Rules, 2016 and these guidelines. This may include permitting use of deep burial pits for disposal of yellow category waste as per standards prescribed in Schedule II of Bio-medical Waste Management Rules, 2016.
- Coordinate with CBWTFs and ULBs in establishing adequate facilities for collection and disposal of COVID-19 waste.
- In case of generation of large volume of yellow color coded (incinerable) COVID-19 waste, permit HW incinerators at existing TSDFs to incinerate the same by ensuring separate arrangement for handling and waste feeding.

Duties of Urban Local Bodies

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- Urban Local Bodies are responsible for ensuring safe collection and disposal of biomedical waste, if any, generated from Quarantine Camps/ Quarantine Homes/ Home Care for COVID-19 suspected persons.
- Information on each Quarantine Camps/ Quarantine Homes/ Home-Care should be available with local administration and provide updated list to SPCBs from time to time;
- In case of quarantine camps, ensure that biomedical waste is collected directly by CBWTFs identified by ULB. Waste from quarantine camps to be lifted by CBWTFs on call basis as and when the biomedical waste gets generated. Provide contact details of CBWTF operator at Quarantine Camps;
- Provide necessary support, security including authorization to staff of CBWTFs;
- ULB shall engage CBWTF operator for ultimate disposal of biomedical waste collected from quarantine home/home care or waste deposition centers or from door steps as may be required depending on local situation; ULB shall make agreement with CBWTF in this regard.
- ULBs envisage following options to facilitate safe collection and disposal of biomedical waste from quarantined homes/Home care;
 - a) Engage authorized waste collectors for door steps collection of biomedical waste and transfer to collection points for further pick-up by CBWTF; and/or
 - b) In case number of quarantined homes/Home-care units are less, ULBs may engage services of CBWTFs to collect the waste directly from door-steps.

Provide yellow colored bags (designated for BMW) to the persons responsible for operating Quarantine Camp or home-care. If required, such bags may be provided through CBWTF.

ULBs shall ensure the following in engaging authorized waste collectors at door-steps or at waste deposition centers;

- Create a separate team of workers who shall be engaged in door step waste collection at waste deposition centres or at quarantine homes or home care.

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- Ensure that only designated staff collects biomedical waste from quarantine homes or home care.
- Training should be provided for sanitization, about collection of biomedical waste, precautionary measures to handle biomedical waste.
- Impart training to waste collector in handling of biomedical waste including methods of sanitization. Training to waste collectors should be arranged through CBWTF operators;
- The staff involved in handling and collection of waste from quarantine homes or home care centers shall be provided with adequate Personnel Protective Equipment such as three layer masks, splash proof aprons/gowns, heavy-duty gloves, gum boots and safety goggles. These PPEs are required to be worn all the time while collecting of waste from quarantine center/quarantine homes/home care/waste deposition centres.
- Use dedicated carts / trolleys / vehicles for transport of biomedical waste. Ensure sanitization of vehicles with 1% hypochlorite after each trip.
- Ensure that, waste collectors arriving at quarantine center or at home care shall spray the disinfectant (1% hypochlorite solution) on the bin used for yellow bag.
- Establish common waste deposition centers (as stipulated under SWM Rules, 2016) for receiving / collection of biomedical waste. For this purpose, existing Dhalaos if any may be converted suitably.
- The general solid waste collected from quarantine homes or home care shall be disposed off as per SWM Rules, 2016.
- Services of Common Biomedical Waste Treatment & Disposal Facilities (CBWTFs) and staff associated with CBWTFs for collection, transportation, treatment and disposal of biomedical waste generated from hospitals including COVID-19 isolation wards, Quarantine Camps, etc. may be considered an essential service as part of health infrastructure.
- Facilitate smooth operations of CBWTFs.
- Local agencies / ULBs may take additional measures considering prevailing ground situations and feasibility, however while implementing such measures requirements outlined in these guidelines should be complied.

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10.3.5 Land Environment

Treated effluent will be utilized for gardening/plantation after ensuring norms specified by pollution control board by which impact on soil and ground water will be insignificant. Waste such as incineration ash generated in the process of incineration shall be stored in a separate area under the shed so as to avoid entry of rain water during the monsoon and for easy collection and in case, incineration ash is hazardous waste in nature same should be disposed through authorized TSDF.

10.3.6 Socio - Economic

The Socio – Economic impact of operational phase will be positive due to direct and indirect employment opportunity for the local villages. Local people from nearby villages of the surroundings from the site will be employed for construction work to the maximum extent possible.

10.3.7 Ecology

There is no ecological and otherwise sensitive areas viz. wildlife sanctuary, national parks, archeological important areas within 10 km radius of the project site. There are no known rare, endangered or ecologically significant animal and plant species. Except for a few wild species of plants and grasses and a few animals that are very commonly spotted in any rural environment, the study area does not have any endangered or endemic species of animals. Due to the development of green belt at the project vicinity the impact on the ecology will be minimal.

Greenbelt Development

Proposed project to be developed on 3601.0 m² area and as per CPCB guideline greenbelt will be developed on 1450.0 m² area, which is 40% of total plot area. 380 nos. of local and air pollutant tolerant species will be planted in and list of the same is given in table

Plantation Period in year	1st	2nd	3rd	Total
No. of Plants to be Planted	180	155	65	380
Yearly tree plantation (%)	47	41	17	100
Capital cost (Rs.)	90,000	77,500	32,500	200,000

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10.4 General Considerations

For good housekeeping of the proposed facility, following measures will be planned:

- Maintaining cleanliness of roads to prevent accumulation of dust and waste material.
- Inculcating positive attitude among employees for good house-keeping.
- Maintaining hygienic conditions in canteens, near drinking water source and toilets.

10.5 Concept of Waste-Minimization, Recycle/Reuse/Recover Techniques, Energy Conservation, and Natural Resource Conservation

Recycle/Reuse/Recover: Wastewater generated from the proposed facility shall be reutilized in the venture scrubber after giving suitable treatment. The Incineration ash shall be finally disposed to nearest authorized TSDF/landfill site.

Energy conservation: Reduction in usage of traditional light bulbs with Light Emitted Diode (LEDs) means reduction in usage energy consumption. Usage of Solar energy at different locations in the plant like parking light, roadside light etc. will be explored.

Natural Resource Conservation: To conserve ground water, rain water harvesting will be carried out to store rain water for future use and also to recharge ground water.

10.6 Occupational Health Management

There will be routine observation of health as certain sufferings are likely to appear as result of exposure by the workers during operations of various facilities. All the employees shall be required to undergo a medical checkup before joining the facility. Medical checkup will be conducted on regular basis and shall immunize all its health care workers and others, involved in handling of bio-medical waste for protection against diseases including Hepatitis B and Tetanus that are likely to be transmitted by handling of bio-medical waste and will be monitored. First aid facilities required to attend immediately for meeting emergency situations shall be made available at the facility.

10.7 Fire Protection System

The fire protection system will protect the entire site area from fire hazards happening accidentally. This fire protection system comprises of a ground level water storage tank to store the anticipated requirement of water. One electric motor driven pump and one diesel

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high pressure pumps will be provided to pump the water to a high pressure header from where the water is distributed to various high pressure hydrants provided at selected locations. Necessary fire hoses terminated with spouts will be kept ready at each hydrant location to facilitate firefighting.

10.8 Environmental Management Cell

The Environmental Cell will be headed by the Project Head followed by other officers and technicians. The department is the nodal agency to co-ordinate and provides necessary services on environmental issues during operation of the project. This environmental group is responsible for implementation of environmental management plan, interaction with the environmental regulatory agencies, reviewing draft policy and planning. This department interacts with State Pollution Control Board and other environment regulatory agencies. The department also interacts with local people to understand their problems and to formulate appropriate community development plan.

The cell will also be responsible for monitoring of the plant safety and safety related systems which include:

- Checking of safety related operating conditions.
- Visual inspection of safety equipments.
- Preparation of a maintenance plan and documentation of maintenance work specifying different maintenance intervals and the type of work to be performed.

Other responsibilities of the cell will include followings:

- Conduct and submit annual Environmental Audit. SPCB registered agency will be retained to generate the data in respect of air, water, noise, soil and meteorological data and prepare the Environmental Audit report.
- Timely renewal of Consolidated Consents & Authorization (CC & A) will also be taken care of.
- Submitting environmental monitoring report to SPCB. Data monitored by the cell will be submitted to the Board regularly and as per the requirement of SPCB. The cell will also take mitigation or corrective measures as required or suggested by the Board.

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- Keeping the management updated on regular basis about the conclusions/results of monitoring activities and proposes measures to improve environment preservation and protection.
- Conducting regular safety drills and training programs to educate employees on safety practices. A qualified and experienced safety officer will be responsible for the identification of the hazardous conditions and unsafe acts of workers and advise on corrective actions, organize training programs and provide professional expert advice on various issues related to occupational safety and health.
- Conducting safety and health audits to ensure that recommended safety and health measures are followed.

The company will engage one professional with environment background, who will be responsible for looking after day to day environmental compliances, maintaining log books and records. The information will be reported to the project in-charge. The Directors of this company will check and verify the records once in a month. In case any specialized technical services/ audits are required, the same can be obtained from any external professionals/ companies. The company hierarchy will be in the structure mentioned below:



10.9 Budgetary Provision for EMP

To implement the environmental protection measures as suggested in the above sections, the project management has made budgetary provision for environmental protection and safety measures. Cost towards environmental mitigation measures are given in Table 10.3.

Table 10.2: The EMP budget during operation phase

S. No.	Pollution control system	Cost (Rs. Lac)	Recurring Cost (Rs. Lac)
1.	Air pollution control measures Including online monitoring system	15.0	2.5
2.	Water pollution control measures	10.0	2.0

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S. No.	Pollution control system	Cost (Rs. Lac)	Recurring Cost (Rs. Lac)
3.	Environment monitoring	10.0	2.5
4.	Occupational Health (PPE)	5.0	1.0
5.	Green Belt	2.0	1.0
7.	Social EMP	2.0	1.0
Total		44.0	10.0

The EMP budget during construction phase likely to be incurred is given below in Table 10.4.

Table 10.3: The EMP budget during construction phase

Component	Cost (Rs/ Annum)
Water for Dust Suppression	25000
Waste Storage Bins	5000
Environment Monitoring	80000
Total	110000

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Chapter 11 – SUMMAY & CONCLUSION

11.0 Introduction

The Environmental Impact Assessment (EIA) study is carried out as a part of the process to obtain Environmental Clearance for the proposed Bio-medical waste treatment facility to be developed by M/s Punahchakran Private Limited. Proposed project falls under category B, 7(da), Bio-Medical Waste Treatment Facility as per EIA Notification dated 14th September, 2006 and its subsequent amendments thereafter. EIA report is prepared in line with ToR letter (vide proposal No. SIA/UP/MIS/66542/2021 dated 17.08.2021) and generic structure mentioned in EIA notification. Objective of the proposal is as under,

1. To identify, predict and evaluate the economic, environmental and social impact of development activities
2. To provide information on the environmental consequences for decision making and
3. To promote environmentally sound and sustainable development through the identification of appropriate alternatives and mitigation measures

11.1 Project Description

S. No	Parameters	Description		
1	Project	Proposed Common Biomedical Waste Treatment Facility (CBWTF)		
2	Category	The proposed project falls under Category “B” Projects of activity 7 (da) as per EIA Notification dated 14th September, 2006 and its subsequent amendments made in 2015		
3	Project Proponent	M/s Punahchakran Private Limited		
4	Brief description of nature of the project	Biomedical waste is generated from all healthcare institutions; nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks etc. A Common Bio-medical Waste Treatment Facility is a set up where bio-medical waste, generated from a number of healthcare units, is suitably treated as per the prescribed procedure & norms laid down in the regulation. Proposed project of setting up of the Bio- medical Waste Treatment Facility at Village- Paharpur, Post- Gotha Rasoolpur, Tehsil or District- Deoria.		
5	Proposed plant capacity	Particular	Capacity	Nos.
		Incinerator	250 Kg/hr	1

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		Autoclave	1000 Kg/batch	1
		Shredder	150 Kg/Hr	1
		Chemical Disinfection Tank	1500 Liter	1
		Effluent Treatment Plant	10 KLD	1
6	Total plot area	3601 Square Meter (0.88Acre)		
7	Location	Plot No. E-25 and E-26, UPSIDC Industrial Area, Babrala, District Sambhal, UP Site is located at 28°16'38.95"N, 78°26'0.02"E		
8	Water Requirement	Water requirement for the proposed CBWTF project is 9 KLD (Industrial – 8.0KLD & Domestic- 1.0KLD).		
9	Source of water	Bore wells.		
10	Wastewater	Waste water will be generated during incineration, autoclaving of Biomedical waste and floors washing, Vehicle washing. The quantity will be about 7.0 KLD it will be treated in effluent treatment plant and 0.8 KLD Domestic effluent will be treated by septic tank and treated water will be recycle in process and Vehicle washing some portion of treated water will be used as irrigation in Horticultutre.		
11	Man Power	During Construction phase, the labors and workers will be hired from nearby villages. Total 38 persons are proposed to be hired for plant operation including officers, skilled and unskilled workers.		
12	Electricity/ Power requirement	<ul style="list-style-type: none"> • DG set of 32 KVA#2, 10KVA#1 is proposed for the project. • Power Supply form U.P. Power Corporation will also be taken. 		
13	Total Project Cost (Rs.)	281.25 Lakh		

Project Site and Surrounding/Environmental Sensitivity

1	Location of Project	UPSIDC Industrial Area
	District	Sambhal
	State	Uttar Pradesh
	Latitude	28°16'38.95"N
	Longitude	78°26'0.02"E
	Elevation	181 m
2	Nearest Railway station	Babrala Railway Station: 3.19 Km (SW) Bhakrauli Railway Station: 4.01 Km (NE)

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3	National Highway	NH93: 0.38 Km (N) SH 18: 3.72 Km (S)
4	Nearest Airport	Jewar Noida International Airport: 85 Km (W)
5	Tourist Places	Nil (Within 10 km of study area)
6	Archaeological important places	Nil (Within 10 km of study area)
7	Areas which are important or sensitive for ecological reasons	Nil (Within 10 km of study area)
8	Reserved Forest	Nil (Within 10 km of study area)
9	Nearest Major City/Town	Babrala: 3.01 Km (SW)
10	Villages within 2km radius surrounding the project	Village Panwari: 0.48 Km (S)
11	Nearest River	Ganga River: 7.81 Km (W) Bardman River: 1.05 Km (W)
12	Settlements in 500 meter radius of proposed project	Ware House FCI: 0.20 Km (N) Fire Station: 0.33 Km (N) Petrol Pump Indian Oil: 0.38 (NW) Village Panwari: 0.48 Km (S)
13	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Hospitals: <ul style="list-style-type: none"> Government Hospital, Gawan: 17.30 km (NW) Vidya ram hospital chadoshi road Babrala Sambhal: 2.36 Km (SW) School/College: <ul style="list-style-type: none"> Shri Sai Convent School Rajpura Road Babrala: 0.91 Km (NW) Primary School Kail: 1.74 Km (NE) Temple: <ul style="list-style-type: none"> Shiv Mandir: 0.70 Km (W) Chamunda Devi Mandir: 2.37 Km (SE)
14	Soil Type	Sandy Loam
15	Seismic Zone	Seismic Zone-IV



11.2 PROJECT PROCESS

The Bio-Medical Waste generated in the health care units has to follow a specified path from source of its generation to its final disposal at the facility in accordance with the Bio- Medical Waste (Management & Handling) Rules, 2016 and standards prescribed by the Pollution Control Authorities. The process of BMW Management involves.

- 1- Waste Acceptance
- 2- Collection and Transportation
- 3- Waste Storage
- 4- Treatment
 - Incineration
 - Autoclaving
 - Shredding
- 5- Final Disposal

Complete process of Bio-Medical Waste Collection, Transportation, Storage, Treatment and final disposal are displayed in Figure no 11.1.

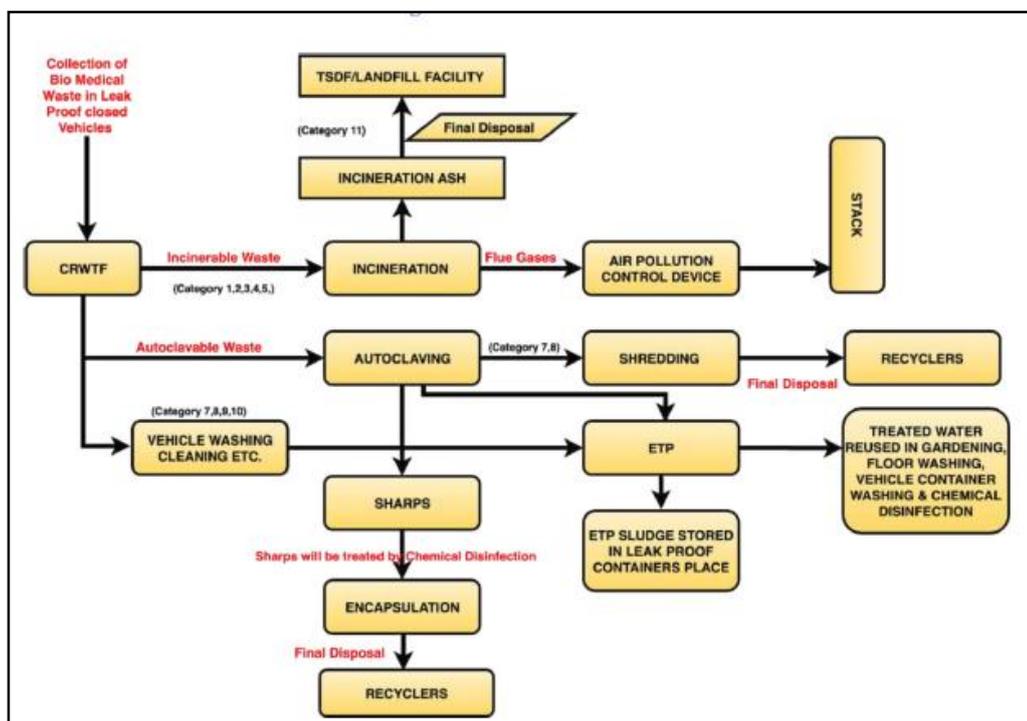


Figure 2.14: Process flow diagram

11.3 Description of the Environment

Summary of the Environmental monitoring undertaken at different locations during post - monsoon Season (October – December 2021) are given below for various parameters:

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The baseline status collated from analysis of primary and secondary data is summarized in **Table-11.1.**

Table-11.1: Baseline Status Collected from Analysis of Primary and Secondary Data

Parameter	Location	Results	Standards
Ambient Air Quality	8 Location	PM2.5 : 41.14 – 80.44 µg/m ³ PM10: 80.15 – 127.91 µg/m ³ SOx : 10.32 – 18.68 µg/m ³ NOx : 23.04 – 33.83 µg/m ³ CO:	PM2.5 : 60 µg/m ³ PM10 : 100 µg/m ³ SOx : 80 µg/m ³ NOx : 80 µg/m ³
Noise Levels	8 Location	The day equivalents during the study period are ranging between 47.9 to 67.4 dB (A). Whereas the night equivalents were in the range of 37.2 to 58.7 dB (A).	
Water Quality	Ground Water: 8 Location	pH : 6.98 to 7.2 TDS : 433 to 791.0 mg/l TH : 172.0 to 264.0 mg/l	pH: 6.5 to 8.5 2000 mg/l
	2 Location	pH : 6.98 to 7.82 TDS : 128 to 152 mg/l Cl : 72.4 to 152.63 mg/l	
Soil Quality	8 location	pH: 6.87 to 8.13 K: 109.92 to 246 mg/kg Na: 106.36 to 302.31 mg/kg Ca: 3601.33 to 4794.92 mg/kg Mg: 465.41 to 836.14 mg/kg	
Biological Environment	The regions are covered by indigenous floral species. Common animals and birds are predominant in the area. There is no rare or endangered species were found. The project site is devoid of any nesting or breeding ground. Impact on flora and fauna has been assessed to be insignificant.		
Socio-economic	The area is predominantly residential and the only positive impacts were assessed due to this project.		

11.4 Environmental Impacts and Mitigation Measures

Impacts:

- Impact of the project during construction phase, operation phase has been predicted.
- Impact in air due to the construction and operation stages of the project were predicted quantitatively using models such as AERMOD for air dispersion calculations.
- Impact on ground water and noise level has been predicted.
- It is summed up that the impacts are minimum and temporary in nature

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Mitigation Measures:

Air Pollution

- During the construction phase, operation of construction equipment and vehicles will be the main sources of pollution. A dust control plan will be implemented and regular maintenance of vehicles and equipment will be carried out.
- During the operation phase, emissions from Incinerator and emissions due to vehicular movement. Adequate mitigation measures shall be implemented.

Noise Pollution

- During the construction phase, the ambient noise level is low in the project site. There will be no major noise generating activity in the project. As the nearest habitation is more than 1km from the project site, no significant impact is envisaged during construction phase of the project.
- During the operation phase, Major source of noise generation is from the operation of shredder. It is estimated that the shredder may generate about 80 dB(A) noise during shredding if the shredder is in open condition. To mitigate the noise generated from the shredder it will be kept on a rubber base. The cover of the shredder hopper will have rubber capping around so as to seal the hopper top and the cover.

Water Pollution

- During the construction phase, water from tanker shall be used so there will be no impact on Ground Water. The vehicle washing area will have concrete flooring with tiles, proper drainage channel that connects to the ETP. Proper toilet facility will be provided for the workers.
- During operation phase, Ground water quality may be impacted due to leaching of medical waste from the stores and operation areas. Water may flow in the operation areas and store areas during operation and storage, and flow to the open area, percolate to the ground and contaminate the ground water and also the surrounding areas. Ground water contamination is also likely to occur due to leaching of oil and other lubricant storage areas. Waste water from vehicle washing may also leach to ground water and contaminate the ground water. To mitigate all these impacts All oil, lubricants and waste oils will be stored in impermeable containers and the containers will be kept on the concrete flooring/ tarpaulin sheets. The vehicle washing area will

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have concrete flooring with tiles, proper drainage channel that connects to the ETP. Proper toilet facility will be provided for the workers.

Ecology

No Significant impact of Ecology and Biodiversity has been assessed as there is no tree cutting involved in the project and no nesting and breeding ground were found.

Socio Economic Environment

- The proposed project will lead to employment generation and will have a positive impact on the socio economic environment. Preference to local population shall be given and adequate mitigation measures will be ensured to reduce odor emissions and disease vectors from proposed site. No R & R plan is applicable.

11.5 Environment Monitoring Plan

Environmental monitoring plan has been formed as a part of the EIA report to ensure that there is no vulnerable change in the environmental parameters due to the project and the proposed Management Plan is being implemented.

11.5.1 Additional Studies

Various risk and hazard parameters were analyzed in the study.

Table-11.2 : Various risk and hazard parameters

S. No.	Name of plant	Hazardous Process and Operation	Materials in the process / operation with their Quantity	Name Of The Vessel and Its Location	Operating Parameters	Type of Hazards Possible	Control Measures Provided
1.	Incineration plant	Incineration	Yellow category waste	Primary chamber and secondary chamber , Incineration area	Temperature 85°C – primary chamber And 1050°C – secondary chamber	Fire, Explosion, Burn	1] Fully Automatic 2] Emergency Local Stop 3] Fire Extinguisher (CO ₂) 4] PPE 5]Emergency Provision for Fire Brigade from outside source.

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Project: Common Bio Medical Waste Treatment Facility (CBWTF) at Plot No. E-25 and E-26, UPSIDC Industrial Area, Bahraich, District – Sambhal, Uttar Pradesh		
Applicant : M/s Punahchakran Private Limited	Final EIA/EMP Report	

2.	Auto-clave	Sterilization	Red Category Waste	Autoclave	Temp. around 135°C & 2.2Kg/cm ² pressure	Fire, Health Hazard	1] Fully automatic Computer based Automation 2] Emergency Local Stop 3] PPE
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11.6 Project Benefits

Though this project is a small capacity project, it is expected that about 38 workers will be employed during operation of the project. The project is estimated to incur cost of 281.25 lakhs (estimated cost of the project may finally vary till completion of the project). Two percent of the project cost will be spent as a part of corporate environment responsibility, which is part of EMP as per OM dated 2018 by MoEF&CC.

11.7 Environment Management Plan

The project proponent will be responsible for implementing the Environmental Management Plan. For the effective implementation of the EMP, an Environmental Management System (EMS) will be established at the proposed project. The EMS will include the following:-

- An Environmental Management cell
- Environmental Monitoring Program
- Personnel Training
- Regular Environmental Audits and Corrective Action
- Documentation – Standard operating procedures Environmental Management Plans and other records.

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